The Center for Nanotechnology in Society
ARIZONA STATE UNIVERSITY

The Center for Nanotechnology in Society at Arizona State University

NSF #0937591 September 1, 2012 – August 31, 2013

PI: David H. Guston, *Arizona State University*

Co-PIs: Elizabeth Corley, *Arizona State University*
Deirdre Meldrum, *Arizona State University*
Clark Miller, *Arizona State University*
Dietram Scheufele, *University of Wisconsin, Madison*
Jan Youtie, *Georgia Institute of Technology*

Annual Report for the Period
September 1, 2012 to August 31, 2013

This report includes work conducted at three collaborating universities of NSEC/CNS-ASU: Arizona State University, Georgia Institute of Technology, and the University of Wisconsin-Madison.

2. Table of Contents

(2. Table of Contents continued)

Tables

3. Project Summary

The Nanoscale Science and Engineering Center/Center for Nanotechnology in Society at Arizona State University (NSEC/CNS-ASU) combines research, training, and engagement to develop a new approach to governing emerging nanotechnologies. CNS-ASU uses the research methods of "real-time technology assessment" to enable a strategic vision of anticipatory governance through enhanced foresight capabilities, engagement with lay publics, and integration of social science and humanistic work with nanoscale science and engineering research and education.

CNS-ASU has two types of integrated research programs, as well as educational and outreach activities (themselves well-integrated with research). Its real-time technology assessment programs are: RTTA 1, Research and Innovation Systems Assessment, which uses bibliometric and patent analyses to understand the evolving dynamics of the NSE enterprise; RTTA 2, Public Opinion and Values, which uses surveys and quasi-experimental media studies to understand changing public and scientists' perspectives on NSE; RTTA 3, Anticipation and Deliberation, which uses scenario development and other techniques to foster deliberation on plausible NSE applications; and RTTA 4, Reflexivity and Integration, which uses participant-observation and other techniques to assess the Center's influence on reflexivity among NSE collaborators. Second, the thematic research clusters (TRCs), which pursue fundamental knowledge and create linkages across the RTTAs, are: TRC 1, Equity, Equality and Responsibility; and TRC 2, Urban Design, Materials, and the Built Environment ("Nano and the City").

The Center's major conceptual-level achievement has been validating anticipatory governance as a richly generative strategic vision. Its major operations-level achievements include: 1) demonstrating capacities for foresight, engagement, and integration that constitute anticipatory governance; 2) completing the "end-to-end" activities by linking multiple RTTA capacities for (the earlier) TRC 2 to create novel insights in a study of nanotechnology and the brain and for TRC 1 to create novel insights into equity and nanotechnology; 3) deepening the integration of NSE researchers into CNS-ASU; and 4) building collaborations for informal science education (ISE) on the societal aspects of NSE. Programmatic achievements in the reporting year include: revising an internationally adopted definition of nanotechnology and assembling a large study panel of nano firms; conducting polls of national public opinion poll and of leading nano-scientists; piloting a new type of future-oriented deliberation; demonstrating that interactions between NSE researchers and social scientists can generate more reflexive decisions; conducting new field research on NSE and equity; and delineating some challenges and approaches to nanotechnology innovation in the context of urban sustainability.

The Center's principal **intellectual merit** derives from the large-scale, interdisciplinary ensemble that underpins it. The ability to generate creative scholarship, embrace and facilitate interactions among disparate approaches to understanding nanotechnologies, and build complementary capacities to tap that knowledge for governance, is the critical intellectual contribution to which CNS-ASU aspires. The Center's work has a substantial impact on scholarship, not only in terms of publications and citations but also through hosting international visitors. For **broader impact**, the Center has coupled research, education, and outreach activities exceptionally well by training significant numbers of new scholars from the social sciences and NSE, incorporating forefront research into a new winter school for early career scholars, new courses and ISE opportunities, and returning lessons learned and techniques developed for outreach back to the classroom. The Center has broadened the participation of under-represented groups by cultivating junior scholarship and raising issues of equity, gender, and disability as objects of programmatic study. The Center has enhanced the infrastructure for research and education by organizing community-defining conferences, producing community-defining sources of knowledge, serving as an international hub for dozens of scholars, sharing data and instruments widely, and disseminating its results aggressively to its academic peers as well as to public, scientific, industry, and policy audiences through traditional means and increasingly through new media.

4. List of Center Participants, Advisory Boards, and Participating Institutions

4. (a) LIST OF CENTER PARTICIPANTS

Participants receiving Center support:

ASU

Braden Allenby	**Professor**	**Civil & Environmental Engineering**
Moshe Apelas	Associate Professor	Engineering Computer Science
Andrew Askland	Director	Center for Law, Science & Innovation
Denise Baker	**Faculty Associate**	**Social & Behavioral Sciences**
Daniel Barben	Assistant Research Professor	Consort. for Science, Policy & Outcomes
George Basile	**Executive Director**	**Decision Theatre for a Desert City**
Ira Bennett	**Assistant Research Professor**	**Consort. for Science, Policy & Outcomes**
Philip Bernick	Assistant Professor	English
Christopher Boone	Professor	Human Evolution & Social Change
Prasad Boradkar	**Associate Professor**	**Architecture & Landscape Architecture**
Katja Brundiers	Academic Associate	Global Institute of Sustainability
Harvey Bryan	**Professor**	**Architecture & Landscape Architecture**
Marilyn P. Carlson	Professor	Mathematics & Statistics
Matthew Chew	Faculty Associate	Global Institute of Sustainability
Nalini Chhetri	**Lecturer**	**Global Institute of Sustainability**
Netra Chhetri	**Assistant Professor**	**Consort. for Science, Policy & Outcomes**
David Conz	**Lecturer**	**Letters & Sciences**
Elizabeth Corley	**Associate Professor**	**Public Affairs**
Kevin Corley	Assistant Professor	Management
Kurt Creager	Executive Director	Stardust Center
Peter Crozier	**Professor**	**Engineering of Matter, Transport & Energy**
Sandwip Dey	Professor	Engineering
Rodolfo Diaz	Professor	Electrical Engineering
Chris Diehnelt	Assistant Research Professor	Biodesign Institute
Gary Dirks	**Director**	**LightWorks**
Thomas Duening	Director	Entrepreneurial Programs
Terrie Lee Ekin	Director	CLAS Research Administration
Karin Ellison	**Associate Director**	**Biology & Society**
James Elser	**Regents' Professor**	**Life Sciences**
Scott Endsley	Vice President	System Design for Quality Improvement
Sandy Epstein	Sr. Mgr. Strategic Bus. Dev.	Decision Theatre
Timothy Eschrich	Process Engrg. Manager	Ctr. for Solid State Electronics Research
Mahmud Farooque	**Associate Director**	**Consort. for Science, Policy & Outcomes**
Tricia Farwell	Professor	Journalism & Mass Communication
Adelheid Fischer	**Staff**	**Innovation Space**
Erik Fisher	**Assistant Professor**	**Political Science**
Matthew Fraser	**Associate Professor**	**Global Institute of Sustainability**
Sylvain Gallais	**Clinical Professor**	**Languages & Cultures**
Joel Garreau	**Lincoln Professor of Law**	**Law**
Alexandra Gino	**Faculty Associate**	**Consort. for Science, Policy & Outcomes**
Jay Golden	Assistant Professor	Global Institute of Sustainability
Aaron Golub	**Assistant Professor**	**Geographical Sciences & Urban Planning**
Deborah Gonzalez	**Chief Academic Officer**	**University Public Schools**
Stephen Goodnick	**Professor**	**Electrical Engineering**

Gisela Grant	Internship Coordinator	Politics & Global Studies
Subhro Guhathakurta	Professor	Geographical Sciences & Urban Planning
Devens Gust	Professor	Chemistry & Biochemistry
David H. Guston	**Professor**	**Political Science**
Ed Hackett	**Professor**	**Human Evolution & Social Change**
Rolf Halden	**Associate Professor**	**Biodesign Institute**
Jiping He	Professor	Bioengineering
Renata Hejduk	**Associate Professor**	**Architecture & Landscape Architecture**
Stephen Helms Tillery	**Assistant Professor**	**Bioengineering**
Mark Henderson	Professor	Engineering
Kirsten Hendrickson	Lecturer	Chemistry & Biochemistry
Joseph Herkert	**Lincoln Associate Professor**	**Humanities & Arts**
James Hershauer	Professor	Management
William Heywood	**Assistant Clinical Professor**	**Design**
Lori Hidinger	**Managing Director**	**Consort. for Science, Policy & Outcomes**
Chong Ho Yu	**Systems Analysis**	**ALTI Research & Outreach**
Kiril Hristovski	**Assistant Professor**	**Technology & Innovation**
Ben Hurlbut	**Assistant Professor**	**Life Sciences**
Mary Ingram-Water	Lecturer	Barrett Honors College
Marco Janssen	**Associate Professor**	**Ctr. for Study of Institutional Diversity**
John Johnson	Emeritus Professor	Social Transformation
Paul Johnson	**Dean**	**Engineering**
Erik Johnston	**Assistant Professor**	**Public Affairs**
Stephen Johnston	Professor	Biodesign Institute
Kamil Kaloush	Associate Professor	Sustainable Engrg. & Built Environment
Sayfe Kiaie	Associate Dean	Engineering
Yushkim Kim	Assistant Professor	Public Affairs
William Kimbel	Virginia M. Ullman Professor	Human Evolution & Social Change
Gordon Knox	**Director**	**University Art Museum**
Anatoli Korkin	Director	Research & Economic Affairs
Joseph Kullman	**Sr. Media Relations Officer**	**FSE Marketing & Public Affairs**
Timothy Lant	Assistant Research Professor	Decision Theatre for a Desert **City**
Karen Leong	Associate Professor	Social Transformation
Nancy Levinson	Director	Design
Rachel Levinson	Indus. & Gov. Rel. Liaison	Research & Economic Affairs
Merlyna Lim	**Assistant Professor**	**Consort. for Science, Policy & Outcomes**
Mary Laura Lind	**Assistant Professor**	**Engineering of Matter, Transport & Energy**
Stuart Lindsay	**Regents' Professor**	**Biodesign Institute**
Jose Lobo	**Associate Professor**	**Global Institute of Sustainability**
George Maracas	Research Professor	Electrical Engineering & Sustainability
Gary Marchant	**Lincoln Professor of Law**	**Law**
Joan McGregor	Professor	Philosophy
Chad McAllister	Staff	Chemistry & Biochemistry
Michael Mehaffy	Faculty Associate	Geographical Sciences & Urban Planning
Jeri Meeks	Bus. Operations Manager Sr.	OKED Finance
Kostalena Michelaki	Associate Professor	Human Evolution & Social Change
Clark A. Miller	**Associate Professor**	**Political Science**
Tom Moore	Professor	Chemistry & Biochemistry
Torin Monahan	Assistant Professor	Justice & Social Inquiry
Dan O'Neill	Lecturer & Director	Technology & Innovation
Scott Muir	**Administrator & Librarian**	**Library Downtown**

Alan Nelson	Director	Biodesign Institute
Robert Ott	**Associate Director**	**Occupational Health & Safety**
Robert Pahle	Assistant Research Professor	Decision Theatre for a Desert City
Mary Jane Parmentier	**Senior Lecturer**	**Letters & Sciences**
Darren Petrucci	**Professor**	**Architecture & Landscape Architecture**
Patrick Phelan	**Professor**	**Engineering of Matter, Transport & Energy**
Rhonda Phillips	**Professor**	**Community Resources/Development**
S. Thomas Picraux	Professor	Materials Research
Kenneth Polasko	**VP Business Development**	**AZ Technology Enterprises**
Jonathan Posner	**Assistant Professor**	**Mechanical & Aerospace Engineering**
George Poste	Chief Scientist	Complex Adaptive Systems Initiative
Paul Privateer	Associate Professor	Film & Media Studies
B. Ramakrishna	Associate Professor	Materials
Kelly Rawlings	**Assistant Research Professor**	**Public Affairs**
Charles Redman	Director	Global Institute of Sustainability
Barry Ritchie	Professor	Physics
Bruce Rittman	**Regents' Professor**	**Biodesign Institute**
Jason S. Robert	Associate Professor	Life Sciences
Ariel Rodriguez	Assistant Professor	Community Resources/Development
Aaron Rothman	Specialist	Phoenix Urban Research Laboratory
Mark Ryan	Adjunct Professor	Design
Carlo Sammarco	Professor	FabLab
Hava Samuelson	Professor	Jewish Studies
Daniel R. Sarewitz	**Professor**	**Science & Society**
Anne Schneider	Professor	Justice & Social Inquiry
Dawn Schwenke	Research Professor	Health Management & Policy
Kimberly Scott	Associate Professor	Social Transformation
Thomas Seager	**Associate Professor**	**Sustainable Engrg. & Built Environment**
Cynthia Selin	**Assistant Professor**	**Global Institute of Sustainability**
Don Seo	Associate Professor	Chemistry & Biochemistry
RF (Rick) Shangraw	President	ASU Foundation
Michael Sullivan	Director	Hispanic Research Center
Emily Talen	Professor	Geographical Sciences & Urban Planning
Colin Tetreault	Faculty Associate	Global Institute of Sustainability
Trevor Thornton	Professor	Electrical, Computer, & Energy Engineering
Michael Tracy	Director	Center for Cancer Research
Sander van der Leeuw	**Dean and Professor**	**Sustainability/Human Evol. & Soc. Change**
Warren Van Egmond	**Adjunct Faculty**	**Mathematics**
Steven VanGinkel	Assistant Research Scientist	Environmental Biotechnology
Wim Vermass	**Professor**	**School of Life Sciences**
Myla Vicenti Carpio	Assistant Professor	American Indian Studies
Ajay Vinze	Professor	WPC Information Systems
Qiangbin Wang	Professor	Biodesign Institute
Xiao Wang	Assistant Professor	Biomedical Engineering
Paul Westerhoff	**Professor**	**Sustainable Engrg. & Built Environment**
Jameson M. Wetmore	**Professor**	**Human Evolution & Social Change**
Roxanne Wheelock	Web Administrator	International Languages & Cultures
Philip White	Professor	Industrial Design
Arnim Wiek	**Assistant Professor**	**Global Institute of Sustainability**
Joann Williams	**Research Professor**	**Chemistry & Biochemistry**
Neal Woodbury	**Professor**	**Chemistry & Biochemistry**

Chong Yu	Systems Analyst Principle	ALTI Research & Outreach
Gregg Zachary	**Professor**	**Consort. for Science, Policy & Outcomes**
Frederick Zenhausern	Professor	Biodesign Institute

Collaborators

Wendoly Abrego	**Sust. Communities Prog. Mgr.**	**Phoenix Revitalization Corporation**
Jessica Adamick	InterNano Project Mgr.	National Nanomanufacturing Network
Greg Adamson	**Honorary Fellow**	**University of Melbourne**
Perry Allen	**Teacher**	**Arizona School for the Arts**
Roger Angel	Univ. of AZ, Regents' Prof.	Astronomy
Richard Applebaum	Univ. of California, Berkeley	Global & International Studies
Simone Arnaldi	University of Padua	CIGA
Peter Asaro	Rutgers, Assistant Professor	Philosophy
Geri Augusto	Brown University	Public Policy
Davis Baird	Clark University	Academic Affairs
Shawn Barcelona	Univ. of California, Berkeley	Center for Nanotechnology in Society
Ardeth Barnhart	Univ. of AZ, Co-Director	AZ Research Institute for Solar Energy
Indrani Barpujari	The Energy & Resources Inst.	Science and Technology
Rob Barnett	**Dir. of Envir. Systems**	**PING Inc.**
Deborah Bassett	Univ. of WA, Dir Social Stud.	Workforce Development
Ottavia Bassetti	Board Member	The Bassetti Foundation
Rebecca Bates	AAAS Sci. & Tech Pol Fellow	National Science Foundation
Shawn Beckman	**Sr. V.P. Market. & Strategy**	**SDC Materials**
Larry Bell	**Sr. V.P. Strategic Initiatives**	**Museum of Science**
Michael Bennett	Professor, Law	Northeastern University
Frazier Benya	Natl. Acad. Engin.,Prog. Offc.	Engineering, Ethics, & Society
Kavita Berger	AAAS, Project Director	Science, Technology & Security Policy
Robby Berloznik	Director	Flemish Institute Society & Technology
Andrew R. Binder	NC State Univ., Asst. Prof.	Communication
David Bjornstad	UT Battelle	Environmental Sciences
Regina Blakely	**Instructional Designer**	**Regina Blakely Consulting**
John Bobalek	Dept. of Treasury, Prog. Mgr.	Bureau of Engraving & Printing
Larry Bock	Chairman	Luxe Ventures
Jason Boehm	Director, Prog. Coord. Offc.	Natl. Inst. of Standards & Technology
Marianne Boenink	Univ. of Twente, Lecturer	Philosophy
Cathy Boggs	Cal., Santa Barbara, Dir. Ed.	Center for Nanotechnology in Society
Greg Book	Georgia Tech, Asst. Dir.	Nanotechnology Research Center
Valerie Bonham	Executive Director	Pres. Comm. for Study of Bioethical Issues
Line Bonneau	Said Bus. School, Res. Fellow	Science, Innovation and Society
Jason Borenstein	Georgia Tech, Professor	Graduate Research Ethics Program
Chris Bosso	**Northeastern University**	**Public Policy and Urban Affairs**
Ann Bostrom	University of Washington	Public Affairs
Daryl Boudreaux	President	Boudreaux and Associates
Robert Bowman	Queens Univ. Belfast, Dir.	Center for Nanostructured Media
Kevin Boyack	President	SciTech Strategies, Inc.
Timothy Boyd	**Teacher**	**Bioscience High School**
Barry Bozeman	**Georgia, Professor**	**Public Administration & Policy**
Suzanne Brainard	Univ. of Washington, Ex. Dir.	Center for Workforce Development
Donald Braman	George Washington, Prof.	Law
Philip Brey	**Department Chair/Professor**	**University of Twente**
Susan Brienza	**Shareholder**	**Ryley, Carlock & Applewhite Attorneys**

Sage Briggs	Cal.-Santa Barbara, Fin. An.	Physics
Dominique Brossard	**Wisconsin, Professor**	**Journalism & Mass Communication**
Simone Browne	Texas-Austin, Asst. Prof.	Sociology
Will Bruder	**President**	**Will Bruder & Partners Ltd.**
Karl Bryant	Cal., Santa Barbara, Asst. Pr.	Sociology and Women's Studies
Jill Buschbacher	City of Phoenix, Proj. Mgr.	Community & Economic Development
Francesco Calabrese	Advisory Research	MIT SENSEable City Lab
Brian Calaway	**Program Director**	**Odysee of the Mind**
Jane Calvert	**Edinburgh, Academic Fellow**	**Social & Political Science**
Heather Canary	University of Utah, Asst. Prof.	Communication
Thomas Chermack	Colorado, Asst. Professor	Organizational Performance & Change
Parag Chitnis	NSF, Deputy Div. Director	Molecular & Cellular Biosciences
Michael Chorost	Author	
Jennifer Cleary	Rutgers, Sr. Project Mgr.	Planning & Public Policy
Michael D. Cobb	**NCSU, Associate Professor**	**Political Science**
Mary Beth Cochran	**Education Services Coord.**	**Arizona Science Center**
Christopher Coenen	Scientific Staff	Karlsruhe Institute of Technology
Sarah Cohn	**Evaluation & Research Mgr.**	**Science Museum of Minnesota**
Susan Coller-Monarez	Sr. Sci. Adv., Sci. & Tech. Dir.	U.S. Dept. of Homeland Security
Napier Collyns	Co-Founder	Global Business Network
Joseph Conti	**Wisconsin-Madison, Prof.**	**Sociology and Law**
Craig Cormick	Australian Gov., Manger	Department of Innovation
Kevin Costa	Administrative Director	Synthetic Biology Engineering Research Ctr.
Susan Cozzens	**Georgia Tech, Asst. Dean**	**Public Policy**
Kurt Creager	President & CEO	Urbanist Solutions
Wendy C. Crone	Wisconsin, Professor	Engineering Physics
Edward Cupoli	**Chief Economist**	**SEMATECH**
Sari Custer	Sr. Mgr. Guest Experience	Arizona Science Center
Michael Dahlstrom	Iowa State Univ., Asst. Prof.	Greenlee School of Journalism & Comm.
Dorothy Dankel	Bergen, Researcher	Center for Study of Sciences & Humanities
Marian Deblonde	Antwerp, Researcher	Environment & Sustainable Development
Bruna De Marchi	Bergen , Guest Researcher	Sciences & the Humanities
Peter deLeon	**Colorado, Denver, Professor**	**Public Affairs**
Jeff Desroches	**Bus. Development Manager**	**ATMI, Inc.**
Terry Devitt	Wisconsin, Science Writer	Science & Technology
Ricardo Dominguez	Calif., San Diego, Assoc. Prof.	Visual Arts
Robin Downey	**Genomics & Society Advisor**	**Genome British Columbia**
Fanie Duvenghuge	Manager	Microchip
Jake Dunagan	**Research Director**	**Institute for the Future**
Sharon Dunwoody	Wisconsin, Professor	Journalism & Mass Communication
Kevin Dwyer	Sundt Construction, Inc.	Senior Paralegal
Kathleen Eggleson	**Notre Dame, Res. Scientist**	**Science & Technology**
Ken Eklund	Serious Game Designer	Game Designer
Shirin Elahi	Scenario Architect	Complex Global Risks
Kirsten Ellenbogen	**Sr. Dir. Lifelong Learning**	**Science Museum of Minnesota**
Kevin Elliott	South Carolina, Assoc. Prof.	Philosophy
Jose Faria	Unicamp, Professor	Medicine
Elizabeth Farrell	New Hampshire, Coord.	Culture & Sustainability, Food & Society
James Faubion	Rice, Professor	Anthropology
Art Felsinger	**Independent Professional**	
Ulrike Felt	Univ. of Vienna, Professor	Social Studies of Science

Patrick Feng	Assistant Professor	University of Calgary
A. Fernandez-Ribas	Georgia Tech	Public Policy
Aaron Fichtner	Rutgers, Director	Research & Evaluation
Ulrich Fiedeler	Austrian Academy of Science	Institute of Technology Assessment
Guillermo Foladori	Universidad de Zacatecas	Nanotechnology
Torsten Fleischer	**Deputy Head of Research**	**Karlsruhe Institute of Technology**
Guillermo Foladori	Universidad de Zacatecas	Nanotechnology
John Fortner	Wash. Univ, Asst. Professor	Engineering
Sharon Friedman	Lehigh University, Professor	Journalism & Communication
Emma Frow	Edinburgh, Res. Fellow	ESRC Genomics Forum
Teresa Fryberger	NASA, Associate Director	Earth Science Division, Applied Science Prog.
Silvio Funtowicz	European Commission	Protection & Security of the Citizen
Joan Fujimura	Wisconsin, Professor	Sociology
Wayne Fuqua	Western Michigan, Professor	Psychology
Jason Gallo	**Researcher**	**Science and Technology Institute**
Stefan Gammel	Researcher	Technical University of Darmstadt
Veronica Garcia Luis	**Research Associate**	**Exploratorium**
Hans Glimell	Gothenburg, Professor	Sociology
Jean Goodwin	Iowa State Univ., Assoc. Prof.	English
Lieve Goorden	Antwerpen, Professor	Millieu & Technologieman
Michael Gorman	**Virginia, Professor**	**Science, Technology and Society**
Melinda Gormley	Notre Dame, Asst. Dir. Res.	Reilly Center
Stuart Graham	Georgia Tech, Professor	Management
Peter Granda	Univ. of Michigan, Asst. Dir.	Political & Social Research
Gisela Grant	Internship Coordinator	Politics & Global Studies
David Grimshaw	Head of International Prog.	Practical Action
Alexei Grinbaum	CEA-Saclay, Researcher	LARSIM Laboratory
Laura Grossenbacher	Wisconsin, Assoc. Professor	Engineering Professional Development
Julia Guivant	Fed. Santa Catarina, Prof.	Sociology & Political Science
William Hallman	**Rutgers, Professor/Chair**	**Human Ecology**
Patrick Hamlett	NCSU, Associate Professor	Science, Technology & Society
Shari Hartshorn	**Program Manager**	**Science Museum of Minnesota**
Birgitte G. Hansen	Copenhagen Business School	Management, Politics and Philosophy
Anders Hanssen	Executive Officer	Research Council of Norway
Keishiro Hara	Osaka, Assoc. Professor	Research Inst. For Sustainability Science
Gary Harris	Howard Univ., Professor	Electrical & Computer Engineering
Jim Harris	Vice President Bus. Develop.	Translational Genomics Research Institute
Barbara Harthorn	California, Santa Barbara	Director, CNS-UCSB
David Hartmann	Western Michigan, Professor	Sociology
Brad Herring	**Mus. of Life Science, Director**	**Nanoscale Informal Science Education**
Paul Hickey	**Systems Administrator**	**Mesa Community College**
Diana Hicks	Georgia Tech, Professor	Public Policy
Stephen Hilgartner	Cornell University, Professor	Science & Technology Studies
Linda Hogle	Wisconsin, Associate Professor	Medical History & Bioethics
Michael Holland	DOE, Sr. Advis. & Staff Dir.	Office of the Under Secretary for Science
Rachelle Hollander	**Executive Director**	**National Academy of Engineering**
Maja Horst	University of Copenhagen	Policy & Philosophy
Leigha Horton	**Presenter**	**Science Museum of Minnesota**
Maurizio Iacopetta	Georgia Tech, Assistant Prof.	Economics
Helen Ingram	California-Irvine, Professor	Planning, Policy, and Design
Noela Invernizzi	**Federal University of Parana**	**Development Studies**

Jennifer Iriye	Guest Exper. Prog. Interpret.	Arizona Science Center
Alan Irwin	Copenhagen Business School	Research
Deborah Jackson	Program Manager, ERC	Prog.National Science Foundation
Sheila Jasanoff	**Harvard University, Professor**	**Science & Technologies Studies**
Mitchell Joachim	Co-Founder	Planetary ONE
Mikael Johansson	Gothenburg Univ., Lecturer	Global Studies
Deborah Johnson	Virginia, Professor	Science, Technology & Society
Marilyn Johnson	**Oregon Mus. Sci. & Industry**	**Science Director**
Travis Johnson	Scientist	Agilent Technologies
Michele Kadnar	Research Fellow	National Institutes of Health
Dan M. Kahan	Yale, Professor	Law
Seth Kahn	Associate Professor, English	West Chester Pennsylvania
Michael Kalichman	Cal., San Diego, Director	Ethics & Science in Technology
Amy Kaminski	NASA, Senior Policy Advisor	Officer of the Chief Scientist
Brad Keelor	Sr. Sci. & Inn. Policy Advisor	British Embassy
Thomas Kelly	New Hampshire, Professor	Office of Sustainability
Denisa Kera	Assistant Professor	National University of Singapore
George Khusf	Univ. South Carolina, Dir.	Center for Bioethics
Matt Kim	**Founder and President**	**QuantTera**
Tammy Kinsey	Toledo, Associate Professor	Film
Kamilla Kjolberg	Bergen, Research Fellow	Study of the Sciences and Humanities
Frederick Klaessig	**Manager**	**Pennsylvania Bio Nano Systems LLC.**
Richard Klavans	**President**	**SciTech Strategies Inc.**
Daniel Kleinman	Wisconsin, Professor	Rural Sociology
Mark Knell	Norwegian Institute	Chemistry
Joan Koerber-Walker	**Pres. & Chief Exec. Officer**	**Arizona Bioindustry Association**
Shinichi Kobayashi	Assistant Professor	Nagoya University
Kornelia Konrad	Univ. of Twente, Asst. Prof.	Science, Technology, & Policy Studies
Margaret Kosal	GA Tech, Asst. Professor	International Strategy, Technology & Policy
Fred Kronz	**Prog. Dir., Sci., Tech. & Soc.**	**National Science Foundation**
Kristen Kulinowki	**Research Staff Member**	**Science & Technology Policy Institute**
Elizabeth K. Kullman	**Sen. Res. & Eval. Associate**	**Museum of Science, Boston**
Ray Kurzweil	Author	
Frank Kusiak	**California-Berkeley**	**Science**
Jennifer Kuzma	**Minnesota, Assoc. Professor**	**Public Affairs**
Astrid Lagreid	**Norwegian Univ. Sci. & Tech.**	**Cancer Research & Molecular Medicine**
Frank Laird	Colorado, Professor	International Studies
Nancy LaPlaca	**Policy Analyst**	**Arizona Corporation Commission**
Lewis Laska	Tenn. State Univ., Professor	Law
Ruth Lee	Director	Research Councils UK
Christopher Lenhardt	UT-Battelle, DAAC Sci. Lead	Oak Ridge National Laboratory
Sam Lipson	Director of Envir. Health	Cambridge Public Health Department
Laurie Locascio	Chief, Biochemical Sci. Div.	Natl. Inst. of Standards & Technology
Stephanie Long	**Mgr., Public Prog. & Science**	**Science Museum of Minnesota**
Michael Loui	Illinois, Urb.-Cham., Prof.	Electrical & Computer Engineering
Brandon Lucas	Mich., NNIN Ed Out. Coord.	Electrical Engineering & Computer Science
Michael Lynch	Cornell, Professor	Science & Technology
Christine MacKay	**Dir. of Economic Develop.**	**Chandler City Government**
Phil Macnaghten	Durham University, Professor	Geography
Roop Mahajan	Virginia Tech, Director	Critical Technology & Applied Science
Farzad Mahootian	**New York Univ., Professor**	**Global Liberal Studies**

Jim Malone	Physician	Private Practice
Mike Manasco	Project Manager	Heliae
William Mansfield	Penn State, Dir. of Operations	NNIN Materials Research Institute
Paul Martin	**Sr. V.P. Science Learning**	**Science Museum of Minnesota**
Christina Matta	Wisconsin, Asst. Fac. Assoc.	Engineering Professional Development
Catherine McCarthy	Project Leader	Science Museum of Minnesota
Heather Mayfield	Deputy Director	London Science Museum
Catherine McCarthy	Project Leader	Science Museum of Minnesota
Katherine McComas	Cornell, Associate Professor	Communication
David McConville	**Director, Noospheric Res.**	**The Elumenati, LLC.**
Robert McGinn	Stanford, Professor	Science, Technology, & Society
Alan McGowan	Eugene Lang, Adjunct. Fac.	New School for Liberal Arts
Sheila McNamee	New Hampshire, Professor	Communication
Celia Merzbacher	Vice President	Semi-Conductor Research Corporation
Robert Melikian	**Author**	
Celia Merzbacher	**Vice President**	**Semi-Conductor Research Corporation**
Pierre Meulien	President and CEO	Genome British Columbia
Evan Michelson	**Senior Research Associate**	**New York University**
Colin Milburn	**Cal.-Davis., Assoc. Professor**	**English and Science & Technology Studies**
Robert J. Milligan	Physician	Physician Services Group
Carl Mitcham	CO School of Mines, Prof.	Liberal Arts & International Studies
Cyrus Mody	Rice University, Asst. Prof.	History
Alison Mohr	Senior Research Fellow	University of Nottingham
Julia A. Moore	Deputy Director	Woodrow Wilson Center
Steven Moore	Texas at Austin, Professor	Architecture & Planning
Jeffery Morris	EPA, Natl. Program Director	Nanotechnology Research Program
Nora Moynihan	**Comm. Partnerships Coord.**	**Port Discovery**
Maj Munch-Andersen	Technical Univ. of Denmark	Senior Scientist, Dept. of Management
Webb Myers	STIP Associate	Intelligent Info. Services Group
Anne I. Myhr	Genøk, Scientist	Center for Biosafety
Kenneth Nealson	Southern California, Prof.	Environmental Studies
Alan Nelson	Director	Biodesign Institute
Richard Nelson	Columbia University, Professor	Economics
Chris Newfield	Cal., Santa Barbara, Prof.	English
Nils Newman	STIP Associate	Intelligent Info. Services Group
Dean Nieusma	Rensselaer Poly. Inst., Prof.	Science & Technology Studies
Alfred Nordmann	Darmstadt Tech. Univ., Prof.	Philosophy
Rune Nydal	Norwegian Univ., Associate	Science & Technology
Eva Olivas	**CEO**	**Phoenix Revitalization Corporation**
Rosemary Ommer	Adjunct Professor	University of Victoria
Rae Ostman	**National Collab., Director**	**Sciencenter**
Richard Owen	University of Exeter, Prof.	Business
Lynn Palacios	**Teacher**	**Bioscience High School**
Krsto Pandza	Leeds Univ., Senior Lecturer	Business
Shobita Parthasarathy	Michigan, Assistant Professor	Public Policy
Tanuja Parulekar	Professor	S.I.W.S. N.R. Swamy College
Scott Patison	**Research & Evaluation Assoc.**	**Oregon Museum of Science & Industry**
Eleonore Pauwels	Research Scholar	Woodrow Wilson Center
Alice Pawley	Assistant Professor	Purdue University
Angela G. Pereira	Eur. Comm., Scientific Offc.	Joint Research Centre
Tim Person	Chief Scientist	U.S. Gov. Accountability Office

Sarah Pfatteicher	Assistant Dean	Wisconsin, Madison
Simon Pfersdorf	Karlsruhe, Researcher	Instit. Tech. Assessment & Sys. Analysis
Mark Philbrick	California-Berkeley	Public Policy
Nicholas Pidgeon	Cardiff University, Professor	Psychology
Roger Pielke, Jr.	Colorado, Professor	Environmental Studies
Cynthia Pillote	**Partner**	**Snell & Wilmer Law**
Sylvia Planer	**Test Engineer**	**Medtronic**
Kenneth Pimple	Indiana, Professor	Religious Studies
Anne Plant	Grp. Ldr., Biochem. Sci. Div.	Natl. Inst. for Standards & Technology
Alan Porter	**Georgia Tech, Professor**	**ISYE & Public Policy**
Susanna Priest	George Mason Univ., Prof.	Communication
R. Queralto Moreno	Univ. of Seville, Professor	Ethics & Political Philosophy
Paul Rabinow	California, Berkeley, Prof.	Social Cultural Anthropology
Margaret Race	Senior Research Scientist	SETI Institute
Ismael Rafols	Sr. Lecturer, Univ. of Sussex	Science & Technology Policy Research
Khan Rahi	Loka Institute, Staff	Community Research Network
Rex Raimond	Sr. Mediator & Prog. Mgr.	Meridian Institute
Sally Randles	Manchester, Sr. Res. Fellow	Manchester Business School
Jerome Ravetz	Said Bus. Sch., Assoc. Fellow	Science, Innovation & Society
Steve Rayner	Said Bus. Sch., Dir. & Prof.	Institute for Science, Innovation & Society
Christine Reich	Assistant Director	Museum of Science
David Rejeski	Director, Sci. & Tech. Inn.	Woodrow Wilson Center
Arie Rip	**Univ. of Twente, Professor**	**Science & Technology Studies**
Jody Roberts	Chem. Her. Found., Asso. Dir.	Center for Contemporary History & Policy
Melanie Roberts	Director	Emerging Leaders in Science & Society
Bob Reuss	Independent Consultant	
Tracy Rexroat	State Sup. Engin./Manufact.	AZ Department of Education
H. Rodriguez Zabaleta	Univ. del Pais Vasco	Automatic Control & Systems Engineering
David Roessner	Associate Director	SRI International
Juan Rogers	**Georgia Tech, Assoc. Prof.**	**Public Policy**
J. Rogers-Brown	Long Island Univ., Asst. Prof.	Sociology & Anthropology
Louise Roman	**Assistant to President**	**Will Bruder & Partners Ltd.**
Kjetil Rommetveit	Univ. of Bergen, Researcher	Centre for Science
Dale Rothman	Denver, Assoc. Prof.	International Futures
Alan Rubel	Greenwall Fellow	Georgetown Univ. Law Ctr.
Daniele Ruggiu	Univ. of Padua, Res. Fellow	CIGA
Chuck Runyan	Head, Patent Prosecution	Gallagher & Kennedy
Tina Sanford	**Educational Researcher**	**SRI International**
Dietram Scheufele	**Wisconsin, Professor**	**Life Sciences Communication**
Erich Schienke	Penn State, Asst. Professor	Science, Technology & Society
Jennifer Schneider	CO Schl. of Mines, Asst. Prof.	Liberal Arts & International Studies
Ronald J. Schott	**Executive Emeritus**	**Arizona Technology Council**
Gerd Scholl	Economist	Inst. for Ecological Economy Research
Ronald J. Schott	Executive Emeritus	Arizona Technology Council
Daan Schuurbiers	**Radboud Univ., Project Mgr.**	**Center for Society & Genomics**
Astrid Schwarz	Univ. of Basel, Assoc. Res.	Science Research
Claudia Schwarz	Univ. of Vienna, Researcher	Social Studies of Science
Dane Scott	Montana, Director	Ethics & Public Affairs
Franz Seifert	Univ. of Vienna, Professor	Anthropology
Stefanie Seitz	**Karlsruhe, Research Fellow**	**Instit. Tech. Assessment & Sys. Analysis**
John Selsky	Univ. South Fl., Assoc. Prof.	Management

Meena Selvakumar	**Director**	**Pacific Science Center**
Chris Sequeira	FAA, Envir. Program Mgr.	Environment & Energy
Philip Shapira	**Georgia Tech, Professor**	**Public Policy**
Mark Shapiro	Ctr for Investigative Journalism	
Gwyneth Shaw	**Writer**	**New Haven Independent**
Bret Shaw	UW-Madison, Asst. Prof.	Life Sciences Communication
Joshua Sheehan	**Sr. Mgr. Guest Experience**	**Arizona Science Center**
Brian Sherman	Managing Dir./VP Bus. Dev.	Arizona Commerce Authority
Tania Shibata	Product Application Manager	BrasEq
Katherine Shilton	Maryland, Assistant Professor	Information Studies
Elena Simakova	University of Exeter, Lecturer	Innovation
David Sittenfeld	**Program Manager, Forum**	**Museum of Science**
Rasmus Slaatelid	Univ. of Bergen, Assoc. Prof.	Sciences and Humanities
Mitchell Small	Carnegie Mellon, Professor	Public Policy
Alex Smith	**Tech. Development Specialist**	**Tempe City Government**
Laurel Smith-Doerr	Program Director	National Science Foundation
James Soudriette	Cert. Mgmt. Consul./Partner	The Galaxy Organization
Ahmad Soueid	**Principal & Sr. Vice Pres.**	**HDR Architecture**
Kayte Spector-Bagdady	Associate Director	Pres. Comm. Study Bioethical Issues
Joe Spencer	Production Manager	ALD NanoSolutions
James Stack	**Senior Switch Tech**	**Cricket Communications**
Tina Stanford	SRI Intl, Educ. Researcher	Center for Learning & Technology
Nicholas Steneck	Michigan, Professor	Research Ethics Program
Karl Stephan	Texas State, Assoc. Professor	Engineering
Jack Stilgoe	**Univ. Exeter, Sr. Res. Fellow**	**Business**
Roger Stout	**Senior Research Scientist**	**ON Semiconductor**
Roger Strand	Bergen, Professor	Science Theory
Deborah Strumsky	**Assistant Professor**	**UNC Charlotte**
Michael Sullivan	Director	Hispanic Research Center
Arho Suominen	**University Teacher**	**University of Turku**
Steve Suppan	Senior Policy Analyst	Inst. Agriculture & Trade Policy
John Sweeney	Envir. Health & Safety Offc.	Harvard
Tsjalling Swiersta	Twente, Professor	Philosophy
Albert Teich	**George Wash., Res. Prof.**	**International Science & Technology Policy**
Frank Theys	Visual Artist and Filmmaker	Savage Film
Brian Thibeault	Project Scientist	California, Santa Barbara
Paul Thompson	Michigan State Univ., Prof.	Philosophy
Joanna Tornow	Office of the Director	National Science Foundation
Julia Trosman	Director	Center for Business Models
Elizabeth Tran	Associate Program Officer	National Science Foundation
Paul Turgeon	Georgia Tech, Proj. Coord.	Nanotechnology Research Center
Jeff Ubois	Archivist	The Bassetti Foundation
Simone Van der Burg	Radboud Univ. Med., Sr. Res.	Scientific Inst. Quality Healthcare
Rinie van Est	Coordinator	Rathenau Institute
Carl Van Horn	Rutgers, Professor	Planning & Public Policy
Harro Van Lente	Utrecht Univ., Assoc. Prof.	Emerging Technologies
Thomas Val Valey	Professor Emeritus	Western Michigan University
Rene Von Schomberg	**Directorate General Research**	**European Commission**
Catherine Vrentas	Mol. Biologist/Sci. Out. Spec.	U.S. Department of Agriculture
Jonce Walker	**Sustainability Manager**	**Maricopa County Assoc. of Governments**
Julie Walker	**Project Manager**	**Windmill Ranch, LLC.**

Jue Wang	Florida Intl., Asst. Prof.	Religious Studies
Stephanie Wang	UT-Battelle, Behavioral Res.	Oak Ridge National Laboratory
Vivian Weil	Illinois Inst. Tech., Prof./Dir.	Ethics / CSEP
Peter Weingart	**University of Bielefeld, Prof.**	**Institute for Science & Technology Studies**
Jianying Wen	Professor	University of Jiangsu, China
Kyle Powys Whyte	**Michigan, Assistant Professor**	**Philosophy**
Fern Wickson	GenØk, Associate Professor	Center for Biosafety
Matthias Wienroth	**Edinburgh, Acad. Res. Fellow**	**Genomics Forum**
Terence Wilkins	University of Leeds, Professor	Inst. of Particle Science & Engineering
James Wilsdon	Director	The Royal Society
David Winickoff	California, Berkeley, Prof.	Bioethics & Society
Gregor Wolbring	Univ. of Calgary, Asst. Prof.	Bioethics, Culture, and Disabilities
Amy Wolfe	UT-Battelle, Group Leader	Environmental Sciences
Edward Woodhouse	Rensselaer Poly. Inst., Prof.	Science & Technology Studies
John Wooding	Massachusetts, Lowell, Prof.	Economic & Social Development
Joan Woolfrey	West Chester, Assoc. Prof.	Philosophy
Michael Xenos	**Wisconsin, Assoc. Professor**	**Communication Arts**
Charyl Yarbrough	Rutgers, Project Director	Workforce Development
Go Yoshizawa	Project Lecturer	Tokyo University
Peter Yeadon	Associate Professor/Architect	RISD/Decker Yeadon LLC
Edward You	Supv. Special Agent	FBI Weapons of Mass Destruction
Paul Youngman	UNC-Charlotte, Assoc. Prof.	Humanities, Technology & Science
Jan Youtie	**Georgia Tech, Sr. Research.**	**Enterprise Innovation Institute**
G. Zenner Petersen	Wisconsin-Madison, Dir. Ed.	Materials Research Science & Engineering
Lee Zwanziger	Designated Federal Official	Food & Drug Administration
Steven Zylstra	**Pres. & Chief Exec. Officer**	**Arizona Technology Council**

ASU
Post-Doctoral Scholars

Troy Benn	Post-doctoral Fellow	Civil & Environmental Engineering
Doe Daughtrey	Post-doctoral Fellow	Religious Studies
Sarah Davies	**Post-doctoral Fellow**	**Center for Nanotechnology in Society**
Matthew Harsh	Post-doctoral Fellow	Center for Nanotechnology in Society
Sean Hays	Post-doctoral Fellow	Consort. for Science, Policy & Outcomes
Daniel Higgins	**Post-doctoral Fellow**	**Center for Nanotechnology in Society**
Punarvasu Joshi	**Post-doctoral Fellow**	**Elect. Comptr. & Energy Engineering**
Braden Kay	**Post-doctoral Fellow**	**Sustainability**
Anastasios Panaretos	Post-doctoral Fellow	Electrical Engineering
Michael Reinsborough	**Post-doctoral Fellow**	**Center for Nanotechnology in Society**
Cathy Slade	Post-doctoral Fellow	Public Policy
Walter Valdivia	**Post-doctoral Fellow**	**Public Administration**
Kathryn Vignone	**Post-doctoral Fellow**	**Center for Nanotechnology in Society**
Berea Williams	Post-doctoral Fellow	Chemistry & Biochemistry

ASU
Graduate Researchers

Dulce Perez Aguilera	Social Justice
Parul Agrawal	Materials Science & Engineering
Rebecca Allen	**Biodesign Institute**
Carlo Altamirano-Allende	**Human and Social Dimensions of S & T**
Judd Anderman	Science & Technology Policy

Caroline Appleton	**Biology & Society**
Ebraheem Azhar	**Electrical Engineering**
Marci Baranski	Biology & Society
Ceyhan Beckham	Electrical Engineering
Michael Bernstein	**Sustainability**
Monamie Bhadra	Human & Social Dimensions of S & T
Shreya Bhattacharyya	Chemistry & Biochemistry
Bradley Brennan	Chemistry & Biochemistry
Jennifer Brian	**Biology & Society**
Michael Burnam-Fink	**Human & Social Dimensions of S & T**
Santhosh Chenna	Engineering of Matter, Transport & Energy
Shannon Conley	**Political Science**
Jessica Corman	**Biology**
William Curran	**Electrical Engineering**
Robert Davis	**Political Science**
Natalie DeGraaf	**Science & Technology Policy**
Shannon DiNapoli	Life Sciences
Ajit Dhamdhere	Nanoscience
Kyle Doudrick	**Sustainable Engineering & Built Envir.**
Justin Flory	Chemistry & Biochemistry
Rider Foley	**Sustainability**
Ariana Fox	Biology
Jinglin Fu	Chemistry & Biochemistry
Gretchen Gano	**Human & Social Dimensions of S & T**
Manuel Garay Valenzuela	Education Leadership & Policy Studies
Aixa Garcia-Mont	Education
Meredith Gartin	Global Health
Sandeep Kaur Gill	Nanoscience
Cecilia Gonzalez	Life Sciences
Cesar Gonzalez Esquer	SOLS Graduate Programs
Annie Hale	**Science & Technology Policy**
Kelly Hale	Anthropology
Dongran Han	Chemistry
Keivon Hobeheidar	Biological Sciences
Qian Hu	Public Affairs
Nate Hisamura	Mathematics
Douglas Huron	**Global Technology Development**
Christoforos Ioannidis	**Philosophy**
Daniela Ivan	English
Taylor Jackson	Biology & Society
Lijing Jiang	Chemistry & Biochemistry
Valerie Johnson	**Design**
Craig Jolley	Biophysics
Tomasz Kalinowski	**Biological Design**
Cameron Keys	**PSM Nanoscience**
Andrew Kao	School of Public Affairs
Risto Karinen	Political Science
Lauren Keeler	**Sustainability**
Eric Kennedy	**Human & Social Dimensions of S & T**
Julia Kerran	**Urban & Environmental Planning**
Ashley Kibel	Physics

Youngjae Kim	**Public Administration**
Mindy Kimball	**Sustainability**
Phani K. Kondapani	Nanoscience
Tim Kostyk	**Human & Social Dimensions of S & T**
Christopher Kuzdas	**Sustainability**
Jason Lappe	Chemistry and Biochemistry
Jonathan Lappen	Geography
William Lepkowski	Chemistry & Biochemistry
Shannon Lidberg	**Human & Social Dimensions of S & T**
Jewel Loree	Science & Technology Policy
Yi Lai Christine Luk	**Human & Social Dimensions of S & T**
Christopher Madden	Chemistry & Biochemistry
Kevin Margeson	Science & Technology Policy
Blakely McConnell	**Art**
John C. McKnight	**Human & Social Dimensions of S & T**
Chris Mercer	Sustainability
Emily Molfino	Political Science
Chad Monfreda	**Human & Social Dimensions of S & T**
Sharlissa Moore	**Human & Social Dimensions of S & T**
Vicki Moore	Chemistry & Biochemistry
Romarie Morales	Applied Mathematics
Jeffrey Moran	Mechanical Engineering
Rebecca Murans	Design
Israel Murguia	Public Administration
Tanya Musgrave	Public Policy
Tracy Niday	Chemistry & Biochemistry
Christina Nulle	Global Technology Development
Jason O'Leary	**Science & Technology Policy**
Azra Panjwani	Mathematics
John Parsi	Political Science
David Proffitt	Urban & Environmental Planning
Caroline Reid	Urban & Environmental Planning
Kiera Reifschneider	**Biochemistry**
Alicia Rodgers	Science & Technology Policy
Laura Rodriguez	Technology & Innovation
Jathan Sadowski	**Applied Ethics**
Kehinde Salau	Mathematics & Statistics
Cyndy Schwartz	Human & Social Dimensions of S & T
Jaswinder Scharma	Biomedicine
Lee Seabrooke	Human & Social Dimensions of S & T
Nisha Sherma	Chemistry
Quinn Spadola	Physics
Lucia Stavig	Justice Studies
Yuri Sylvester	Political Science
Trista Taylor	Public Administration
Justin Tosi	Political Science
Brenda Trinidad	**Human & Social Dimensions of S & T**
Dwarakanath Triplican	**Sustainable Engineering & Built Envir.**
Yusuf Tufail	SOLS Graduate Programs
Oriol Vidal Aparicio	Political Science
Jennifer Watkins	**Chemistry & Biochemistry**

Benjamin Wender		**Civil, Envir., & Sust. Engineering**
Muharrem Yildirim		**Media Arts & Sciences**
Jinglei Zhang		Chemistry & Biochemistry

Affiliated
Post-Doctoral Scholars

Ashley Anderson	**George Mason University**	**Climate Change Communication**
Jason Delborne	**Wisconsin**	**Rural Sociology**
Pierre Delvenne	University of Liege	Political Science
Matthew Eisler	Calfornia, Santa Barbara	Center for Nanotechnology in Society
Arianna Ferrari	Karlsruhe Inst. Technology	Technology Assessment & Systems Analysis
Domingo Ferrer	University of Texas	Microelectronics Research Center
Sonia Gatchair	Georgia Tech	Public Policy
Cecilie Glerup	**Copenhagen Business School**	**Social Responsibility of Science**
Luciano Kay	**Georgia Tech**	**Public Policy**
Sharon Ku	Southern Indiana	Sociology
Padraig Murphy	Dublin City University	Communication
Megan Palmer	Stanford	Synthetic Biology
Laxmi Pant	**Guelph**	**Envir. Design & Rural Develop.**
Debasmita Patra	Cornell	Communication
Ramya Rajagopalan	Wisconsin	Sociology
Christine Shearer	California, Santa Barbara	Social Science
Elena Simakova	Cornell	Science & Technology Studies
Li Tang	**Georgia Tech**	**Public Policy**
Jue Wang	**Georgia Tech**	**Public Policy**

Affiliated Graduate Researchers

Heather Akin	Wisconsin	Life Science Communication
C. Alvial Palavicino	University of Twente	Science, Technology, and Policy Studies
Ashley Anderson	Wisconsin	Life Sciences Communication
Derrick Anderson	Georgia	Public Administration
Sanjay Arora	**Georgia Tech**	**Public Policy**
Ravtosh Bal	Georgia Tech, Georgia State	Public Policy
Andrea Bandelli	Vu University Amsterdam	Communication Sciences
Javiera Barandiaran	California, Berkeley	Environmental Sciences
Amy Barr	New Hampshire	Sociology
Christian Beaudrie	Univ. of British Columbia	Resource Management Envir.Studies
Sean Becker	Univ. of Wisconsin-Madison	Sociology
Noel Benedetti	Wisconsin	Life Sciences Communication
Gaymon Bennett	California, Berkeley	Systematic Theology
Ajay Bhaskarabhatla	Georgia Tech	Public Policy
Sonja Billerbeck	ETH Zurich	Synthetic Biology
Angie Boyce	**Cornell**	**Science & Technology Studies**
Rachel Brockhage	Grove City College	Communication Studies
Ben Brucato	**Rensselaer Polytechnic Inst.**	**Science & Technology Studies**
Michael Cacciatore	**Wisconsin-Madison**	**Life Sciences Communication**
Antonio Calleja-Lopez	University of Seville	Political Science
Stephen Carley	**Georgia Tech**	**Public Policy**
Rafael Castillo	**Georgia Tech**	**Public Policy**
Gong Chao	Dalian Univ. of Technology	Humanities
Doo-Hun Choi	**Wisconsin-Madison**	**Life Sciences Communication**

Mary Collins	California, Santa Barbara	Environmental Science & Management
Rodrigo Cortes-Lobos	**Georgia Tech**	**Public Policy**
Rachel Cranfill	California, Santa Barbara	Linguistics
Yvonne Cuijpers	Utrecht University	Innovation Studies
Chris Cummings	**North Carolina**	**Communication**
Amy Dale	Carnegie Mellon University	Engineering & Public Policy
Kajsa Dalrymple	Wisconsin	Life Sciences Communication
Robert Del Barco	Autonomous Univ. Zacatecas	Development Studies
Ana Delgado	**University of Bergen**	**Sciences and the Humanities**
Julie Dillemuth	California, Santa Barbara	Geography
Larisa Doroshenko	Wisconsin	Communication Arts
Anthony Dudo	**Wisconsin**	**Journalism & Mass Communication**
Roger Eardley-Pryor	California, Santa Barbara	History
Paul Ellwood	Leeds Univ. Business School	Business
Cassandra Engeman	California, Santa Barbara	Social Science
Gina Eosco	Cornell University	Communication
Zumel Espinoza	Autonomous Univ. Zacatecas	Development Studies
Wei Fan	Beijing Institute of Tech.	Management
Steven Flipse	**Technical University of Delft**	**Responsible Innovation**
Jason Gallo	Northwestern	Media, Technology & Society
Reynold Galope	Georgia Tech	Public Policy
John Garner	Georgia Tech	Computing
Matthew Gebbie	California, Santa Barbara	Science and Engineering
Lidan Gao	**Chinese Academy of Sciences**	**Patent Analysis**
Harmeet Ghandi	Georgia Tech	Quantitative & Computational Finance
Cecilie Glerup	Copenhagen Business School	Public Policy
Kyle Gracey	University of Chicago	Public Policy
Ted Greenhalgh	Nevada, Las Vegas	Environmental Studies
Ying Guo	Beijing Institute of Tech.	Management
Shirley Han	California, Santa Barbara	Science & Engineering
Courtney Hanna	Univ. of British Columbia	Integrated Sciences
Shannon Hanna	California, Santa Barbara	Science & Engineering
Rachel Hauser	**Colorado**	**Environmental Studies**
Leela Hebbar	Rutgers	Public Policy
Elliott Hillback	Wisconsin	Journalism & Mass Communication
Raffael Himmelsbach	**University of Lausanne**	**Politics and International Studies**
Shirley Ho	Wisconsin	Journalism & Mass Communication
Travis Horsley	**Georgia Tech**	**Public Policy**
Zach Horton	California, Santa Barbara	English
Zhengyin Hu	Chinese Academy of Science	Information Science
Can Huang	Georgia Tech	Industrial Management
Jonathan Huang	Georgia Tech	International Affairs, Science & Tech.
Lu Huang	Beijing Institute of Tech.	Management
Jennifer Jensch	Wisconsin	Public Policy
Ronak Kamdar	Georgia Tech	Quantitative Finance & ISYE
Byoungyoon Kim	Rensselaer Poly. Institute	Science & Technology
Enukyung Kim	**Wisconsin**	**Journalism & Mass Communication**
Jiyoun Kim	**Wisconsin**	**Life Sciences Communication**
Sojung Kim	Wisconsin	Journalism & Mass Communication
Ashley Kirby	Georgia Tech	Public Policy
Lotte Krabbenborg	Groningen	Science & Society

Jeanne Marie Kusina	Bowling Green State Univ.	Applied Philosophy
Pete Ladwig	Wisconsin	Life Sciences Communication
Erin Lamos	Georgia Tech	Public Policy
Brice Laurent	Ecole des Mines	Public Policy
Ricky Leung	Wisconsin	Sociology
Nan Li	Wisconsin	Life Sciences Communication
Yin Li	**Georgia Tech**	**Public Policy**
Xuan Liang	Wisconsin	Life Sciences Communication
Miao Liao	**Tsinghua University**	**Science, Technology & Society**
Monica List	Michigan State University	Philosophy
Chien-Chun Liu	Georgia Tech	Management
Maria Sonsire Lopez	Venezuelan Ins. Sci. Research	Studies of Science
Beate-Josefine Luber	University of Bielefeld	Science and Technology Studies
Federica Lucivero	**University of Twente**	**Philosophy**
Tingting Ma	**Beijing Institute of Tech.**	**Management**
Indrani Mahapatra	**Birmingham, U.K.**	**Geog., Earth and Envir. Sciences**
Pratik Mehta	Georgia Tech	Industrial & Systems Engineering
Patrick E.T. McKeon	Georgia Tech	Public Policy
Yu Meng	Georgia Tech	Public Policy
Bastien Miorin	**Grenoble Inst. of Technology**	**Science & Technology Democracy**
Mary Moore	Wisconsin	Computer Science
R. John Naranja Jr.	**Northeastern**	**Law**
Hari Narayanan	Georgia Tech	Quantitative Finance & ISYE
Christina Ndoh	NCSU	Public Administration
Jayme Neiman	Univ. of Nebraska, Lincoln	Public Policy
Tanner Osman	Georgia Tech	Public Policy
Krishna Parthasaathi	Georgia Tech	Industrial & Systems Engineering
Jayesh Patil	Georgia Tech	Computing
Ruimin Pei	Chinese Academy of Science	Management
Robin Phelps	Colorado, Denver	Public Affairs
Dena Plemmons	California, San Diego	Research Ethics
Sofia Randhawa	Georgia Tech	Quantitative Finance & ISYE
Gernot Rieder	Vienna	Science, Technology & Society
Kristin Runge	**Wisconsin**	**Life Sciences Communication**
Simone Schumann	Vienna	Social Studies
Vanessa Schweizer	Carnegie Mellon	Engineering & Public Policy
Sarah Scripps	South Carolina	History
Jeong Yim Seo	Ehwa Women's Univ., Korea	Nanotechnology
Sara Yeo	Wisconsin	Life Science Communication
Oliver Shackleton	**Manchester**	**Business, Innovation and Policy**
Molly Simis	Wisconsin	Life Sciences Communication
Lea Shanley	Wisconsin	Environment & Resources
Tsung-Jen Shih	Wisconsin	Journalism & Mass Communication
Harmeet Singh	Georgia Tech	Quantitative Finance & ISYE
John Slanina	Georgia Tech	Public Policy
Diran Soumonni	**Georgia Tech**	**Public Policy**
James Spartz	Wisconsin	Life Sciences Communication
Anthony Stavrianakis	California, Berkeley	Anthropology
Alexa Stephens	Georgia Tech	Public Policy & City & Regional Planning
Galen Stocking	California, Santa Barbara	Social Science
Maria Stubbings	Wisconsin	Life Sciences Communication

Leona Yi-Fan Su	**Wisconsin**	**Life Sciences Communication**
Vrishali Subramanian	Georgia Tech	Public Policy
Meghnaa Tallapragada	**Cornell**	**Communication**
Dhanaraj Thakur	Georgia Tech	Public Policy
Francois Thoreau	**University of Liege**	**Political Science**
Juin-Yi Tsai	Wisconsin	Journalism
Rutger van Merkerk	University of Twente	Innovation & Environmental Sciences
M. Van Oudheusden	**Antwerp University**	**Political & Social Sciences**
Stephanie Vasko	Washington	Materials Chemistry & Nanotechnology
Andrew Quitmeyer	**Georgia Tech**	**Digital Media**
Charles Walsh	Georgia Tech	Public Policy
Wenping Wang	**Beijing Institute of Tech.**	**Management**
Alec Waterworth	**Manchester**	**Emerging Technologies**
Rosalyna Wijaya	Wisconsin	Journalism & Mass Communication
John Willingham	North Carolina State	International Studies
Thomas Woodson	**Georgia Tech**	**Public Policy**
Xuanting Ye	**Beijing Institute of Tech.**	**Political Science**
Heming Zhang	Nankai Univ./Georgia Tech	Public Policy
Shuliang Zhang	Beijing Institute of Tech.	Management
Yi Zhang	**Beijing Institute of Tech.**	**Management**
Xiao Zou	**Beijing Institute of Tech.**	**Management**
Qin Zhu	**Dalian University of Tech.**	**Philosophy**

ASU

Undergrad Interns & Researchers

Kalil Abdullah	Molecular Biotechnology
Eric Beeler	Sustainability
Nidhi Bhalla	Political Science
Nolan Bidese	**Biomedical Engineering**
Brandon Borsheim	Sustainability
William Bowman	**Materials Science & Engineering**
Linda Boyd	Geography
Tanner Brants	Management
Connie Burdis	Supply Chain Management
David Calderon	Molecular Bioscience & Biotechnology
Rahul Chhabra	Chemistry
Josh Choi	Biomedical Engineering & Economics
Kelley Conley	Psychology
Aaron Cornejo	**Biomedical Engineering**
Amie Dabu	**Sustainability**
Rob Davis	Biology
David Edwards	English & Creative Writing
Tara Egnatios	Public Policy
Daniel Escolin	**Film and Media Production**
Alicia Fremling	Management, Political Science, Spanish
Tereza Fritz	Global Studies
Andrew Gaddis	Industrial Engineering
Ian Griffith	Film & Media Studies
Hannah Hall	Sustainability
Catherine Hoke	**Mechanical Engineering**
Sarah Hoke	**Asian Language**

Rebecca Hudson	Business
Benjamin Lowenstein	Sociology
Rachel Lowenstein	Business
Alexander MacLean	Honors
Keith Martin	**Film**
Colin McDonald-Smith	Computer Science
Tobie Milford	Biology & Society
Timothy Norris	Architectural Studies
Sidra Omer	Journalism & Mass Communication
Mark Petersen	Economics
Zachary Pirtle	Mechanical Engineering
Jaron Reed	Political Science
David Renolds	Chemical Engineering
Lucas Rogers	Engineering
Dusana Schnell-Vivas	Marketing
Jesse Shedd	**Anthropology**
Suzanne Shlom	Design Studies
Rachel Smith	Biology & Society
Chad Stearns	**Economics**
Evan Taylor	**Sustainability**
Daryl Traylor	Microbiology
Tai Wallace	**Sustainability**
Amelia Walsh	Interdisciplinary Studies
Julia Weakley	Global Studies
Brian Young	Biology & Society
Ke Wu	Biology & Society

Affiliated Undergrad Interns & Researchers

Annie Bidgood	Georgia Tech	ISYE
Audrey Campbell	Georgia Tech	Industrial Systems & Engineering
Brescia Cassellius	Wisconsin	Journalism & Mass Communication
Gordon Cutler	Georgia Tech	Computing
Sharyn Finney	Georgia Tech	Public Policy & Economics
Brian Lynch	Georgia Tech	Public Policy
John Garner	Georgia Tech	Public Policy
Clay Karwisch	Georgia Tech	History, Technology & Society
Charles Luke McCloud	Georgia Tech	Public Policy
JJ O'Brien	**Georgia Tech**	**Public Policy**
Laura Rodriguez	Georgia Tech	International Affairs
Dave Schoeneck	Georgia Tech	Physics
Shawn Skolky	Georgia Tech	Public Policy
Charles Walsh	Wisconsin	Business

CNS-ASU Staff

Melissa Cornish	Biodesign Institute Liaison
Elizabeth Curran	Program Coordinator
Corrine Dillon	Program Manager
Daniel Hooker	**Program Coordinator**
Michelle Iafrat	**Program Coordinator**
Regina Sanborn	**Assistant Director**
Joy Trottier	Administrative Associate

Participants affiliated, not receiving CNS-ASU support:

ASU

Kenneth Abbott	**Professor**	**Law**
Azadeh Adibi	Graduate Student	Industrial Design
Luis Aguilera	Student	Business
Francisca Agusta	Student	Interior Design
Ismaeel Almarazeeq	Student	Industrial Engineering
Mohamed Alqabandy	Graduate Student	Design
G. Alvarez Sieber	Graduate Student	Engineering
Ariel Anbar	Professor	Earth & Space Exploration
Sandra Andrews	Retired Faculty	Mary Lou Fulton Teachers College
Catherine Arnold	Communications Coordinator	Consort. for Science, Policy & Outcomes
Jose Ashford	Professor	Social Work
Heman Au	Student	Industrial Design
James Audiss	Student	Business
Ricardo Avila	Student	Art
Denise Baker	Graduate Student	Psychology
John Ball	Graduate Student	Design, Environment & Arts
Carl Ballard	**Graduate Student**	**Applied Math for Life & Social Sci.**
Sasha Barab	Professor	Educational Leadership & Innovation
Maribel Barba	Wed Designer/Developer	Foundation
Michelle Barry	Graduate Research Associate	Sustain. Engr. & Built Envir.
Tain Barzso	Instructional Tech. Analyst	Digital Culture
Jennifer Bekki	Doctoral Student	Industrial Engineering
Leslie Beres	Director College Facility	Design & Arts
Zachariah Berkson	**Student**	**Chemical Engineering**
Vineet Bhosle	Graduate Student	Architecture
Jordan Biechler	Student	Explore-Social & Behavioral Sci.
Colleen Bivona	Program Manager	Arts Media & Engineering
James Blasingame	**Associate Professor**	**English**
Timur Boskailo	Student	Architectural Studies
Rachel Bowditch	Assistant Professor	Theatre & Film
Amanda Breaux	**Events Coordinator**	**Law**
Nicholas Broderick	Student	Theatre & Film
Daniel Brune	Faculty Research Associate	Life Sciences
Banel Bucknor	Student	Design
Caren Burgermeister	Project Coordinator	Res. & Innov. Math & Science Educ.
Winslow Burleson	Assistant Professor	Computing & Informatics
Daragh Byrne	Assistant Research Professor	Arts Media & Engineering
David Calverley	Attorney	Law, Science and Technology
Joel Carrasco	Graduate Student	Landscape Architecture
Angela Cazel-Jahn	Artist/Graduate Student	Humanities Research
M. Chavez-Echeagaray	Graduate Student	Computer Science
Jeffrey Chudy	Student	Art Exploratory
Sam Chung	Faculty	Art (Ceramics)
Daniel Cifuentes	Graduate Student	Arch. & Urban Design
Jeffrey Clancy	Graduate Student	Architecture
Robert Clinton	Professor	Law
Grisha Coleman	**Assistant Professor**	**Arts Media & Engineering**

David Corral	Student	Civil Engineering
Jacqueline Cortez	Graduate Student	Architecture
Michael Crow	President	Arizona State University
Roy Curtiss	Professor	Biodesign Institute
Daniel Cutrara	Assistant Professor	English
Williams Dabars	Dir. Special Communications	Office of Public Affairs
S. Doddaballapur	Graduate Student	Urban Design & Built. Environ.
Travis Doom	**Management Intern**	**Consort. for Science, Policy & Outcomes**
Heather Draper	Graduate Student	Design
Michelle Duah	Graduate Student	Design
Mark Dudlik	Management Intern	Office of the President
Margaret Duff	Graduate Student	Bioengineering
Lauren Dykes	Graduate Teaching Assistant	Theatre & Film
Mark Edwards	Professor	Business
Farzaneh Eftekhari	Graduate Student	Design
Mohamed Elkhesky	Graduate Student	Mechanical Engineering
Ron Elliott	Graduate Student	Architecture
John Ernzen	Student	Biomedical Engineering
Faye Farmer	Associate Director	OKED Research Strategy Group
Michelle Fehler	Lecturer	Design
Susan Felt	Comm. & Mrktg. Coord.	Design & Arts
Edward Finn	**Assistant Professor**	**Arts Media & Engineering**
Camilla Finnie	Student	Art
Joseph Fletcher	Student	Computer Science
Alfinio Flores	Professor	Curriculum & Instruction
Mary Fonow	Director & Professor	Social Transformation
Mary Fonow	Director & Professor	Social Transformation
Jason Franz	Special Advisor to Dean	Design & Arts
Ralph Gabbard	Librarian	Hayden Library
Brian Ganter	Student	Art
Antonio Garcia	Associate Director	Hispanic Research Center
Justin Gauger	Student	History
Alan Gershfeld	Consultant	Mary Lou Fulton External Projects
Lance Gharvi	Associate Professor	Theatre & Film
Joshua Gigantino	Graduate Student	Design
Gina Gillies	Assistant to Director	LightWorks
Maureen Goggin	Chair & Professor	English
Peter Goggin	**Associate Professor**	**English**
George Goh	Student	Intl. Student Exchange Partner
Nicola Goldberg	Sr. Healthcare Tech. Manager	Engin. & Phys. Sci. Research Council
J. Gonzalez-Sanchez	Graduate Student	Computer Science
Gisela Grant	Internship Coordinator	Politics and Global Studies
Nancy Gray	Graduate Teaching Assistant	Design
Joel Greene	Professor	Public Policy
Priscilla Greenwood	Research Professor	Ins. for Strengthening Math & Science
Jason Griffiths	Assistant Professor	Arch. & Landscape Arch.
Diane Gruber	Senior Lecturer	Social and Behavioral Sciences
Andrey Gunawan	Graduate Teaching Assistant	Elect. Comptr. & Energy Eng.
Daniil Gunitskiy	United Way Univ. Innov. Fel.	Office of University Initiatives
Jennifer Gunther	Student	Design Studies
Lee Gutkind	**Professor**	**Consort. for Science, Policy & Outcomes**

Jodi Guyot	Dir. Res. Advance. & Comm.	Human Evolution & Social Change
Stuart Hadley	Vice President	Public Affairs & Foreign Relations
Joshua Hammer	Student	Biomedical Engineering
Hilary Harp	Assistant Professor	Art
Thomas Hartman	Associate Professor	Design
Lee Hartwell	Professor	EVPP Consultant Group
Elisabeth Hayes	Professor	English
Stephen Hermens	**Student**	**Chemical Engineering**
Colin Ho	Student	Mechanical Engineering
Jenna Hoban	Student	Biomedical Engineering
Kim Holsclaw	**Graduate Student**	**Mass Communication**
Janet Holston	Dir. of Programs-Solutions	Offc of Knowledge Enterprise Dev.
Christiana Honsberg	**Professor**	**Engineering**
Timothy Horn	Graphic Designer Principal	Education Outreach & Student Svcs.
Afzal Hossain	Graduate Teaching Assistant	Arch. & Landscape Arch.
Sarah Hough	Manager Creative Services	Design & Arts
Oscar Huerta	Graduate Student	Design
Amelia Huggins	Mgr, Marketing & Comm.	LightWorks
A Magdalena Hurtado	Professor	Human Evolution & Social Change
Zahra Hussaini	Student	Materials Science & Engineering
Joanna Iacovelli	Prospect Research	Foundation
Jeffrey Ignaszewski	Graphic Design Specialist	Design & Arts
Todd Ingalls	Associate Professor Research	Arts Media & Engineering
Aziza Ismael	Student	Design Studies
Courtney Jackson	Student	Design & Production
Jane Jackson	Retired Faculty	Physics
Jennifer Jaeckals	Communications Cordinator	CSPO
Erin Jeffries	Specialist to Director	Arts Media & Engineering
Adriene Jenik	**Professor and Director**	**Herberger Inst. for Design & Arts**
Jeff Jilek	Graduate Student	Architecture
Parker Jones	Student	Art
Joseph Jurado	Student	Film
Korhan Kaftanoglu	Graduate Research Associate	Elect. Comptr. & Energy Engineering
Michael Katic	**Student**	**Applied Computer Science**
Josh Katzker	Graduate Teaching Assistant	Theatre & Film
Anita Keitel	Graduate Student	Architecture
James Keller	Student	Theatre
Aisling Kelliher	Assistant Professor	Design
Amruta Khanolkar	Graduate Teaching Assistant	Arch. & Landscape Arch.
Daniel Kharisma	Graduate Student	Civil, Envir. & Sustain. Engineering
Dhara Kothavala	Graduate Student	Sustainability
Matthew Krise	Shop Superintendent	Design
Michael Kroelinger	Professor	Design
Nicholas Kunz	Student	Housing & Urban Development
Michael Lande	Assistant Professor	Engineering
Heather Landes	Associate Dean	Design & Arts
Heather Le Fur	Graphic Design Principal	Design & Arts
Neal Lester	Assoc. VP & Professor	Knowledge Enterprise Development
Tyler Libey	Graduate Student	Biomedical Engineering
Min Lin	Student	Computer Systems Engineering
Heather Lineberry	**Interim Associate Director**	**Art Museum**

Sydney Lines	Management Intern	LightWorks
Priscilla Long	Student	Art
Lauren Loosveldt	Graduate Student	Architecture
Richard Loveless	Emeritus Professor	
Ryan Luikens	Student	Sustainability
Jane Magruder	Dir. Print Comm. & Med. Rel.	Law
Giada Mannino	Graphic Designer	Sustainability
Jingzian Mao	Graduate Student	Computer Science
Erik Margolis	Associate Professor	Human Communication
Richard Martorano	Director	Engineering Technical Services
Maritza Maurer	Support Systems Analyst	Design & Arts
Michael McBeath	Professor	Psychology
Scott McClintock	Faculty Associate	Sustainability
Danielle McNamara	Professor	Learning Sciences Institute
Michael Meeder	Graduate Student	English
Deirdre Meldrum	Dean	Fulton School of Engineering
George Moakley	Student	Theatre & Film
Erika Mohaupt	Graduate Student	Design
Adam Monroe	Graduate Teaching Assistant	Chemistry & Biochemistry
Gabriel Montemayor	Assistant Professor	Arch. & Landscape Arch.
Michael Montgomery	Student	Psychology
Scott Murphy	Graduate Student	Technology
Rafiu Mustapha	Graduate Student	Engineering
Michele Mutchek	Graduate Research Assistant	Sustainability
Anumeha Narain	Graduate Student	Industrial Design
Spencer Nelson	Student	Design Studies
Judy Newland	Faculty Associate	Anthropology
Judy Nichols	Dir. Dig. Comm. & Soc. Med.	Law
Juliana Novic	Graduate Student	Anthropology
Lindsey O'Connell	Student	Bio and Society
Prescott Ogden	Student	Electrical Engineering
Grace O'Sullivan	Staff	Biodesign Institute
Daniel Oliden	Graduate Student	Sustain. & the Built Environment
Paul Oran	Postdoctoral Associate	Biodesign Institute
Victor Orioke	Student	Biomedical Engineering
Larry Orr	Manager	Chemistry & Biochemistry
Suzan Ozcelik	Graduate Student	Urban Design & Architecture
Michael Pang	Graduate Student	Law
Mookesh Patel	Associate Professor	Visual Communication Design
Varun Patel	Student	Biomedical Engineering
Peggy Payne	Assistant Director Bus. Srvs.	Law
Chi-Han Peng	Graduate Student	Computer Science
Jacob Pinholster	School Dir. & Assoc. Prof.	Theatre & Film
Vincent Pizziconi	Professor	Bioengineering
Evan Pomerantz	Student	Art
Carlan Pontious	Student	Industrial Design
Randal Pope	Graduate Student	GRES
Adriana Ramos	Student	Urban Design
Patricia Reiter	Director of Development	Sustainability
Wellington Reiter	Special Advisor to President	Arizona State University
Deborah Relph	Program Coordinator	Law

Grant Richardson	Student	Graphic Design
Thanassis Rikakis	**Vice Provost of Design**	**Arts, Media and Engineering**
Mindy Robbins	Student	Architectural Studies
Laura Rodriguez	Office Specialist Sr.	College of Technology & Innovation
Susan Rubin	Events Coordinator Sr.	Sustainability
Shaily Rungta	Graduate Student	Built Environment
Richard Rushforth	Graduate Student	Sustainability
Julie Russ	Coordinator Senior	Institute of Human Origin
Michael Russo	Graduate Student	Architecture
Justin Ryan	Graduate Student	Bio. & Health Systems Engin.
Arthur Sabatini	Associate Professor	Humanities Arts & Culture
Michael Saks	Professor	Law
Jamie Sandomire	Student	Theatre & Film
Deepika Sangoi	Graduate Teaching Assistant	Arch. & Landscape Arch.
Lisa Santy	Graduate Student	Landscape Architecture
Blaire Schenck	Student	Interior Design
Sherrie Schmidt	Librarian	Hayden Library
Sara Schwabe	Graduate Teaching Assistant	Theatre & Film
Samantha Sears	Graduate Teaching Assistant	Arch. & Landscape Arch.
Allison Shannon	Grant Proposal Writer	Sustainability
Ankur R. Sharma	Graduate Student	Electrical Engineering
Nicholas Shekerjian	Student	Architectural Studies
Denis Simon	Vice Provost	China Initiatives and Strategy
Vipul Singh	Graduate Research Assistant	Built Environment
Paul Skiera	Tech. Support Analyst Coord.	Technology Based Learning Res.
Ian Smith	Student	Interdisciplinary Studies
Bryan Smith	Student	Sustainability
Michael E. Smith	Professor	Hum. Evol. & Social Change
Milton Sommerfield	Professor	Life Sciences
Alexandra Spaeth	Student	Bio Science
Andreas Spanias	Professor	Elect. Conptr. & Energy Eng.
Anton Spevacek	Manager Information Tech.	Arts
Joseph Spiro	Graduate Student	Computer Science
Jim St. Leger	Technology Marketing Mgr.	Intel
Ellen Stechel	Deputy Director & Professor	LightWorks
Anne Stone	Professor	Hum. Evol. & Social Change
Jason Sukut	Graduate Student	Applied Ethics
Hari Sundaram	Professor	Arts, Media & Engineering
Douglas Sylvester	Interim Dean	Law
Christine Szuter	Professor of Practice	Hist., Phil. & Religious Studies
Chen Tang	Graduate Student	Industrial Design
Michael Thomet	Graduate Student	English
Michael Thompson	Student	Theatre & Film
Leslie Thornton	Assistant Progessor	Journalism & Mass Comm.
Ben Tieni	Student	Graphic Design
Ben Tieni	Student	Graphic Design
Paulette Tohonnie	Student	Interior Design
Lisa Tolentino	Graduate Student	Media Arts & Sciences
Jose Torres	Student	Landscape Architecture
Pavan Turaga	Assistant Professor	Arts Media & Engineering
Steven Turner	Student	Business & Management

Diane Van Hoy	Student	Aerospace Engineering
Arvin Villena	**Student**	**Explore-Health/Life Sciences**
David Wahls	Regional Major Gift Officer	Foundation
Sheila Wakelam	Graduate Student	Design
Qiao Wang	Graduate Student	Art Media & Engineering
Matt Watkins	Student	Theatre & Film
Zachary Watson	Student	Landscape Architecture
Eric Wheeler	Student	Theatre & Film
Jorden Whicker	Student	Computer Science
Dave White	Associate Professor	Community Res. & Develop.
Laurie Valenti	Specialist	Theatre & Film
Jennifer Wilken	Budget Analyst Principal	Office of V.P. and Provost
Thomas Williams	Chief Staff/Asst. Dean	Law
Lea Wilson	Graduate Teaching Assistant	Sustainability
Greg Wise	Associate Dean & Professor	New Interdisc. Arts & Sciences
Russell Wisniewski	Student	Architectural Studies
Kuan-Chuen Wu	Graduate Student	Electrical Engineering
Trish Yasolsky	Assistant to Dean	Sustainability
Mark Zeigler	Student	Mathematics

Affiliated

Clement Adebamowo	**Associate Professor**	**University of Maryland**
Zeeshan Ahmad	**Professor**	**University College London**
Maria S M Alencar	Researcher	Federal University of Rio de Janeiro
Ida Andersen	Director	Danish Board of Technology
Iris Andrade	**Participant**	
Adelaide M. Antunes	Adjunct Professor	State University of Campinas
Timothy Apenzeller	Editor	National Geographic
Peter Ashton	**Aquatic Ecologist**	**Council of Scientific & Indus. Res.**
David Attis	Senior Director	Policy Studies
Kelly Bauer	FIIDA Principal	Richard + Bauer Architecture
David Beck	Staff	NISEnet
Amy Becker	Assistant Professor	Towson University
David Beltran-del-Rio	**Author**	
Francois Berger	**Head, Brain Nanomedicine**	**INSERM**
Rosalyn Berne	Professor	University of Virginia
Jill Bernstein	Communications Manager	Downtown Phoenix Journal
Roberta M. Berry	Professor	Georgia Institute of Technology
David Berube	Professor	North Carolina State University
Rachel Bess	Artist / Painter	
Gary Bild	Member	Nanotech. Industry Liaison
Anne Bilsbarrow	Principal	SmithGroup
Craig Boardman	**Assistant Professor**	**Ohio State University**
Marianne Boenink	**Assistant Professor**	**University of Twente**
Christopher Bosso	Professor	Northeastern University
Kevin Boyack	**President**	**SciTech Strategies, Inc.**
Elizabeth Boyd	**Participant**	
Eileen Brill Wagner	President	Brilliant Concepts LLC.
Garrett Brown	Editor	National Geographic

Mark Brown	Cal. State Univ., Assoc. Prof.	Government
Sebastien Brunet	Professor	University of Liege
James Buizer	Dir. Climate Adapt. Intl. Dev.	University of Arizona
Regula Burri	Professor	HafenCity University
Hilary Burton	**Director**	**Found. Genomics & Population Health**
Dale Buskirk	Transp. Plan. Div. Director	Department of Transportation
Soon Cheon Byeon	Senior Researcher	Korea Inst. of Science & Technology
Alexander Calderon	Help Desk Support	Nothing but NET
Heather Campbell	Associate Professor	Claremont Graduate University
Phillip Campbell	Editor	Nature.com
Rick Canady	Staff	Food & Drug Administration
Heather Canary	Assistant Professor	The University of Utah
Amy Carroll	Staff	House Committee
Lorenzo Cena	Graduate Student	University of Iowa
Jan Cerveny	Staff	Department of Energy
Joshua Chamot	Staff	Legislative & Public Affairs
Max Chandler	Artist	Max Chandler Robot Art
Diego Chavarro	Student	University of Sussex
Denise Chiavetta	Program Chair	Search Technology
Stephanie Chism	Prog Mgr, Ctr Creat & Innov.	Boise State University
William Clark	Professor	Harvard University
Maria Coccia	Senior Researcher	Italian National Research Council
Mathilde Colin	Research Assistant	Wisconsin-Madison
James Collins	Head of Biological Sciences	National Science Foundation
Matthew Cooper	**Faculty, Phil. & Rel. Studies**	**South Mountain Community College**
David Crowley	Artist	David Crowley Gallery
Stacey Crumbaker	Designer	Richard + Bauer
Scott Cunningham	Professor	Technical University of Delft
William Cyrs	Graduate Student	University of Iowa
Collet Dandara	**Assoc. Prof., Health Sciences**	**University of Cape Town**
Luke Denmon	Critical Envir., Data Ctr Adv.	CB Richard Ellis
Michael Dennis	Staff	Society & Technology
Richard Diehl	Senior Systems Engineer	General Dynamics
Robert Diehl	Senior Professor	DeVry University
Johnathan Dillon	Senior Applications Engineer	Microchip Technology Inc.
Ira Domsky	Princpal	Ira Domsky Environmental
Heather Douglas	Professor	University of Tennessee
Edward Dove	**Res. Assoc., Human Genomics**	**McGill University**
Kate Duckworth	Staff	NISEnet
Megan Dyer	Research Technologist	Mayo Clinic
Douglas Edgelow	Owner	Equus Development Corporation
Daniel Erasmus	Scenario Faciliatator	Digital Thinking Network
Chris Ewald	Staff	Buckeye Express
Vicki Ewald	Staff	Buckeye Express
Dee Dee Falls	**Principal**	**Bioscience High School**
Francesca Farioli	**Research Fellow**	**Sapienza University of Rome**
Elizabeth Farrell	Staff	University of New Hampshire
Ellen Feigal	Staff	TGen
Martha Feldman	Chair, Civic Gov. & Pub. Mgt.	University of California, Irvine
Todd Fernandez	**Participant**	
Arianna Ferrari	Post-doctoral Fellow	Karlsruhe Institute of Technology

Leonard Fine	Science Officer / Prog. Officer	Science Foundation Arizona
Jonathan Fink	V.P. Res. & Strategic Part.	Portland State University
Hunter Floyd	Intern Architect	Corgan Associates
Joan Foltz	Economic Futurist	Alsek Research
Ed Fox	V.P. & Sustainability Officer	Arizona Public Service
Bon Franklin	EAI Specialist	AZ Dept. of Health Services
Ken Galluppi	Senior Scientist	University of North Carolina
Robert Garfinkle	**Program Director**	**Science Museum of Minnesota**
Monica Gaughan	Professor	University of Georgia
Michael Gazzaniga	**Professor, Univ. California**	**Psychology**
Sjef Gevers	**Health Care Law Expert**	**Rutgers and Posch**
Richard Gibbs	**Professor, Baylor Coll. Med.**	**Human Genetics**
Brian Gleim	Instructor	Glendale Community College
Jerry Gless	Indep. Writer & Editor Prof.	
Stephen Godwin	Director	National Research Council
Abdullah Gok	Senior Researcher	University of Manchester
Mark Goldstein	President	International Research Center
Suresh Golwalkar	Manager	Intel
Richard Gooding	Founder	Strategic Advantage, Inc.
Claire Gordon	Research Scientist	Army Material Command
David Goldston	Professor	Harvard University
Douglas Goodman	Member	Nanotech. Industry Liaison
Herb Goronkin	Member	Nanotech. Industry Liaison
Henry Greely	**Director, Stanford Univ.**	**Law and Biosciences**
Richard Gullickson	Staff	Lawrence Livermore Lab
Yi Guo	Instructor	Chandler Gilbert Comm. College
Pat Hamilton	**Program Director**	**Science Museum of Minnesota**
Richard Handy	**Professor, Plymouth Univ.**	**Biomedical & Biological Sciences**
Cole Hang	**Participant**	
Aaron Heinzmann	Hardware Engineer	Intel
Aaron Herring	Designer	Gould Evans
Don Hiatt	**Participant**	
Leda Hiatt	**Participant**	
Paul Hickey	Systems Administrator	Mesa Community College
Diana Hicks	Public Policy	Georgia Institute of Tech.
Lauren Higgins	Cartographer	Metacurrency Project
Stephen Hilgartner	Science & Technology Studies	Cornell University
George Hoffman	City Manager	City of Apache Junction
Michael Holland	Staff	House Science Committee
Prathma Howe	**Participant**	
John Hughes	Member	Nanotech. Industry Liaison
Kent Hughes	Director	Teach America
Sol Jaffe	Indep. Mgmt. Consultant	
Anil Jain	Computer Science & Engin.	Michigan State University
Ann Jarmusch	Writer / Editor	
Charles Jeffery	Dean, Institutional Planning	Glendale Community College
Carol Johnson	Planning Department	City of Phoenix
Eric Juarez	**Participant**	
Eli Kawam	President and CTO	EKLATEK Engineering
Donna Kent	Global Studies	Televerde
Timothy Kiehl	Artist/Craftsman	Airplayn

Zach Kieter	**Participant**	
Matt Kim	Member	Nanotech. Industry Liaison
Evgeny Klochikhin	Student	University of Manchester
Mitzi Krockover	Senior Consultant	Sokolov, Sokolov, Burgess Solutions
Ray Kurzweil	Member	Board of Visitors
Dirk Libaers	Public Policy	Georgia Institute of Tech.
Jiayong Li	**Participant**	
Troy Livingston	Staff	NISEnet
Eric Luchian	Research Associate	Lancaster University
Connie Mabelson	Attorney	Mabelson Law Group
Eric Magrane	Graduate Student	University of Arizona
Uttam Malani	Public Policy	Georgia Institute of Technology
Tony Maniaci	Director Product Develop.	ITel
Benjamin M. Mann	Program Manager	Defense Science Office
Robin Marks	Staff	NISEnet
Florence Matusky	Writer	
Catherine May	Senior Historical Analyst	Salt River Project
John McGarity	Member	Nanotech. Industry Liaison
Chris McKibben	Estimator	Underwood Bros., Inc.
Maxwell J. Mehlman	Professor	Case Western Reserve Univ.
Celia Merzbacher	Staff	Office of Naval Research
Daniel Metlay	Staff	Nuclear Waste Review Board
Jeff Michelsen	Property Attorney	TraskBritt Intellectual
Danielle Millam	Director of Development	Las Vegas-Clark Cty Library Dist.
Blaine Miller	President & Prin. Analyst	Modern Insights
Elizabeth Miller	Water Res. Planning Advisor	City of Scottsdale
John Miller	Dir. of Information Tech.	Litchfield Elementary School District
Laurence Miller	Physician	Mayo Clinic – Scottsdale
Michael Moffitt	Associate Professor	University of Michigan
John Moravec	Senior Lecturer	University of Minnesota
Daniel Morrison	Professor	Vanderbilt University
George Muncaster	Professor	Scottsdale Community College
Sean Murdock	Member	Nanotech. Industry Liaison
Carolyn Nelson	Technical Delivery Manager	Bank of America
Lee Nelson	Prin., Scott L. Libby Elem.	Litchfield Elementary School District
Richard Nelson	Member	Board of Visitors
Susan Norton	Editor	National Geographic
Thomas Ormston	Product Support Manager	Apriva ISS
James Paul	Staff	House Committee
Jim Paisley	Director, Assess. Services	Leathers Milligan & Associates
Spencer Pearce	**Participant**	
Pat Petriai	**Participant**	
Maggie Pingolt	Writer	The Embryo Project
Diane Planidin	Real Estate Agent	Re/Max Fine Properties
Melissa Pulsifer	Marketing Coordinator	Richard + Bauer Architecture
Kristin Raffaelle	Executive Director / CEO	PACeHR
Priscilla Regan	Professor	Social, Behavioral & Econ.
Roger Reynolds	Composer/Professor	Univ. of California, San Diego
Jack Ring	Systemist	
Estelle Robichaux	**Graduate Student**	**University of Florida**
Michael Roco	Senior Advisor	National Science Foundation

Hannot Rodriguez	**Assistant Professor**	**University of Basque Country**
Jacob Rosenthal	Maker	Heatsync Labs
Donald Roth	**Participant**	
Marc Rothenberg	Staff	Legislative & Public Affairs
Sean Rothman	Professional	University of Manchester
Terry Ryan	**Participant**	
Leslie Rycroft	Vice President	Scottsdale League for the Arts
Dana Sadler	District Human Resources	Home Depot
Tind Shepper Ryen	Staff	House Committee on Science
Michael Savarese	Senior Software Architect	Unicorn Media, Inc.
Laura Schiavo	Curator	National Building Museum
Stuart Scott	**Participant**	
Evan Selinger	**Associate Professor**	**Rochester Institute of Technology**
Karen Shakman	Project Architect	Iconic Architecture
Mark Shapiro	Member	Board of Visitors
Ingrid Shults	Educator	Collins College
Gregory Simonson	Professor	Science, Tech. & Military
Mitchell Small	Professor	Carnegie Mellon University
Scott Smith	Founder	Changeist, LLC.
Jacque Sokolov	Chairman / Senior Partner	Sokolov, Sokolov, Burgess Solutions
Alexa Stephens	Public Policy	Georgia Tech
Kerri Stone	**Student**	**Colorado School of Mines**
Reva Stone	Artist	Winnipeg Art Gallery
Karen Tanenbaum	Graduate Student	Simon Fraser University
Samantha Taylor	**Participant**	
Jason Teske	Buyer / Planner	Lasertel, Inc.
Judith Testani	Owner/President	Testani Design Troupe, Inc.
D.A. Therrien	Artist	
Gerald Thurman	Instructor	Scottsdale Community College
Raoul Tibes	Assoc. Dir, Leukemias Prog.	Mayo Clinic
Mike Trier	Senior Budget Analyst	Maricopa Community Colleges
Rebecca Toor	**Associate Editor**	**Research Media Ltd.**
Joanne Tornow	Program Manager	National Science Foundation
Cassandra Valdez	**Participant**	
Steve Valev	Associate	Gould Evans
Ian Vandeventer	Owner	Ivy Consulting, Inc.
Dawn Visser	President	MJS Designs, Inc.
Anna Waldron	Professor	Cornell University
Simone van der Burg	**UMC St. Radboud, Sr. Res.**	**Scientific Inst., Quality of Healthcare**
Fred Weber	Member	Nanotech. Industry Liaison
Fan Wei	**Student**	**Beijing Institute of Technology**
Marshall Whitmire	Owner & Managing Director	RCI Surveys, Inc.
Thalia Williams	**Participant**	
Kristine Wilcox	Principal	Kristine Wilcox Consulting
Jeff Williamson	CEO/Pres. & Exec. Director	Phoenix Zoo
James Wilsdon	Director	The Royal Society
Carly Wobig	Graduate Student	University of Illinois
Gregory Woodhead	Director of Support Services	Corinthian Colleges
Donghua Zhu	Professor	Beijing Institute of Technology
Ranu Zunjarwad	Product Designer/Writer	

Nanotechnology in Society Network PIs:

Davis Baird	University of South Carolina
Richard Freedman	Harvard University
Barbara Harthorn	UCSB
Lynne Zucker	UCLA

Expert and Oversight Panel for National Citizens' Technology Forum

Roberta M. Berry	Professor	Georgia Tech
Stephen Helms Tillery	Professor	ASU
Maxwell J. Mehlman	Professor	Case Western Reserve
Kristen Kulinowski	Executive Director	Rice
Jason S. Robert	Assistant Professor	ASU
Ida Andersen	Staff	Danish Board of Technology
David Rejeski	Director	Woodrow Wilson Center

4. (b) LIST OF ADVISORY BOARDS

i. Executive Committee

Elizabeth Corley, Associate Professor, ASU Department of Public Affairs
David H. Guston, Professor, ASU School of Government, Politics, & Global Studies
Deirdre Meldrum, Dean, ASU Fulton Schools of Engineering
Clark A. Miller, Associate Professor, ASU School of Government, Politics, & Global Studies
Dietram Scheufele, Professor, Journalism and Mass Communication, and Life Sciences, University of Wisconsin-Madison
Jan Youtie, Manager, Policy Services, Georgia Institute of Technology

ii. Board of Visitors

Edward Cupoli, Chief Economist, SEMATECH
Heather Douglas, Associate Professor/Chair, Dept. Philosophy, University of Waterloo
William Hallman, Professor/Chair, Dept. Human Ecology, Rutgers, State Univ. of New Jersey
Rachelle Hollander, Center Director, National Academy of Engineering
Kristen Kulinowski, Research Staff Member, Science & Technology Policy Institute
Jennifer Kuzma, Associate Professor, Department of Public Affairs, University of Minnesota
Andrew Maynard, Chief Senior Advisor, Project on Emerging Technologies, Woodrow Wilson Center
Colin Milburn, Assoc. Professor, English & Science & Tech. Studies, University of California, Davis
Albert Teich, Research Professor, the George Washington University, International Science & Technology Policy

iii. Nanotechnology Industry Liaison Committee

Gary Bild
Larry Bock, Chairman, Luxe Ventures
Ellen Feigal, Director of Medical Devices and Imaging, TGen
Douglas Goodman
Herb Goronkin
John Hughes
Anil Jain, Professor, Department of Computer Science & Engineering, Michigan State University
Donna Kent, Senior Vice President of Global Studies, Televerde
Anatoli Korkin, Director, ASU Office of Research and Economic Affairs
John McGarity
Michael Moffitt, Professor, Department of Computer Science and Engineering, University of Michigan
Sean Murdock, Nanotechnology Industry Association
Fred Weber

iv. Private Sector Engagement Committee

Larry Bell, Senior Vice President, Strategic Initiatives, Museum of Science
Lynn Bergeson, Owner, Bergeson & Campbell, P.C.
Susan Brienza, Attorney, Ryley Carlock & Applewhite
Kurt Creager, Executive Director, Stardust Center for Affordable Homes and the Family.
Sarah Davies, Private Sector Engagement Coordinator, Center for Nanotechnology in Society, Arizona State University
Jake Dunagan, Research Director, Technology Horizons Program, Institute for the Future

Erik Fisher, Assistant Professor, School of Government, Politics and Global Studies, Arizona State University
Jason Gallo, Science and Technology Policy Analyst, Science and Technology Policy Institute
Stephen Goodnick, Professor, Ira A. Fulton School of Engineering, Arizona State University
David Guston, Professor, School of Government, Politics and Global Studies, Arizona State University
Patti D. Hill, Founder, Penman Public Relations
Frederick Klaessig, Manager, Pennsylvania Bio Nano Systems
Celia Merzbacher,Vice President, Innovative Partnerships, Semi-Conductor Research Corporation
Evan Michelson, Associate Director, The Rockefeller Foundation
Robert Ott, Associate Director, Occupational Health and Safety, Arizona State University
Rax Raimond, Senior Mediator and Program Manager, Meridian Institute
David Roessner, Senior Fellow, Center for Science, Technology, and Economic Development, SRI International
Dietram Scheufele, Professor, Journalism and Mass Communication, and Life Sciences, University of Wisconsin-Madison
Cynthia Selin, Assistant Professor, Center for Nanotechnology in Society, Arizona State University
Philip Shapira, Professor, School of Public Policy, Georgia Institute of Technology; Professor of Innovation Management and Policy, Manchester Institute for Innovation Research, University of Manchester
Ahmad Soueid, Principal and Senior Vice President, HDR Architecture, Inc.
Arnim Wiek, Assistant Professor, School of Sustainability, Arizona State University
Peter Yeadon, Co-founder, Decker Yeadon
Jan Youtie, Manager, Policy Services, Georgia Institute of Technology
Steven Zylstra, President & CEO, Arizona Technology Council

v. Expert and Oversight Panel for National Citizens' Technology Forum

Stephen Helms Tillery, Assistant Professor, Harrington Department of Bioengineering; Assistant Professor of Kinesiology, Arizona State University
Kristen Kulinowski, Executive Director, Center for Biological & Environmental Nanotechnology, Rice University
Maxwell J. Mehlman, Arthur E. Petersilge Professor of Law; Professor of Bioethics, School of Medicine; Director of the Law-Medicine Center, Case Western Reserve University
Jason S. Robert, Associate Professor, Department of Basic Medical Sciences, The University of Arizona College of Medicine; Associate Professor, School of Life Sciences, Arizona State University
Ida Andersen, Danish Board of Technology
David Rejeski, Director, Project on Emerging Nanotechnologies, Woodrow Wilson International Center for Scholars

4. (c) LIST OF PARTICIPATING INSTITUTIONS

i. ASU Academic Participating Institutions

Applied Learning Technologies Institute
Arizona Institute for Nano-Electronics (AINE)
Arizona Technology Enterprises (AzTE)
Axon Technologies
Barrett, the Honors College
Biodesign Institute
Center for Biology & Society
Center for Research on Education in Science, Mathematics, Engineering, & Technology (CRESMET)
Center for the Study of Religion & Conflict
Center for Law, Science and Innovation
Center for Solid State Electronics Research
Center for Study of Institutional Diversity
College of Liberal Arts & Sciences
College of Public Programs
College of Technology & Innovation
Center for Science and the Imagination
Complex Adaptive Systems Initiative
Consortium for Science, Policy & Outcomes
Decision Theater for a Desert City
Foundation, ASU
Global Institute of Sustainability
Graduate College
Hayden Library
Health Services
Herberger Institute for Design & the Arts
Hispanic Research Center
Institute of Human Origin
Ira A. Fulton Schools of Engineering
LightWorks
Mary Lou Fulton College of Education
New Interdisciplinary Arts & Sciences
Office of China Initiatives and Strategy
Office of Knowledge and Enterprise Development (OKED)
Office of Public Affairs
Office of the President
Office of the Vice President and Provost
Office of University Initiatives
Occupational Health and Safety
Phoenix Urban Research Laboratory
Responsible Conduct of Research Program, School of Life Sciences
Sandra Day O'Connor School of Law
School of Earth & Space Exploration
School of Government, Politics, & Global Studies
School of Human Evolution & Social Change
School of International Languages & Cultures
School of Letters & Sciences
School of Life Sciences

School of Mathematical & Statistical Sciences
School of Philosophical, Historical, and Religious Studies
School of Social Transformation
School of Sustainability
Science Policy Assessment & Research on Climate (SPARC)
Stardust Center
Technology Based Learning Research
University Art Museum
University Public Schools
W.P. Carey School of Business
Walter Cronkite School of Journalism & Mass Communication

ii. Academic Participating Institutions Other than at ASU

Aarhus University, Denmark
Ansal Institute of Technology
Antwerp University
Austrian Academy of Science
Baylor College of Medicine
Beijing Institute of Technology, China
Bioscience High School
Boise State University
Bowling Green State University
Brown University
California State University, Sacremento
Cardiff University
Carnegie Mellon University
Case Western Reserve University
Chinese Academy of Sciences
Chandler Gilbert Community College
Claremont Graduate University
Clark University
Collins College
Colorado School of Mines
Columbia University
Copenhagen Business School, Denmark
Corinthian Colleges
Cornell University
Dalian University of Technology, China
Delft University of Technology
DeVry University
Dublin City University
Durham University, United Kingdom
Ecole des Mines, France
ETH Zurich
Eugene Lang College the New School for Liberal Arts
Ewha Women's University
Federal University of Parana, Brazil
Federal University of Santa Catarina, Brazil
Flemish Institute of Science & Technology
Florida International University

George Mason University
George Washington University
Georgetown University
Georgia Institute of Technology
Glendale Community College
Grenoble Institute of Technology
Grove City College
Harvard University
Howard University
Illinois Institute of Technology
Indiana University
Institute of International Sociology of Gorizia
Institut d'Etudes Politiques de Grenoble, France
Iowa State University
James Martin Institute for Science & Civilization, Oxford University, UK
Karlsruhe Institute of Technology
Korea Institute of Science and Technology, Seoul, Korea
Lancaster University, UK
Leeds University Business School, UK
Lehigh University
Litchfield Elementary School District
Long Island University
Manchester Business School
Maricopa Community Colleges
McGill University
Mesa Biotech Academy
Mesa Community College
Mesa High School
Michigan State University
MIT SENSEable City Lab
Nagoya University, Japan
National Academy of Sciences
National University of Singapore & Asia
New York University
North Carolina State University
Northeastern University
Northwestern University
Norwegian University of Science & Technology, Norway
NSEC/CNS-University of California, Santa Barbara (UCSB)
Ohio State University
Osaka University, Japan
Pennsylvania State University
Plymouth University
Portland State University
Purdue University
Queens University
Radboud University
Rensselaer Polytechnic Institute
Rhode Island School of Design
Rice University
Rice University/ICON

Rochester Institute of Technology
Rutgers, The State University of New Jersey
Said Business School, Oxford
Sapienza University of Rome
Scottsdale Community College
Simon Fraser University, British Columbia
S.I.W.S. N.R. Swamy College, India
South Mountain Community College
Stanford University
State University of Campinas
Technical University of Delft
Technical University of Denmark
Technical University of Darmstadt
Tennessee State University
Texas State University, San Marcos
The Center for International Development, Harvard University
Tokyo University
Tsinghua University, China
UCLA/Harvard/NBER: Collaborative Research; Personnel Exchanges
UMC St. Radboud
Unicamp University, Brazil
Universidad de Zacatecas, Mexico
Universidad del Pais Vasco, Spain
University College London
University at Albany
University of Antwerp, Belgium
University of Arizona
University of Basel
University of Basque Country
University of Bergen, Norway
University of Bielefeld, Germany
University of British Columbia
University of Calgary, Canada
University of California, Berkeley
University of California, Davis
University of California, Irvine
University of California, Los Angeles
University of California, San Diego
University of California, Santa Barbara
University of Cape Town
University of Chicago
University of Colorado, Boulder
University of Colorado, Denver
University of Copenhagen
University of Denver
University of Edinburgh
University of Exeter, United Kingdom
University of Florida
University of Georgia
University of Gothenburg, Sweden
University of Groningen, Netherlands

University of Illinois, Chicago
University of Illinois, Springfield
University of Illinois, Urbana-Champaign
University of Iowa
University of Jiangsu, China
University of Lausanne, Switzerland
University of Leeds
University of Liege, Belgium
University of Manchester, United Kingdom
University of Maryland
University of Massachusetts, Amherst
University of Melbourne, Australia
University of Michigan
University of Minnesota
University of Montana
University of Nebraska, Lincoln
University of Nevada, Las Vegas
University of New Hampshire
University of North Carolina, Charlotte
University of Notre Dame
University of Nottingham
University of Padua
University of Seville, Spain
University of South Carolina
University of South Florida
University of Southern California
University of Southern Indiana
University of Sussex, United Kingdom
University of Tennessee, Knoxville
University of Texas, Austin
University of Trieste, Italy
University of Twente, the Netherlands
University of Turku
University of Utah
University of Victoria
University of Vienna
University of Virginia
University of Washington
University of Wisconsin, Madison
UT-Battelle
Utrecht University
Vanderbilt University
Virginia Tech University
VU University of Amsterdam
Washington University, Saint Louis
West Chester University of Pennsylvania
Western Michigan University
Yale University

4. (d) Non-Academic Participating Institutions

Agilent Technologies
Airplayn
ALD Nano Solutions
Alsek Research
American Association for the Advancement of Science (AAAS)
American Bar Foundation
Apriva ISS
Arizona Bioindustry Organization
Arizona Commerce Authority
Arizona Corporation Commission
Arizona Department of Education
Arizona Department of Health Services
Arizona Nanotechnology Cluster
Arizona Public Service (APS)
Arizona Research Institute for Solar Energy
Arizona Science Center
Arizona Technology Council
Army Military Command
Australian Government
Bank of America
Bassetti Foundation
Bioindustry Organization of Southern Arizona
Boudreaux and Associates
BrasEq
Brilliant Concepts LLC.
British Embassy
Buckeye Express
Cambridge Public Health Department
Carnegie Mellon
CB Richard Ellis
CEA-Saclay
Cell Publishing
Center for Business Models in Health Care
Center for Responsible Nanotechnology
Changeist, LLC.
Chemical Heritage Foundation
City of Apache Junction
City of Phoenix
City of Scottsdale
Complex Global Risks
Corgan Associates
Council of Scientific and Industrial Research
Danish Board of Technology
David Crowley Gallery
Decker Yeadon LLC
Department of Energy (DOE)
Department of the Treasury
Department of Transportation
Digital Thinking Network

Downtown Phoenix Journal
Ecological Society of America
EKLATEK Engineering
Emerging Leaders in Science & Society (ELISS)
Engineering & Physical Sciences Research Council (EPSRC)
Environmental Protection Agency (EPA)
Equus Development Corporation
European Commission
Exploratorium, San Francisco
Federal Aviation Administration Office of Environment & Energy
FBI Weapons of Mass Destruction
Food and Drug Administration (FDA)
Foundation for Genomics and Population Health
Gallagher and Kennedy
General Dynamics
Genøk Centre for Biosafety
Genome British Columbia
German Parliament
Global Business Network
Gould Evans
Gordon Research Conferences
Greenwall Foundation
HafenCity University
HDR Architecture
Heatsync Labs
Heliae
Home Depot
Iconic Architecture
INSERM
Institute for Agriculture and Trade Policy
Institute for Ecological Economy Research, Germany
Institute for the Future
Institute of Technical Assessment & Systems Analysis
Intel
Intelligent Information Services Corporation (IISC)
International Nanotechnology in Society Network (INSN)
International Research Center
Ira Domsky Environmental
Italian National Research Council, Turin, Italy
ITel
Ivy Consulting, Inc.
Jennings, Strouss, & Salmon PLC
Kristine Wilcox Consulting
Las Vegas-Clark County Library District
Lasertel, Inc.
Lawrence Livermore Lab
Leathers Milligan & Associates
Loka Institute
London Science Museum
Luxe Ventures
Mabelson Law Group

Max Chandler Robot Art
Mayo Clinic - Scottsdale
Mabelson Law Group
Meridian Institute
Metacurrency Project
Microchip
MJS Designs, Inc.
Modern Insights
Museum of Life & Science, North Carolina
Museum of Science, Boston
Nanoscale Informal Science Education Network (NISENet)
National Academy of Engineering
National Advisory Committee on Aeronautics (NASA)
National Business Museum
National Geographic Society
National Institute of Standards and Technology (NIST)
National Institutes of Health (NIH)
National Nanomanufacturing Network (NNN)
National Nanotechnology Coordinating Office
National Nanotechnology Infrastructure Network
National Research Council
National Science Foundation
Nature.com
Nature Publishing Group
New Haven Independent
Norwegian Institute
Nuclear Waste Review Board
Office of Naval Research
Oregon Museum of Science & Industry
PACeHR
Penman PR
Pennsylvania Bio Nano Systems, LLC.
Phoenix Zoo
Physician Services Group
PING Inc.
Planetary ONE
Practical Action
Presidential Commission for the Study of Bioethical Issues
QuantTera
Rathenau Institute
RCI Surveys, Inc.
Research Council of Norway
Research Councils U.K. (RCUK) in the U.S.
Re/Max Fine Properties
Research Media Ltd.
Richard + Bauer Architecture
Rockefeller Foundation
Rutgers and Posch
Ryley, Carlock & Applewhite Attorneys
Salt River Project
Sandia National Laboratory

Savage Film
Science and Technology Institute
Sciencenter, New York
Science Foundation Arizona
Science Museum of Minnesota
SciTech Strategies, Inc.
Scottsdale League for the Arts
Search Technology
Semi-Conductor Research Corporation
SETI Institute
SmithGroup
Snell and Wilmer Law
Sokolov, Sokolov, Burgess Solutions (SSB)
Spirit of the Senses Salon
Springer Publishing
SRI International
Strategic Advantage, Inc.
Sundt Construction, Inc.
Synthetic Biology Engineering Research Ctr. (SynBERC)
Targeted Genetics Corporation (TGen)
Teach America
Tempe Festival of the Arts (Fall and Spring)
Televerde
Testani Design Troupe, Inc.
The Elumenati, LLC
The Embryo Project
The Energy and Resources Institute
The Foresight Institute
The Galaxy Organization
The Rockefeller Foundation
The Royal Society
The Washington Post
Translational Genomics Research Institute (TGEN)
TraskBritt Intellectual
Underwood Bros., Inc.
Unicorn Media, Inc.
U.S. Government Accountability Office (U.S. GAO)
U.S. Department of Agriculture
U.S. Department of Homeland Security
U.S. DOE/Center for Integrated Nanotechnology (CINT)
Will Bruder & Partners Ltd.
Winnipeg Art Gallery
Woodrow Wilson International Center for Scholars

5. Quantifiable Outputs

Table 1: Quantifiable Outputs - NSF Award #0937591

Outputs	Reporting Year -1 2010-2011	Reporting Year-2 2011-2012	Reporting Year-3 2012-2013	Reporting Year-4 2013-2014	Reporting Year 5 2014-2015	Total
Publications resulted from NSEC Support						
in Peer Reviewed Journal	19	40	71			130
in Peer Reviewed Conference Proceedings	0	0	0			0
in Peer Reviewed Book Chapters	9	16	33			58
Technical Reports	7	6	1			14
Working Papers	7	2	2			11
Books	3	2	3			8
Theses	9	8	5			22
in Trade Journals	3	0	2			5
Other Journal Publications	2	6	9			17
Internet	24	8	15			47
with Multiple Authors	35	42	110			187
co-authored with NSEC faculty	34	41	136			211
NSEC Technology Transfer						
Inventions Disclosed	0	3	3			6
Patents Filed	0	0	0			0
Patents Awarded	0	0	0			0
Software Licensed	0	0	0			0
Spin-off Companies Started	0	0	0			0
Degrees to NSEC Students						
Bachelors Degrees Granted	14	8	12			34
Masters Degrees Granted	12	11	9			32
Doctoral Degrees Granted	14	10	5			29
NSEC Graduates Hired by						
Industry	12	15	3			30
NSEC participating Firms	0	0	0			0
Other US Firms	12	15	3			30
Government	3	2	2			7
Academic Institutions	15	12	3			30
Other	0	0	0			0
Unknown	10	0	18			28
NSEC Influence on Curriculum						
New Courses Based on NSEC Research	4	7	1			12
Courses Modified to Include NSEC Research	0	0	0			0
New Textbooks Based on NSEC Research	0	0	0			0
Free-standing Course Modules or Instructional CDs	0	0	0			0
New Full Degree Programs	1	0	0			1
New Certificate	0	0	2			2
Information Dissemation/Educational Outreach						
Workshops, Short Courses to Industry	0	3	8			11
Workshops, Short Courses to Others	5	9	3			17
Seminars, Colloquia, etc.	112	141	121			374
World Wide Web courses	1	0	0			1
Academic Presentations	60	86	74			220
Industry Presentations	18	27	12			57
Science Cafes	7	8	6			21
Visiting Speakers	17	5	6			28
Community Speaking Engagements	4	3	12			19
Newsletters	0	0	0			0

6. Mission, Significant Advances, and Broader Impacts

The Center's mission is to: 1) *research* the societal dimensions of nanoscale science and engineering (NSE); 2) *train* a community of scholars with new insight into these dimensions; 3) *engage* various publics and NSE researchers in dialogues about the goals and implications of NSE; and 4) *partner* with the NSE enterprise to generate greater *reflexiveness* in research, development, education and policy. Using the methods of real-time technology assessment (RTTA; Guston and Sarewitz 2002), CNS-ASU weaves together these activities to support a broad-based societal capacity for the *anticipatory governance* of emerging technologies.

The Center has made significant strides in accomplishing this mission. In particular, the Center's RTTA methods and its anticipatory governance vision have been recognized in important scholarly venues, e.g., the field-defining *Handbook of Science and Technology Studies*, which includes Barben et al.'s (2008) chapter, and the series on innovation policy in *Nature*, which published Guston's (2008) commentary. The Center's work also includes a more detailed genealogy of anticipatory governance (Karinen and Guston 2010), a synoptic piece placing anticipatory governance in the NNI's approach to responsible development and in the context of some recent scholarly debate (Guston revise and resubmit, *SSS*), and a historical exploration of a critical case in anticipation of the atomic bomb (Guston 2012). A forthcoming submission of a special issue (edited by Barben and Guston) on reflexive and anticipatory governance to *Social Studies of Science* delves deeper into the constituent capacities anticipatory governance. Beyond such publications, a number of programs and scholars have begun to adopt anticipatory governance and scrutinize it for their own purposes, from the incorporation of anticipatory governance into the programmatic agenda of the Nano-scale Informal Science Education Network's (NISE Net) public forums (see **Section 12 Outreach and Knowledge Transfer**), to the work of a cadre of international scholars and practitioners who have visited CNS-ASU to imbibe its perspective (see **Section 13 Shared and Other Experimental Facilities** [**International Collaborations**]), to sessions at the annual meetings of the AAAS Science and Technology Policy Forum (May 09), the Society for the Study of Nanoscience and Emerging Technologies (F 09; F 10; F 11; F 12) and the Society for Social Studies of Science of Science (F 09; F 10) dedicated to anticipatory governance, and elsewhere.

Moreover, anticipatory governance and its component capacities are represented in NNI and other official planning documents, including: endorsement of scenario development as a route to understanding nanotechnological futures, in the NNI 2007 strategic plan; highlighting of integration research as an important element in future NSE collaborations with social science, in the FY 2012 NNI budget summary from NSF; focusing importantly on anticipatory governance in the 2010 NSF/WTEC report on the future of nanotechnology; etc. Guston (revise and resubmit, *SSS*) has begun to collect many of these responses in the community and respond to some critics that have emerged, and the funded supplement to CNS-ASU has begun to research the Center's various impacts and outcomes, including the uptake of anticipatory governance.

CNS-ASU research is having a substantial influence on the scholarly literature. The *Yearbook of Nanotechnology in Society* series (Springer; Guston, series editor) has published three volumes (Fisher, Selin and Wetmore 2008; Cozzens and Wetmore 2011; and Hays, Robert, Miller and Bennett 2013). A fourth is well underway, with draft chapters from most authors (de Ridder

Vignone, Miller and Barben in preparation 2014). The two-volume *Encyclopedia of Nanoscience and Society* (Sage; Guston, editor) was published in 2010. Both the *Yearbooks* and the *Encyclopedia* serve community-forging purposes. The *Yearbook* helps create a community of scholars around a narrow topic and then provides them with relatively high visibility. The *Encyclopedia* has brought together a larger community of scholars in its production – roughly 220 authors – and will help introduce a younger scholarly audience – high school and undergraduate students – to nearly 500 topics in nanotechnology in society. In total, Center researchers have 10 books published, under review or under contract around Center-related material, five of which are primary CNS publications.

The Center's researchers have published, had accepted or submitted for review 186 peer-reviewed journal articles (136 of which are primary CNS-supported publications), covering a range of outlets including:

- broad-based audiences in science and technology studies (e.g., *Science, Technology & Human Values*; *Science as Culture*; *Minerva*; *Social Studies of Science*),
- policy and innovation studies (e.g., *Science and Public Policy*; *Research Policy*; *Journal of Technology Transfer*, *Technological Forecasting & Social Change*, *Review of Policy Research*, *Research Evaluation*),
- law and ethics (*Science and Engineering Ethics*; *Journal of Law, Medicine, and Ethics*, *Jurimetrics*),
- communication (*Science Communication*; *Journal of Mass Communication Quarterly*; *Public Understanding of Science*; *New Media and Society*, *International Journal of Public Opinion Research*),
- urban sustainability issues (*Cities*; *Journal of Urban Technology*, *Sustainability Science*),
- other interdisciplinary specialty journals (*Appetite*; *Long-range Planning*; *China Intellectual Property*) and
- specific, NSE-related audiences for
    - scientists (*Journal of Nanoparticle Research*; *Nature Nanotechnology*; *Journal of NanoScience and Nanotechnology*),
    - policy makers and business leades (*Nanotechnology Law and Business*),
    - social scientists and humanists (*NanoEthics*) and
    - educators (*Journal of Nanotechnology Education*).

The Center's researchers have produced three special issues of peer reviewed journals:

- Fisher, *Science and Engineering Ethics* 17(4), "Public Science and Technology Scholars"
- Bozeman and Sarewitz, *Minerva* 49(1) "Public Value Mapping" and
- Shapira and Youtie, *Journal of Technology Transfer* 36(6) "Nanotechnology and Innovation Policy,

and they are at work on five additional special issues:

- Barben and Guston, *Social Studies of Science*
- Davies and Invernizzi, *Journal of Nanotechnology Law and Business*
- Guston, *Review of Policy Research*,
- Selin, *Futures* and
- Selin and Pereira, *International Journal of Foresight and Innovation Policy*.

The Center has 27 non-peer-reviewed publications in trade journals and other journals, including commentaries by Brossard and Scheufele (2013) in *Science*, Guston in *Nature* (2008) and in

People & Science (2009), Shapira and Wang (2010) in *Nature*, Scheufele and Corley in *The Scientist* (2010), and Wetmore and Posner in *NanoToday*.

Center researchers have further published or have forthcoming 79 book chapters (66 of which are primary CNS-supported publications), including three contributions to the field-defining *Handbook of Science and Technology Studies*, many contributions to the *Yearbooks* and other new nano-in-society anthologies, and major international works on interdisciplinarity, governance, risk, and innovation policy and assessment. The *Encyclopedia of Nanoscience and Society* also drew on the expertise of Center-affiliated researchers for 59 entries, or about 12% of the total number, which are listed under "Other."

Although citations are a somewhat crude measure of scholarly impact, this body of published work is already garnering an impressive number – more than 3300 citations as documented in Google Scholar (as of Apr 13), up from just over 1500 citations in Mar 12, 983 citations in Mar 11, roughly 500 citations in Apr 10, and 188 citations in Apr 09. The Center's H-index has risen to 28, from 21 last year and 19 the year before (indicating precisely 28 publications with 28 or more citations each). (This total does not include the more than 80% of the 310 Google Scholar citations to the original RTTA article by Guston and Sarewitz [2002] that have occurred since CNS-ASU was founded and which represent the visibility of the Center and its core intellectual ideas as well. It also excludes some recent *Nature Nanotechnology* publications, which do not appear accessible on Google Scholar, as well as citations to *Yearbook* chapters not written by CNS researchers or individual *Encyclopedia* entries whether or not written by CNS researchers.) Particularly pleasing about the H-index publications is their inclusion of work from almost all of the research thrusts and intellectual perspectives of the Center.

CNS-ASU has also attempted to make its research and other products available in other formats, including 35 reports of various types available on the Internet and numerous video and audio clips available through the CNS website, YouTube, and other organized blogs.

As evidence of its impact on education, the Center has primarily contributed to the completion of 42 student theses, including 17 doctoral theses, 3 master's theses, and 22 undergraduate honors theses, across a variety of disciplines. CNS has contributed to the completion of an additional 21 student theses, including STIR collaborators, CNS-Biodesign fellows and others completing the PhD+. These numbers include only a handful of roughly one dozen doctoral students whose research is formally being guided by the STIR project, as well as additional students who have become affiliated with that project but are not formally part of it and other students advised by Center faculty outside CNS-ASU on related topics.

Data and instruments produced by CNS-ASU are sought by and shared with an increasing number of researchers across the globe. For example, the searchable definition of nanotechnology produced by RTTA 1 has been adopted by the European Nano Observatory. The public opinion survey instrument developed by RTTA 2 was not only developed in coordination with EuroBarometer but also has been shared with researchers in Singapore, Ireland, France, and Poland. Survey data has also been provided to policy officials, including the National Nanotechnology Communication Office. NCTF data have been used not only by the distributed groups of scholars who hosted local citizens' technology forums, but have also been provided at

the request of researchers at NYU and in France. In Feb 12, CNS-ASU collaborated with librarians at UMass Amherst in submitting a $48K proposal to Institute for Museum and Library Services for a planning activity, "Nanoscience and Emerging Technologies in Society: Sharing Research and Learning Tools," which will occur in June 13.

Center activities have also helped generate additional research projects, including more than $4.4M of associated and spin-off awards at ASU and roughly $3.1M at the collaborating universities. At ASU, these awards include:

- Boradkar, et al., National Collegiate Inventors and Innovators Alliance, $30K, Sep 07 – May 08 (this award supported one year of InnovationSpace on CNS agenda);
- Sarewitz and Bozeman, NSF SciSIP, $203K, Oct 07 – Sep 10, Public Value Mapping: Developing a Non-Economic Model of the Social Value of Science and Innovation Policy (this award included collaborations with TRC 1 and RTTA 4);
- Sarewitz and Fisher, NSF SciSIP, $35K, Aug 10-Sep 10, How to STIR Public Values for Policy Making: A Supplemental Proposal for Web-based Dissemination of Two SciSIP Projects (a supplement to the PVM award above, this award extended outreach and dissemination via video for both PVM and STIR projects across RTTA 1 and RTTA 4);
- Herkert, Wetmore, et al., NSF Ethics Education in Science and Engineering, $300K, Jan 08 – Dec 10 (this award tested a number of macro-ethics education interventions, several initially piloted by CNS-ASU);
- Guston, NSF Conference Award for the Gordon Research Conference, $60K, Aug 08 (this award supported the GRC on "Governing Emerging Technologies");
- Guston, Greenwall Foundation Conference Award for the Gordon Research Conference, $10K, Aug 08 (this award supported the GRC on "Governing Emerging Technologies");
- Fisher and Guston, NSF Socio-Technical Integration and Research, $540K, Apr 09-Mar 12 (this award extends the RTTA 4 agenda to create an international team of doctoral students doing interventionist-oriented comparative laboratory ethnographies);
- Fisher, National Nanotechnology Infrastructure Network, 09-10, $5,300 (this award documents the integration of social and ethical considerations into a number of NSEC and NNIN sites);
- Corley, Marchant and Sylvester, DOE, $245K, Sep 10-Aug 12, Governing Nanotechnology Risks and Benefits in the Transition to Regulation: Innovative Public and Private Approaches (this award draws on and extends Corley's RTTA 2 work);
- Corley, Lincoln Center for Applied Ethics, ASU, $20K, May 10 – Dec 11, An Exploration of the Ethical Implications of Human Exposure to Nano-Materials in University Research Laboratories (this award draws on and extends Corley's RTTA 2 work);
- Selin, Science Museum Minnesota, $9K, Sep 11-Dec 11, Civic Scenarios on Climate Change Adaptation (this award extends Selin's RTTA 3 research and outreach);
- Wiek, Housing and Urban Development, $2.9M, Reinvent Phoenix: Cultivating Equity, Engagement, Economic Development and Design Excellence with Transit-Oriented Development (continues TRC 2 work to address socio-technical change as a key aspect of sustainability transition research);
- Guston, NSF, Workshop on Anticipatory Governance of Complex, Engineered Nanomaterials, $50K (to apply anticipatory governance framework to advanced generation nanomaterials);

- Graduate students Foley and Kalinowski, $2K, ASU Graduates in Integrative Society and Environment Research on "Future Visions at M52: Investigating Social, Ethical, and Legal Constraints;"
- Lobo et al. DOE, $98K, Sunshot Seed grant for "Forecasting and Influencing Technological Progress in Solar Energy;" and
- Wender et al., $2K, ASU Graduates in Integrative Society and Environment Research on "Burdens and Barriers to Terrawatt-scale Photovoltaic Energy."

At GA Tech, these awards include:

- Porter, NSF National Partnership for Managing Upstream Innovation, $45K, Nov 04 – present;
- Shapira, Youtie, Rogers, NSF Measurement and Analysis of Highly Creative Research, $340K, Jan 08 – Dec 10;
- Porter et al., NSF Measuring and Tracking Research Knowledge Integration $393K, Sep 08 – Aug 11;
- Porter et al., NSF NER: Representations of Active Nanostructures Across Scientific, Popular, and Policy Realms of Discourse, $85K, Jan 07 – Aug 09;
- Porter et al., UK Royal Commission, $20K, Jan 08 – Apr 08;
- Porter, Youtie and Meyers, Euronano, $21K, Jul 07 – Jan 08;
- Fernandez-Ribas, Kauffman and GA Research Alliance, Small Businesses International Nano Patent Strategies, $16K, Jun 08 – May 09;
- Randles, Shapira, et al. National Research Council of Canada, UK Nanoclusters, $40K, Jan 09 – Apr 09;
- Rogers, Youtie, Porter, Shapira, NSF Assessment of Nanoscale Science and Engineering Systems, $200K, Oct 09 – Sep 10;
- Shapira, Tang, Meng. Chemical Heritage Foundation, Development of Advanced Materials in China: Case Studies of Nanotechnology Materials Innovations, $10K, Sep 09 – Aug 11;
- Shapira, Youtie. National Nanotechnology Infrastructure Network, Social and Ethical Issues Seed Grant Competition, 2010, Nanotechnology's Transition from Discovery to Commercialization in Small and Medium-sized Enterprises: An Exploration of Evidence from Novel Unstructured Sources, $19,712, May 10 – April 11;
- Porter et al., NSF SciSIP, TLS: Revealing Innovation Pathways, April 2011- Jan 2014, $419k,
- Shapira, et al., UK Economic and Social Research Council, Emerging Technologies, Trajectories and Implications of Next Generation Innovation Systems Development in China and Russia $350k, Sep 2012-Sep 2014, and
- Arora, Georgia Tech Research and Innovation Conference, $1.5K, Feb 12.

At Wisconsin, these awards include:

- Scheufele, University of Wisconsin—Madison Graduate School, Science and Social Responsibility: Tapping Values and Perceptions among Researchers in Nanotechnology, $9,029, Sp 07;
- Scheufele, NSF, Media, Talk, and Trust: The Social Amplification of Risk during Site Selection for a Bio-research Facility, $400K, Sep 08- Oct 10;
- Scheufele (co-PI with PI Berube at NCSU), NIRT: Intuitive Toxicology and Public Engagement, $1.4M ($150K at UW), Sep 08- Oct 10;

- Scheufele (consultant with PI Hallman at Rutgers), USDA CSREES National Research Initiative (NRI) Food Nanotechnology: Understanding the Parameters of Consumer Acceptance, $200K, Sep 08- Oct 10; and
- Scheufele (with PI Wilson), DOE, Developing a User Experience for the Next Generation Nuclear Fuel Cycle Simulator, $1.2M, Sep 11-Oct 14.

CNS-ASU has been a force for institutional change at ASU and its collaborating universities. Programs have adopted CNS-ASU tools and approaches as well as the broader theme of anticipatory governance, which has emerged as an important element in the conceptualization of new ASU initiatives. In addition to having created numerous undergraduate and graduate courses and its PhD+, CNS-ASU has:

- collaborated with ASU's Biodesign Institute to require integrated societal training of the doctoral students in its new Biological Design PhD program;
- collaborated with ASU's new Professional Science Master's program in Nanoscience to offer a societal training course in the new curriculum;
- collaborated with ASU's new Professional Science Master's program in Solar Energy Engineering and Commercialization to offer integrated societal training in the new curriculum;
- collaborated with ASU's new NNIN node to develop a training program in the societal dimensions of nanotechnology and in informal science education for its users;
- helped instigate the creation of a PhD+ program at GA Tech;
- provided leverage for a proposal by Scheufele at Wisconsin for a "Science and Culture" cluster hire to add personnel to the infrastructure that CNS has supported there;
- collaborated with ASU's university-wide energy initiative, LightWorks, to integrate research on the social and governance challenges of energy systems transitions ; and
- collaborated with a number of proposals to NSF (STC, ERC, IGERT and NUE), DOE (ARPA-E and Hub) and NIH emerging from ASU containing programs that CNS pioneered. Funded NSE and emerging technology awards at ASU with CNS-ASU partnerships and activities include:
  - Lindsay, NSF NIRT for organic photo-voltaics, $1.1M, Sep 06 – Aug 10;
  - Posner, NSF CBER, Interaction of Engineered Nanomaterials with Artificial Cell Membranes, $313K, Sep 09 – Aug 12;
  - Posner, NSF CBER, Collaborative Research: Rational Design of Enhanced Catalytic Nanomotors, $600K, Mar 09 – Feb 12;
  - Phelan, NSF PSM, Professional Science Master's in Solar Energy Engineering and Commercialization, $700K, Jul 10 – Jun 13;
  - Honsberg, NSF ERC, Quantum Energy and Sustainable Solar Technologies, $20M, Aug 11 – Jul 16;
  - Panchanathan, NSF IGERT, Person-Centered Technologies and Practices for Persons with Disabilities, $3M, Aug 11 – Aug 16;
  - Vermass, NSF IGERT, Solar Utilization Network, $3M, Jun 12 – May 17.

Additionally, CNS-ASU researchers have the following associated or collaborative proposals that incorporate CNS ideas under review:

- Guston, NSF SAVI for Virtual Institute for Responsible Innovation, $500K, submitted Aug 12; and
- Wetmore, Harsh and Zachary, NSF STS, Computer Science in Africa, $300K, submitted Aug 12.

While **Section 13 Shared and other Experimental Facilities** details the visits and other contributions by roughly ninety international scholars and practitioners to the Center from more than 20 countries, CNS-ASU scholars have also engaged in substantial international collaborations based on their Center-related work. For example:

- Selin is a senior researcher on a EU 7th Framework funded project led by Strand (Bergen) on "Integrated Assessment of Societal Impacts of Emerging Science and Technology from within Epistemic Networks," to investigate how different methods of analyzing and assessing new and emerging fields of technology can be better integrated, $2.1M, Apr 12-Mar 15.
- Guston is a named international associate on a five-year project funded by the Leverhulme Trust led by Nerlich (Nottingham) on "Making Science Public," to investigate how changes in public engagement with science affect the theory and practice of democracy, $2.84M, May 12-Apr 17.
- Shapira and Youtie are principals with the Innovation Co-Lab – a collaboration of researchers at Georgia Institute of Technology, the University of Manchester (UK), and the Beijing Institute of Technology (China) to advance methodologies and analyses to anticipate the trajectories of emerging technologies. The Co-Lab's focal technologies include graphene, other nanotechnologies and advanced green goods. Co-Lab projects are sponsored by the British Council, the UK Economic and Social Science Research Council, and Chinese Ministry of Science and Technology. Georgia Tech CNS-ASU researchers Porter and Rogers and students Arora, Carley, and Li are among those also engaged in the Innovation Co-Lab.
- Shapira was appointed in 2011 to the advisory board of the Foresight Centre, National Research University - Higher School of Economics (HSE), Moscow, Russia, which focuses on the analysis of emerging technologies including nanotechnology. The Georgia Tech RTTA1 group is a partner with HSE and the Beijing Institute of Technology in a successful University of Manchester proposal to examine nanotechnology emergence in the rising powers of China and Russia.
- Scheufele is member of the External Advisory Committee for the *Wellcome Trust Monitor*, a national tracking survey conducted by the Wellcome Trust in London, UK. He advises on questionnaire construction, data analysis etc.
- Wetmore was a "Bright Ideas" Visiting Research Fellow in Summer 2011 at the ESRC Genomics Policy & Research Forum, University of Edinburgh, Scotland to continue his collaborations on developing new ways to help scientists and engineers better understand the social implications of their work.
- Fisher serves on the Scientific Advisory Boards for the "Applied Metagenomics of the Watershed Microbiome" project (Tang, PI), funded by Genome Canada, and for the "Exploring Possibilities for Patient Involvement in Translational Medicine" project (Boenink, PI), funded by the Netherlands Genomics Institute and Centre for Translational Molecular Medicine.

The following section briefly summarizes the most significant advances of the Center over the last year in terms of fundamental knowledge and technology (here conceived as applied and/or reflexive knowledge, processes, and capacities, often but not exclusively for internal use).

Fundamental knowledge. Each research program, and most individual research projects, contributed significant advances in fundamental knowledge of the societal aspects of nanotechnology in the last year. This section provides some highlights.

- RTTA 1 Research Program Analysis: Analyzing extensive global databases of Science Citation Index records, other publication databases, and patent databases (MicroPatents, PatStat), CNS-ASU researchers have found:
    - The nanotechnology research enterprise is marked by the rise of nanobiotechnology publications and the global frontrunner position of China in absolute publications with over 20,000 publications in 2010 although not in influence as measured by citations (Arora, Porter, Youtie, and Shapira 2012).
    - Green nanotechnology applications – particularly in solar cells, photovoltaics, batteries, fuel catalysts, and water filtration – have the potential to make significant contributions both to addressing green challenges and to fostering sustainable economic development but attention has to be given over the life cycle to the energy and resource requirements to initially produce nano-scale materials, to the sources of energy (renewable or non-renewable) required for their large-scale manufacture, to the fate and disposition of nanomaterials during and after use and associated environmental, health, safety and societal implications, and to broader societal values and considerations (Shapira and Youtie 2012).
    - Green nanotechnology patents have the same number of inventors as the average green patent, but more claims, more citations, and more technology codes and thus may be more "inventive" or "novel" (Lobo and Strumsky in preparation); and
    - Research centers as a policy tool in the US National Nanotechnology Initiative (Rogers, Kay, Youtie, 2012). Using a database that compares nanotechnology research centers to other research centers and unaffiliated researchers, this study indicates that many companies are using the nanoscale science and engineering centers as a network.
    - While graphene as a whole is experiencing concurrent scientific development and patent growth, country- and application-specific trends offer some evidence of the linear and double-boom models (Shapira, Youtie, and Arora 2012).
- RTTA 2 Public Opinion and Values: CNS-ASU researchers found:
    - There are widening gaps in knowledge about nanotechnology since 2004 between the least educated and most educated members of the US public (Cacciatore, Scheufele, & Corley forthcoming);
    - There are three distinct types of nano-scientists with unique perspectives on regulation: cautious innovators, nano-regulators, and technological optimists (Corley, Scheufele and Kim 2012).
- RTTA 3/1 Scenario Development
    - There is an appropriate role for plausibility, as opposed to probability or risk, in scenario development work (Ramirez and Selin, in press); and

    - Participatory processes should be understood as constituted by embodied experience, objects, and affects as well as by discourse (Davies forthcoming).
- RTTA 3/4 National Citizens' Technology Forum: Based on reports from citizens' participating in the NCTF, pre- and post-tests from the event, transcripts, a follow-up survey, and other data, CNS-ASU researchers have found:
    - NCTF participants believe that their experience was valuable and that such forums should be used to foster democratic principles and promote public understanding and engagement with science (Cobb and Gano 2012).
- RTTA 4/2: Through a set of integrative research and educational activities with NSE researchers, CNS-ASU researchers have found:
    - Integrative research tends to increase reflexive awareness among researchers, can introduce changes in practice, and often has longer-lasting residual effects (various STIR reports and manuscripts in preparation); and
    - Significant support for the midstream modulation proposition that the acknowledgement of social and ethical dimensions of their work by scientists and engineers can constitute a prerequisite for an increased capacity on their part to effectively take such broader dimensions of their work into account.
- TRC 1: Through field work in South Africa, combined with bibliometric and patent analysis and other documentary research, research on Equity, Equality and Responsibility has found:
    - There have been only a small number of isolated cases in which South African researchers have explored pro-poor technologies, but there have been signs in other areas that nanotechnology is being used to further equity efforts in the country and across the continent (various manuscripts in preparation).
    - The pro-poor promise of a number of nanotechnologies is not playing out well in actual nanotechnology research agendas (various student publications).
- TRC 2 (former): Through an "end-to-end" process in which issues in Human Identity, Enhancement, and Biology are systematically connected with RTTA activities, CNS-ASU researchers and other contributors to the *Yearbook of Nanotechnology in Society: Nanotechnology, the Brain and the Future* (Hays, Robert, Miller and Bennett 2013) have found that there is significant and substantive connection between nanotechnology and issues in human cognitive and other potential enhancements.
- TRC 2 (current): TRC 2 researchers have found:
    - By developing and analyzing indicators that map to five "sustainability syndromes" characterizing the City of Phoenix, numerous challenges for achieving urban sustainability in the region exist (Foley dissertation in preparation); and
    - The "demand" of urban sustainability problems and prospective "supply" of nanotechnology innovations are not well matched (Wiek, Foley and Guston 2012).

Technology (in this case, mostly applied and/or reflexive knowledge, processes, methods and capacities; often these are developed in one part of CNS-ASU and used in another, thus forming the intellectual core of "ensemble-ization").

- RTTA 1 Research and Innovation System Analysis:

  - RTTA 1 completed its redesign of the searchable definition of nanotechnology, which is supported by numerous programs and dictionaries to enable its use.
  - Several targeted bibliometric studies supported ongoing CNS-ASU work.
- RTTA 2 Public Opinion and Values:
  - RTTA 2's media database is tapped by other programs.
- RTTA 3 Anticipation and Deliberation:
  - InnovationSpace discloses three inventions per year to Arizona Technology Enterprise (AZTE) under CNS-ASU sponsorship.
- RTTA 4 Reflexivity and Integration:
  - STIR protocol is used by numerous researchers outside of the official project.
  - RTTA 4/3 researchers created a large database that has been used for additional projects by other RTTA researchers.
- TRC 2 Urban Design, Materials and the Built Environment
  - The NICE Database catalogues nanotechnologies for the urban environment that is available for users within and without CNS-ASU in short order.

Education and Training:

- At the post-doctoral and junior researcher level, CNS-ASU continues to train high-quality junior researchers and place them into important positions. Most recently Harsh, who began as a CNS post-doc, assumed a tenure-track position at Concordia University in Montreal. Faculty placements of CNS graduate students include Cacciatore, who will be an assistant professor at the University of Georgia; Cortes-Lobos, who will be a professor in the Technology Management Graduate Program at the Universidad de Talca in Santiago, Chile; and Soumonni, wh has a tenure track faculty position at the University of Witwatersrand, South Africa.
- At the graduate level, CNS-ASU has involved roughly two dozen graduate students (funded, unfunded, and visiting) in its YR 8 research activities, not including another approximately 20 STIR students. The Center designed new courses for graduate students, introduced a new graduate certificate, and initiated the Winter School. We are collaborating to teach students at ASU's Professional Science Master's Program in Nanoscience, Professional Science Master's Program in Solar Energy, and in the Biological Design PhD program, and we continued other courses at the graduate level. The Center continues to play an integral role in the Human and Social Dimensions of Science and Technology doctoral program and the Professional Science Master's degree program in Science and Technology Policy, both coordinated by Center senior personnel Miller at ASU.
- At the undergraduate level, CNS-ASU continues to teach classes influenced by the Center, including "Introduction to Science and Technology Policy" for 125 undergraduates at ASU. InnovationSpace continued to make contributions in the cross-training of business, design, and engineering students and the production of provocative and concrete ideas of future nanotechnology products. The Center also contributed to the creation of a new STS minor at ASU.
- In informal science education, CNS-ASU deepened its strategic and highly generative partnership with NISE Net, not only participating in NanoDays in Mar 13 but more importantly working through a series of meetings to develop real innovations in NISE

Net materials, tabletop displays, planned exhibits, and training for museum staff in societal aspects of nanotechnology.
- In training for scientists and engineers, CNS-ASU continues its improved relationship with NNIN through the local node at ASU, providing both required social and ethical implications training and an informal science communication program to NNIN users and joining the recompete proposal for the NNIN, led by Stanford.

Industrial collaborations. The most significant private-sector collaborations that CNS-ASU participated in over the past year are:
- conducting the Dec 12 TRC 2 workshop, "Future Scenarios of Nanotechnology Innovation" and associated activities;
- the disclosure of InnovationSpace inventions to AZTE and other private sector contact through ISpace;
- the completion of intensive interviews and workshops with private-sector participants in the regional nanotechnology innovation system in Phoenix;
- continuing work on a special issue of the *Journal of Nanotechnology Law and Business*; and
- the participation of high-profile private-sector participants in providing sponsorship, leadership, and content in *Emerge*.

The following section briefly describes the current and potential impacts of CNS-ASU on teaching, training, and learning; outreach to pre-college institutions; broadening the participation of underrepresented groups; enhancement of infrastructure of research and education; dissemination to scientific and technological communities; and benefits to society.

Teaching, training and learning. At any given time, CNS-ASU, across its three constituent universities, is training in various capacities approximately one-half dozen junior research faculty and post-doctoral fellows, two dozen graduate students, and one dozen undergraduate students in the societal aspects of nanotechnology. At the constituent universities, most of this training consists of working on CNS-related research projects under the subcontracts to those universities. In each location, but at Wisconsin in particular, the community of trainees is larger than that of funded student researchers because the data developed by the Center are too extensive to be analyzed entirely within the budget. At Wisconsin and ASU, CNS-related research is being incorporated into numerous classroom modules and activities. At ASU, CNS has engaged in extensive training and curriculum development and innovation. In this reporting year, CNS-ASU has continued to influence undergraduate courses in disciplinary areas, expanded its graduate training with new coursework and research opportunities for both social scientists and NSE students, and collaborated with NISE Net to expand the inclusion nano-in-society ideas in informal science education.

Outreach to pre-college institutions. CNS-ASU has arranged for continuing education credit for in-service teachers for attending its Science Cafes. In previous years we have reported on the development and teaching of what we believe to be the nation's only graduate-level course for in-service high school teachers in nanotechnology and society, and on our inability to find an appropriate financial model for attracting enrollment to the course. We previously modified the course for inclusion in the PSM in Nanoscience degree program, and we have

taught it again the current year. The *Encyclopedia of Nanoscience and Society*, published in YR 6, has high school and college libraries as its target market. We are also orienting our interactions with NISE Net to help develop materials for the in-service teachers with whom science museums work. In conjunction with ECAST, CNS-ASU has developed a model for deliberative engagement with high school students over issues in science and emerging technologies. While two (on geoengineering and synthetic biology) were conducted in prior years, one in conjunction with WWV on Biodiversity was conducted in the reporting year.

Broadening participation of under-represented groups. CNS-ASU, including its constituent universities, has developed a strong record of including women in key research and leadership positions and recruiting members of under-represented groups into graduate and undergraduate research positions. In most measurement categories, CNS-ASU equals or exceeds national averages. In previous years, we have focused attention on disability communities as an under-represented population through the activities of TRC 1 Equity and Responsibility and (former) TRC 2 Human Identity, Enhancement, and Biology. In a previous year, we replaced the symposium for under-represented students with a training activity more akin to the DC Summer Session and other training activities that CNS-ASU has made successful, but targeted for under-represented students in partnership with the Hispanic Research Center. Held for the first time in Sp 09 for two dozen graduate students from under-represented communities, the seven-week course was quite successful. We repeated it in Fall 11 and look to do so in Fall 13.

Enhancement of infrastructure for research and education. CNS-ASU maintains a web site (http://cns.asu.edu) that provides information about its research, education and outreach programs to a general audience. It has been redesigned in the recent year. CNS-ASU has most of its monthly seminars and occasional speakers' presentations available on the web site in audio, video, and PPT versions – including new video formats on YouTube, and the re-designed site will emphasize access to video and other resources. The website connections to several associated projects in-depth, including:

- The Plausibility Project site (http://www.cspo.org/projects/plausibility/), which has detailed information, references, and papers about the project;
- The STIR project website (http://cns.asu.edu/stir/) and Facebook site, which provides general information about the project and a password protected site for collaborative work among the far-flung international STIR network; and
- When approved, the Virtual Institute for Responsible Innovation will have a robust web presence that will leverage CNS-ASU in various ways.

CNS-ASU has been crucial in the creation and maintenance of the Society for the Study of Nanoscience and Emerging Technologies (S.NET; Guston is a founding member of the board, a member of the first and second program committees, and a co-chair of its third program committee). It co-hosted, with CNS-UCSB, the third annual meeting of S.NET in Nov 11, with more than 200 attendees from more than 20 countries. CNS-ASU co-sponsored, with NNIN, NISE Net and other ASU projects, the first Congress on Teaching the Social and Ethical Implications of Research, with more than 100 participants. CNS-ASU has also created a number of research tools and instruments, e.g., the searchable definition of nanotechnology and the databases derived with it, survey protocols and opinion data, and the

NCTF reports, internet transcripts and video data that have been sought by and provided to other scholars. CNS-ASU has also received roughly 90 international visiting students, scholars and practitioners seeking a vibrant intellectual community and training in the Center's methods.

Dissemination to scientific and technological communities. CNS-ASU has engaged in extensive dissemination activities, both to its social science and humanities colleagues, but also to the community of NSE researchers with whom it interacts. Roughly 20% of its published, forthcoming or under review journal articles appear in journals like *Nature Nanotechnology*, *Journal of NanoParticle Research*, *Journal of Nanoscience and Nanotechnology*, *EMBO Reports*, and others that are oriented toward science and engineering researchers. We have also published in trade and professional journals that target scientists, e.g., *Materials Today* and *Nano Today*, and have published one commentary in *Science* and two in *Nature*, as well as letters in both journals. CNS-ASU researchers have given nearly 700 presentations, roughly 60% of which were delivered to their social science colleagues and roughly one-third of the remainder to targeted audiences of scientists and engineers. Our dissemination activities have also included supported and unsupported invitations to our All Hands meeting, extended to roughly 10 individuals, including students, each year, and the workshops we conducted in YR 8. Dissemination to colleagues also includes the Winter School.

Benefits to society. In its Jul 07 memorandum, NSF describes a set of questions (sub-criteria) related to its broader impacts criterion. Here we articulate the contributions of CNS-ASU for each of these sub-criteria:

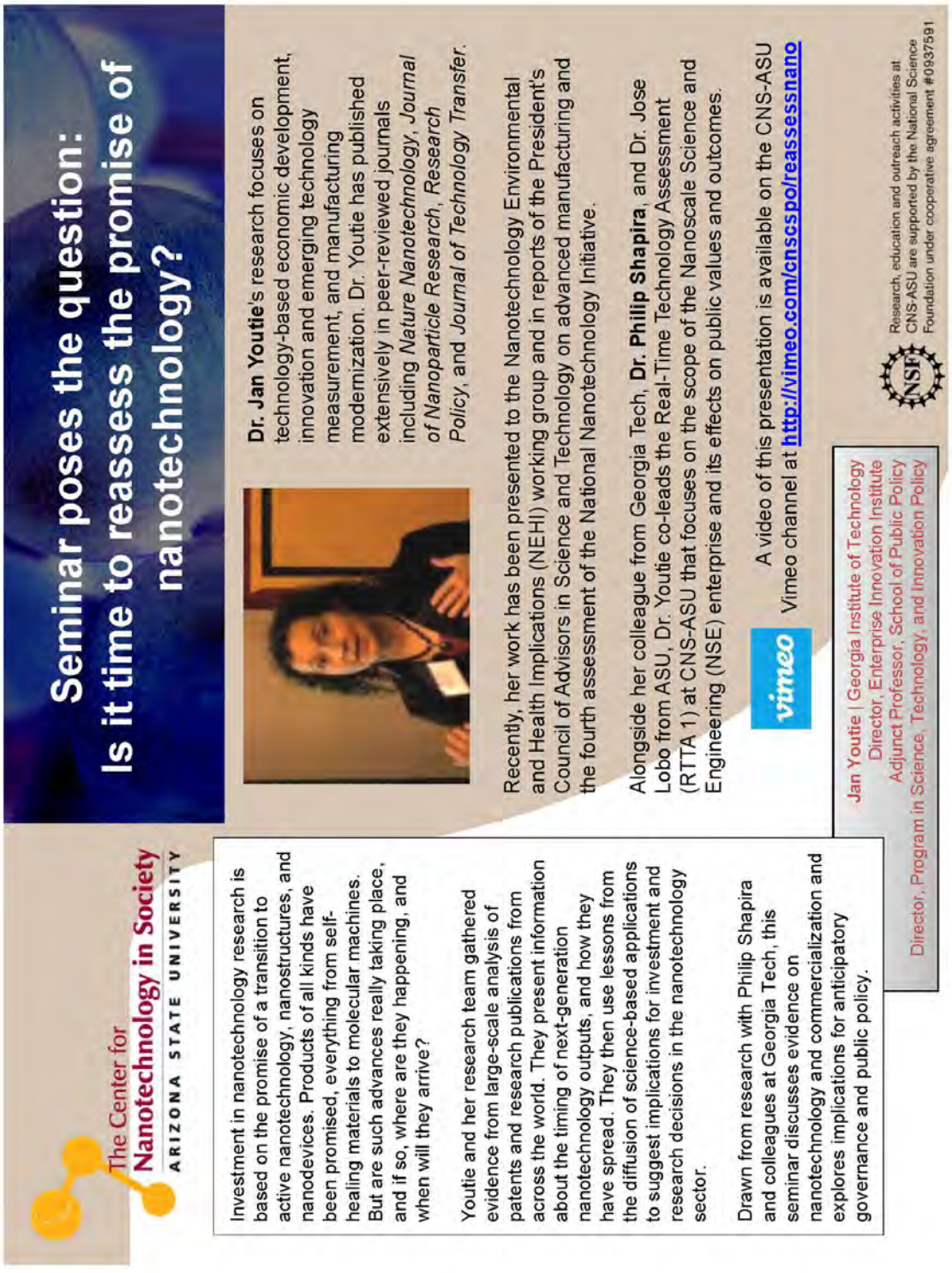
- *"How well does the activity advance discovery and understanding while promoting teaching, training, and learning?"* The integration of research, education, and outreach is a particular focus and strength of CNS-ASU, and many of its programs are designed toward this goal from the outset.
    - CNS-ASU has teaching, training, and learning projects at all levels from the pre-college education to post-doctoral training, as well as informal science education projects and training for scientists and engineers.
    - Most of these teaching, training, and learning projects integrate research, education, and outreach, e.g.:
        - Students and trainees participate in the NISE Net-sponsored NanoDays by staffing a booth of nano-demonstrations at a local arts festival;
        - Undergraduate research, e.g., as represented in the third *Yearbook*, is well-integrated with research programs;
        - Graduate course development, e.g., Selin's studio course derived from *Emerge* is driven by research interests and outreach opportunities;
        - Research frames are brought to bear on high school engagement programs in geoengineering, synthetic biology, and biodiversity;
        - CNS-ASU research activities become case studies for concurrent educational activities, e.g., integrating nanotechnology cases into the units of "Introduction to Science and Technology Policy;" and
        - CNS perspectives are incorporated into interdisciplinary graduate training through the participation of Miller and Guston in IGERT programs.

  - CNS-ASU partnerships with NSE researchers have enriched its Science Cafes, which local teachers may use for credit;
  - CNS-ASU trains a small number of CNS-Biodesign Fellows, CNS-FSE Fellows, and other PhD+ students to conduct societal implications research or perform outreach projects around their NSE research, and this program is expanding to GA Tech;
  - Student authors are included on a large plurality of CNS-ASU manuscripts;
  - Students are first or sole-author on roughly one in six CNS-ASU presentations, and they have presented their CNS-related work in a variety of venues;
  - CNS-ASU has created and will continue to develop a section of its website to serve as a clearinghouse for nano-in-society curricular activities.
- *"How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)?"* CNS-ASU has established a strong record for the participation of women and underrepresented groups. For the Center, however, diversity is not just a matter of inclusion of a diverse research population but making aspects of diversity explicit parts of the research agenda.
  - CNS-ASU fosters research topics that explicitly address issues of underrepresented groups, e.g.:
    - RTTA 1/1 Innovations Systems Assessment has investigated female involvement in nanotechnology patenting;
    - (former) RTTA 1/2 Public Value Mapping included attention to the differential impacts of minority participation in clinical trials for potential nano-therapeutics; and
    - An entire research program area on Equity, Equality and Responsibility (TRC 1), which in part addresses ethnic and geographic issues in the distribution of benefits and risks from nanotechnologies; and
  - CNS-ASU collaborates with the Hispanic Research Center on science policy training for its two dozen graduate-level fellows from underrepresented groups;
  - Through associate director Miller, CNS-ASU is collaborating on an IGERT award to ASU's Panchanathan on "Person-centered Technologies and Practices for Persons with Disabilities."
- *"To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships?"* CNS-ASU envisions itself as a national and international leader in promoting research, education, and outreach in nano-in-society topics and in integrating those topics into NSE research and education settings.
  - CNS-ASU exists as the largest node of the NSF-instigated nano-in-society network and has taken leadership in the generation of the following networks and collaborations (outside ASU):
    - CNS-ASU has hosted roughly ninety international visitors, from more than 20 different countries;
    - CNS-ASU has become a "core partner" in NISE Net, recognizing the extent and depth of collaborations centered on enhancing informal science education with expertise from the societal aspects of NSE; and
    - The Center conducted a Winter School on the Anticipatory Governance of Emerging Technologies, which involved more than one dozen junior scholars;

        - The associated STIR project leads an expanding international network of graduate students and laboratories.
    - Within ASU, CNS-ASU is a hub for transdisciplinary research and teaching, with specific activities including:
        - CNS curricular offerings currently enhance graduate education in the Biodesign Institute, the Ira A. Fulton Schools of Engineering, the Department of Physics and the Department of Chemistry and Biochemistry;
        - CNS supports InnovationSpace, which bridges the schools of design, engineering, and business;
        - CNS has helped create a new, cross-disciplinary undergraduate certificate in Science, Technology and Society;
        - CNS graduate coursework helps link the Schools of Politics and Global Studies, Human Evolution and Social Change, Life Sciences, and the Human and Social Dimensions of Science and Technology doctoral program;
        - CNS has led the creation of a new graduate certificate in responsible research and innovation; and
        - CNS collaborative research and teaching activities are included on virtually every large NSF proposal (IGERT, ERC, SRN, STC) submitted by ASU.
    - CNS-ASU partners with the Arizona Science Center for the production of monthly Science Cafes during the academic year;
- *"Will results be disseminated broadly to enhance scientific and technological understanding?"* CNS-ASU aims to reach a variety of audiences – scholarly, professional, and public – with its research, education, and outreach activities.
    - CNS-ASU's e-mail distribution list reaches roughly 1400 individuals;
    - CNS-ASU researchers have given nearly 700 talks across all audiences since the inception of the Center, with nearly 100 in YR 8 alone;
    - CNS-ASU targets networks and user facilities for the distribution of nano-in-society training material, e.g.: NISE Net has disseminated CNS-ASU products to approximately 300 museums and other participants in NanoDays;
    - CNS-ASU conducts monthly (academic year) Science Cafes – many directly involving CNS personnel – during the academic year, averaging approximately 50 persons in attendance at the Arizona Science Center;
    - CNS-ASU has a contract with Springer to produce the first five volumes of the *Yearbook of Nanotechnology in Society* (Guston, series editor), the first three of which are published, and the fourth of which is significantly in preparation;
    - CNS-ASU Director Guston has published the two-volume *Encyclopedia of Nanoscience and Society* (Sage, 2010) that transmits detailed concepts in nano-in-society to high school and college students;
- *"What may be the concrete and demonstrable benefits of the proposed activity to society?"* The concept of anticipatory governance – comprising foresight, engagement, and integration – provides the intellectual framework for the broader benefits to society that CNS-ASU seeks to generate.

- Foresight activities create an opportunity for diverse publics to encounter, explore, and evaluate nanotechnologies prior to their actual emergence;
- Engagement activities, including the small-scale intensive Science Cafes as well as informal science education activities informed by CNS perspectives and the larger-scale piloted Futurescape City Tours, create more informed citizens on important topics in nano-in-society;
- Interaction with NSE researchers, including courses, training activities, workshops, laboratory collaborations, and interventions results in identifiable changes in knowledge, identity, and practice in the laboratory;
- CNS-ASU has had important informational and educational exchanges with decision makers, including:
    - Shapira's presentation to the OECD/NNI International Symposium on assessing the Economic Impact of Nanotechnology;
    - Guston's presentation to a group in Tokyo, Japan assembled to discuss the Science of Science and Innovation Policy.
    - The Center's collaboration with the CSPO office in Washington, DC on the "New Tools for Science Policy" series, which has hosted CNS scholars Youtie and Scheufele in conversations with 30-40 science policy makers in the reporting year.
    - Scheufele co-organized, with Ralph Cicerone (NAS), Barbara Schaal (Washington University), Alan Leshner (AAAS), and Baruch Fischhoff, the Sackler Colloquium at the National Academy of Sciences on "The Science of Science Communication."
    - Porter, Shapira and others from RTTA 1 performed an assessment of the NNI that was used and cited throughout the President's Council of Advisors on Science and Technology (PCAST)'s congressionally mandated biennial review, *Report to the President and Congress on the Fourth Assessment of the National Nanotechnology Initiative*.

7. Highlights



CNS-ASU faculty confront a Brave New (online) World for Science Policy
The Center for Nanotechnology in Society
ARIZONA STATE UNIVERSITY
We live in an age where new technologies hit the marketplace at a rate that far outpaces society's ability to engage in meaningful political debates about their ethical, legal and political implications. A recent presentation in Washington D.C. addressed the future of social debates about controversial science in our highly polarized policy environment.
Synthetic biology, nanotechnology and Big Data are only a few recent examples of emerging technologies that have broad implications for society and policy. But the recent increase in complex science and technology development coincides with a deterioration in mainstream science journalism, one of the institutions that has traditionally helped translate science outcomes for lay and policy audiences.
The talk focuses on what we can we learn from recent work in the social sciences about strategies for navigating this brave new world of science policy.
Dietram A. Scheufele at the University of Wisconsin-Madison
John E. Ross Professor of Science Communication
Co-Principal Investigator, CNS-ASU
2013 Fellow, American Association for the Advancement of Science (AAAS)
According to Microsoft Academic Search, Dr. Dietram A. Scheufele is one of the ten most cited researchers in the communication field. Dr. Scheufele has published extensively on public opinion, political communication, and attitudes toward emerging technologies, including nanotechnology.
His most recent work focuses on the role that social media and other emerging modes of communication play in our society. His consulting experience includes work for PBS, the World Health Organization, the World Bank, and other corporate and public clients in the U.S., Asia, Europe and the Middle East.
Along with Dr. Elizabeth Corley at ASU, Dr. Scheufele leads the Real-Time Technology Assessment (RTTA 2) research thrust at CNS-ASU that explores the understanding of nanotechnology among the general public and the role of the media in reflecting and influencing that understanding.
vimeo
A video of this presentation is available on the CNS-ASU Vimeo channel at http://vimeo.com/cnscspo/bravenewworld
NSF
Research, education and outreach activities at CNS-ASU are supported by the National Science Foundation under cooperative agreement #0937591

Novel "Futurescape" walking tours engage citizens directly with technology of the city

The Center for Nanotechnology in Society
ARIZONA STATE UNIVERSITY

In November 2012, researchers at CNS-ASU piloted Futurescape City Tours (FCT), a novel approach to engaging citizens on issues of technology and society. FCT is the next iteration of CNS-ASU's research on public deliberation, building on findings from the 2008 National Citizens' Technology Forum. FCT's focus is on equity and urban sustainability.

The FCT pilot took citizens of Phoenix on a walking tour to explore the past, present and future of the city. The citizens walked through downtown and visited several sites taking photographs and field notes to track their concerns and curiosities. They met with city officials, research scientists, business leaders and local administrators to engage in discussions about alternative futures, trade-offs and societal choices.

Following the success of the pilot tour, the FCT team is hosting a training for future site leaders in April 2013, and there will be five sites across North America conducting tours and research in the fall of 2013.

When the walking tour was over, the citizens uploaded their photos to an online archive, where they were studied in the following deliberative sessions, and shared at a public gallery exhibition.

During the tour, the citizens photographed or noted anything that caught their eye or peaked their interest. The themes that came out of the photos and observations were used in further research and deliberation.

Dr. Cynthia Selin explores future-orientation from an interdisciplinary perspective, asking questions about how foresight is applied in the governance of emerging technologies.

With **Dr. Kelly Campbell Rawlings** from the School of Public Affairs at ASU, she leads CNS-ASU's Real-Time Technology Assessment (RTTA 3) exploring plausible futures, and public preferences of alternatives.

Cynthia Selin | Arizona State University
Assistant Professor, School of Sustainability
Senior Sustainability Scientist, Global Institute of Sustainability

Research, education and outreach activities at CNS-ASU are supported by the National Science Foundation under cooperative agreement #0937591

Socio-Technical Integration Research continues to get results in nano-R&D

The Center for Nanotechnology in Society
ARIZONA STATE UNIVERSITY

Despite longstanding calls for collaborations between social and natural scientists to broaden the societal responsiveness of technology development processes, the role that interdisciplinary collaborations can play in enhancing such responsiveness is not well documented or understood.

The Socio-Technical Integration Research (STIR) project at CNS-ASU is changing that. STIR has placed "embedded humanists" into over two dozen nanotechnology and other laboratories across the world to assess and compare the pressures on – and the capacities for – laboratories to integrate broader societal considerations into their work.

STIR systematically tests the integration of societal considerations in science and engineering through a process termed *Midstream Modulation* (Fisher 2006), which aims to deepen and expand decisions through semi-structured dialogues and reflection (Fisher 2007).

A 2012 study by Flipse et al. demonstrates that Midstream Modulation can be effective not only in academic laboratories but also in for-profit industrial labs.

The latest STIR project publication and its methodological counterpart, Midstream Modulation, documents two types of changes that took place in the lab as a result of interdisciplinary collaboration: discursive and practical.

When the social researcher began his stint, only 1 of 5 laboratory researchers considered societal issues to be part of their job. At the end of the study, all 5 agreed on the importance of social and ethical issues to their work.

The study also found that reflection on the societal dimensions of their work allowed the researchers to alter existing R&D decision making processes and to initiate new ones based on societal and ethical considerations.

The **STIR project** is directed by CNS-ASU faculty member **Dr. Erik Fisher**.

He also leads the CNS-ASU Real-Time Technology Assessment (RTTA 4) thrust, which aims to understand the dynamics of nanoscale science and engineering (NSE) laboratories through ethnographic and other methods.

Flipse, S. et al. **Midstream Modulation in Biotechnology Industry: Redefining What is 'Part of the Job' of Researchers in Industry**. *Science and Engineering Ethics*, 2012 Oct.

Research, education and outreach activities at CNS-ASU are supported by the National Science Foundation under cooperative agreement #0937591

The Center for Nanotechnology in Society
ARIZONA STATE UNIVERSITY

"Nano Around the World" card game makes gains in popularity, audiences

Developed originally as an innovative conference presentation, the card game known as "Nano Around the World" is an interactive way to reflect on and discuss the ways in which emerging technologies can and can't benefit people around the globe.

Each player gets a *character* card and two *technology* cards and then has to negotiate with others in the room to find technologies that they deem beneficial for their character. Some characters are rich, some are poor, but all of them have needs and wants that are influenced by their personal situations and global context.

After the players have traded their technologies, the resulting discussions explore basic needs, values, goals and aspirations – and how nanotechnologies may have helped or harmed their chances of achieving those things.

Nano Around the World has now been adapted for use with all ages and has been played successfully in many venues from Science Cafés to elementary schools.

Nano Around the World has been played dozens of times in varying locations. It has been used as a training tool for museum staff in the US and abroad, and also used with graduate students at the first annual CNS-ASU Winter School. There is also a spin-off version developed specifically for young children called "You Decide." With each iteration, players and facilitators seem to discover new possibilities and issues to explore.

Much of the game's development has come from collaboration with the Nanoscale Informal Science Education Network (NISE Net). A printable set of game cards are available from http://nisenet.org/.

Dr. Jameson Wetmore works on understanding how people design technological systems and how those systems reinforce specific values. Along with **Dr. Susan Cozzens** at Georgia Tech, he co-leads Thematic Research Cluster (TRC 1) at CNS-ASU focused on equity and equality of nanotechnologies.

Jameson Wetmore | Arizona State University
Associate Professor, School for Human Evolution and Social Change
Senior Sustainability Scientist, Global Institute of Sustainability

Research, education and outreach activities at CNS-ASU are supported by the National Science Foundation under cooperative agreement #0937591

The Center for
Nanotechnology in Society
ARIZONA STATE UNIVERSITY
Searchable online database of urban nanotechnology now available
Continuing work begun in the previous year, students under the direction of Dr. Arnim Wiek have created a structured data collection called the Nanotechnology in City Environments (NICE) database. The database is composed of expert-reviewed entries of academic research, public reports, advertising materials, technical specifications, and speculative ideas of nanotechnology in urban contexts.
The NICE database catalogs nanotechnologies paying particular attention to functionality, mechanisms of action, potential benefits, potential hazards, urban domain, and development stage. The entries are supplemented by layman's terms summarizing the various technological applications.
As a resource to CNS-ASU as well as interested scholars, professionals, and the general public, the NICE database strives to provide useful information for a variety of user groups. The database has already seen hits worldwide, averaging 130 unique visitors per month in 2013.
In addition to the technological entries, the NICE database contains a detailed bibliography and glossary of nanotechnology-related terms.
A recent uptick in visitors appears to be due in part to the publication of the website's address in the Journal of Nanoparticle Research in August 2012.
Visit the NICE database at http://nice.asu.edu/
Carbon Nanotube (CNT) Transistors and Diodes in Solar Inverters
Dr. Arnim Wiek's research focuses on the question of how research between scientists and non-academic partners is facilitated and institutionalized to support sustainability.
Along with Dr. Sander van der Leeuw, Dr. Wiek leads the Thematic Research Cluster (TRC 2) on Urban Design, Materials and the Built Environment which investigates the nano-enabled city of the future.
Arnim Wiek | Arizona State University
Assistant Professor, School of Sustainability
Senior Sustainability Scientist, Global Institute of Sustainability
NSF
Research, education and outreach activities at CNS-ASU are supported by the National Science Foundation under cooperative agreement #0937591

Yearbook of Nanotechnology in Society series expands with third volume
The Center for Nanotechnology in Society
ARIZONA STATE UNIVERSITY
Nanotechnology, the Brain, and the Future
Springer
Past installments of the Yearbook series have focused on the future of nanotechnology and society in general, as well as the equity and equality of nanotechnologies. In this installment, Nanotechnology, the Brain, and the Future focuses on the physical aspects of nano-scale science and technology. It brings into focus the recent potential for understanding, changing, and manipulating how the brain functions, and does so employing the methods of anticipatory research pioneered by CNS-ASU.
The human brain is the source of the things that make us human. This book explores the convergence of neuroscience with nanotechnology, two revolutionary scientific fields that are poised to impact greatly the biological and political future of human societies.
Nanotechnology, the Brain and the Future is available for order at http://www.springer.com/
Nanoscale science and engineering (NSE) has long been the site of a great deal of social and intellectual contest. NSE is also the site of an increasing amount of scholarship dedicated to understanding the emerging interactions between nanotechnology and society and fathoming its implications.
As one of the international leaders in exploring the societal aspects of nanotechnology and other emerging technologies, CNS-ASU has been devoted to curating scholarship focused on the ethical, social and political impacts of these developments in its Yearbook of Nanotechnology in Society series, published by Springer.
The series as a whole is designed to give social scientists, natural scientists, and the general public alike an opportunity to explore, reflect on, and ultimately critique the ways in which nanotechnology is shaping the future.
This volume of the yearbook series is based in part on the research activity of the original Thematic Research Cluster (TRC 2) that focused on the study of Human Identity, Enhancement and Biology, active in CNS-ASU from 2007-2010.
Sean A. Hays, Jason Scott Robert, Clark A. Miller, Ira Bennett, eds. Nanotechnology, the Brain, and the Future. Yearbook of Nanotechnology in Society. Volume 3. Series editor David H. Guston. New York: Springer, 2013.
NSF
Research, education and outreach activities at CNS-ASU are supported by the National Science Foundation under cooperative agreement #0937591

The Center for Nanotechnology in Society
ARIZONA STATE UNIVERSITY

Nanotechnology and society issues illustrated through "Three Big Ideas"

One of the central collaborations of CNS-ASU's Education and Outreach has been with another NSF-funded project, the Nanoscale Informal Science Education Network (NISE Net, NSF #0940143). One of NISE Net's original learning goals included a recognition of the societal and ethical implications of nanotechnology.

Because including social implications of science represents somewhat of a departure from traditional science museum content, CNS-ASU's work with NISE Net has been particularly fruitful.

As part of a training program for museum floor staff, a series of videos on nano and society was developed starring two CNS-ASU faculty. The series focuses on ways to broach social and ethical issues of with the general public, focusing on "Three Big Ideas" of technology and society.

The three big ideas of the series are

1. *Values* shape technologies
2. Technologies affect *social relationships*
3. Technologies work because they're part of *systems*

The videos use real-world technologies – cell phones, light switches and even a simple speed bump -- as examples to demonstrate how the Three Big Ideas play out in our daily lives.

They also take the time to discuss the innovation systems that bring nanotechnology products into the mainstream. This makes the Big Ideas even more applicable to guiding discussions around emerging technology.

The video series is available online at **http://vimeo.com/channels/nanoandsociety**

Dr. Ira Bennett is an Assistant Research Professor and Assistant Director for Education at CNS-ASU and the Consortium for Science, Policy and Outcomes (CSPO). **Dr. Jameson Wetmore** is Associate Professor at ASU. They have been advising and collaborating with science museums and NISE Net on nano and society issues for several years.

Ira Bennett | Arizona State University
Assistant Research Professor, CNS-ASU and CSPO
Jameson Wetmore | Arizona State University
Associate Professor, School for Human Evolution and Social Change

Research, education and outreach activities at CNS-ASU are supported by the National Science Foundation under cooperative agreement #0937591

Is it a Pumpkin or a Tiger?
Solving the Puzzle of Emerging Science and Technology
The Center for Nanotechnology in Society
ARIZONA STATE UNIVERSITY
Imagine you're putting together a jigsaw puzzle. This puzzle, however, works a bit like the board game in the movie *Jumanji*: when you finish, whatever the puzzle portrays becomes real.
In the September 2012 issue of *Minerva*, CNS-ASU Director David Guston provides this scenario as a thought experiment for the governance of science and technology. When putting together pieces of the emerging scientific puzzle, those orange and black pieces may turn out to be a pumpkin – but they could also be a tiger.
As scientists and scholars, do we forge ahead until the picture completes itself? Or should we do our best to change course based on present knowledge?
The latter approach is attractive, but demanding, and it is this impulse to manage emerging technologies *while such management is still possible*, that is at the heart of CNS-ASU's theoretical underpinning of anticipatory governance.
Polanyi, Soddy and Szilard. Photos used with permission.
Tracing the intertwining stories of Michael Polanyi, Frederick Soddy and Leo Szilard, Dr. Guston lays out the pros and cons of different approaches to putting together the puzzle of emerging science and technology.
Though the research and development of science is unpredictable, he poses the question: "If you are assembling bits of reality, at what point do you want to start asking, 'what happens if this is a tiger?'"
Dr. David Guston is the director of the Center for Nanotechnology in Society at ASU. Dr. Guston is widely published and cited on research and development policy, technology assessment, public participation in science and technology, and the politics of science policy.
Guston, D. The Pumpkin or the Tiger? Michael Polanyi, Frederick Soddy, and Anticipating Emerging Technologies. *Minerva* 50(3):363-379. doi: 10.1007/s11024-012-9204-8
NSF
Research, education and outreach activities at CNS-ASU are supported by the National Science Foundation under cooperative agreement #0937591

8. **Strategic Research Plan**

The long-term research goals of CNS-ASU are to demonstrate and refine the ability to perform RTTA and, in doing so, cultivate reflexivity and build the capacity for anticipatory governance in the NSE enterprise broadly conceived. By "reflexivity" we mean a capacity for social learning – by individuals, groups, institutions, and publics – in the NSE enterprise narrowly and society more broadly that expands the domain of and informs the available choices in decision making about nanotechnologies. By "anticipatory governance" we mean a broad-based capacity that extends through-out society that can collect, analyze, synthesize and interpret a wide range of information to manage emerging knowledge-based technologies while such management is still possible (Barben et al. 2008; Guston 2008; Karinen and Guston 2010; Guston 2010; Sarewitz 2011; Guston revise and resubmit).

In the eight years of the Center, we have demonstrated the ability to perform RTTA through the individually successful programs, the synergies among them, and the successful completion of the "end-to-end" activity related to TRC 2, Human Identity, Enhancement and Biology (Hays et al. 2012), which integrates those programs, along with the integrative research within TRC 1, Equity, Equality and Responsibility (Wetmore and Cozzens 2010). The ability to extend and refine RTTA required developing two related strengths: the connection among the Center's programs in an ensemble, and the guiding role provided by the strategic vision of anticipatory governance – and its component capacities of foresight, engagement, and integration – for the research programs. The success of these two crucial efforts was greatly enhanced by our commitment to embark on empirical projects aimed at the Center's activities – in a reflexive mode of turning our methods on ourselves – to gather strategic intelligence. As described in the YR 4 and YR 5 annual reports, to facilitate the research ensemble, post-doctoral fellow Matt Harsh studied TRC 2's end-to-end process and conveyed his findings to TRC 1. Also as described in the YR 4 and YR 5 annual reports, to strengthen the guiding role of anticipatory governance as the Center's strategic vision, we held a Visioning Workshop on futures of anticipatory governance (Selin 2008).

Within its strategic vision of anticipatory governance and supported by the methodologically oriented RTTA activities, thematic research at CNS-ASU is also crucial. As the former TRC 2, Human Identity, Enhancement and Biology has wound down with the long-awaited publication of volume three of the *Yearbook*, the Center has focused on a new TRC 2, Urban Design, Materials and the Built Environment, a.k.a., "Nano and the City." The primary rationale for selecting this new theme was to ground and locate discussions of the responsible (and sustainable) development of nanotechnology in the city. This grounding is appropriate for reasons including: 1) the transition of the majority of human beings on the planet to being urban dwellers; 2) the promising role of cities for sustainability, e.g., lower energy use per capita; 3) the challenging role of cities for sustainability, e.g., lack of local food and water resources used by cities, and highly skewed income distributions; 4) the location in urban areas of large-scale socio-technical systems – such as water, energy, communication, health, and transportation – for which nanotechnology will have important ramifications; 5) the central role of cities in the geography of innovation; and 6) the decline, over the past two generations, of scholarship (apart from regional economic development) linking the urban with the scientific and technological.

With the "end-to-end" perspectives and the research ensembles firmly established, the new TRC 2 has commenced in a nearly fully integrated manner, e.g., with RTTA 1 providing bibliometric and other data and for joint research with TRC 2, RTTA 2 incorporating questions dedicated to TRC 2 concerns into the public opinion survey fielded in the current year, RTTA 3 planning its major public engagement activity around city tours, RTTA 4 submitting together with TRC 2 an associated proposal to NSF for STIR City, and TRC 1 in essentially constant contact on issues of equity in urban sustainability. A recent change in team leadership – replacing Lim with Rawlings as co-leader of RTTA 3 – has allowed the retention of urban connections while introducing expertise in capacity-building.

In addition to strategic planning for research, the Center's Visioning Workshop contributed to strategic planning for education and outreach. With respect to education, the Center was finally able to implement its Winter School in January 13. Reviews provided by the early career participants were very strong, and the school will continue in January 14.

CNS-ASU's strategic partnership with NISE Net has continued to strengthen, resulting in the Center's being named a "core partner" in NISE Net. Last year's success was placing social and ethical issues squarely at the center of the nano mini exhibit that NISE Net was extended by the implementation of NISE Net's commitment of funds to allow CNS-ASU personnel to train dozens of museum staff to train their staff and volunteers to discuss social and ethical issues with visitors. CNS-ASU continues to make video communication an important focus of activities, and the Center has all but completed an overhaul of its website to show video, social media, etc., in a more attractive way. The Center's commissioned short video, related to the Nano and the City and equity themes, was completed last year, and we are in discussion about how to use it to seed more active outreach around the question of where nanotechnology is in *your* day. The FutureTense documentary project with which CNS-ASU has been collaborating is not dead but is significantly slowed due to funding challenges and "creative difficulties." The documentary filmmaker following the associated STIR project continues to make strong progress.

CNS-ASU outreach to the private sector – strengthened under post-doctoral fellow Davies, who planned and conducted the Center's first Private Sector Engagement workshop in May 11 continued with strong private sector engagement in TRC 2's research activities, especially in its December 12 workshop, and in the *Emerge* conference at ASU, which the Center co-sponsors. While outreach in Washington, DC has suffered some setbacks because federal budget difficulties have distracted potential congressional partners like the Congressional Nanotechnology Caucus, the Center has been active through CSPO's Washington, DC office in hosting additional "New Tools" seminars by co-PI Youtie (GA Tech) and co-PI Scheufele (Wisconsin). More on this collaboration, as well as video and private sector outreach may be found in the **Outreach** section.

In the Center's renewal review, site visitors asked about the apparent mismatch between the huge list of Center participants accounted for in **Section 4, List of Center Participants** and the **List of Center Publications**, which is small in comparison. The response, which the committee found appropriate but which we reiterate here, is that as the largest center dedicated to the study of the societal aspects of nanotechnology in the country and, likely, in the world, CNS-ASU sees itself as an important producer of public goods like networking and infrastructure (capacity-building) – as a good hegemon, in other words. While we identified "growth" as an important strategic goal in our 08 Visioning Workshop, we also limited the size and number of our formal external collaborations (subcontracts) in our renewal. Yet, by accounting for the participants in our capacity-building activities, we can provide a transparent account of the reach the Center has had. This reach has included a vast number of international scholars and practitioners who have visited the Center in a way akin to a user facility in which the Center's faculty, its conceptual tools, and its ongoing collaborations with scientists and engineers provide the infrastructure for work they cannot perform in their home institutions (see also **Section 13, Shared and Other Experimental Facilities**). Thus, the Center does not displace or dilute traditional deliverables like peer review with such activities but adds to them. In pursuit of a clearer vision of our impacts and outcomes, the Center received a supplement in the current to hire post-doctoral fellow Michael Reinsborough, who under the direction of Guston, Corley and Fisher is preparing to survey that long list of center participants and perform follow-up interviews with a subset of them.

CNS-ASU's partnerships with scientists and engineers continue to thrive. At the undergraduate level, InnovationSpace stands as a unique example of cross-functional collaborations among design, business and engineering. At the graduate level, we have transformed the PhD+ into a university-wide certificate program in Responsible Research and Innovation, and the training program in collaboration with ASU's

NNIN node is, along with the activities derived from CNS-ASU and elaborated and evaluated in the associated EESE project, becoming a model for teaching societal and ethical implications (SEI) that was explored by more than 100 scholars at the SEI Congress, held at ASU in Nov 11 and co-sponsored by CNS-ASU. The associated STIR project is consolidating its findings, and an expansion of the STIR protocol that links embedded research activities through a more widespread network of sites to sustainable solar technologies has been introduced into a collaborative IGERT, the Solar Utilization Network, at ASU. The Center's collaboration with Honsberg's NSF-funded Quantum Energy and Sustainable Solar Technologies (QESST) Engineering Research Center has continued, highlighted by CNS-Fulton School of Engineering graduate fellow Ben Wender completing a master's-in-passing on "anticipatory life cycle assessment" at the interface of the two centers. The Center also collaborated with Panchanathan's IGERT on Person-Centered Technologies and Practices for Persons with Disabilities (Miller is co-PI). With these awards, CNS-ASU is partner to roughly $26M in science and engineering funding at ASU. Outside of ASU, while neither of the Sustainability Research Network proposals the Center collaborated on were funded (both full proposals, one to virtual site visit stage), the Center received, in collaboration with Notre Dame, a small workshop award on the anticipatory governance of active nano-materials and nano-systems with CNS-UCSB and the two Centers for Environmental Implications of Nanotechnology at UCLA and at Duke. The Center also continues its role in helping to transform ASU by co-sponsoring the future-oriented *Emerge* workshop with the Herberger Institute of Design and the Arts and its School of Arts, Media and Engineering, and the Sandra Day O'Connor School of Law and its Prevail Project – as well as other entities on campus including the School of Sustainability, the Ira A. Fulton Schools of Engineering and LightWorks.

In looking beyond the Center's ten-year funding from NSF, Guston and Fisher revised and resubmitted the $500K proposal for a "Virtual Institute for Responsible Innovation" (VIRI) under NSF's Science Across Virtual Institutes program. While NSF has issued no award letter yet, there has been preliminary discussion about funding the VIRI. While VIRI would allow the persistence and extension of some of the core research activities of CNS-ASU – particularly a vision of responsible innovation that embraces anticipatory governance – it would also allow its international network of collaborators to continue and expand. Selin is also pursuing an opportunity to continue and extend the Center's anticipation and deliberation activities through a Futures Initiative that may be sponsored by ASU's Global Institute for Sustainability (GIOS). Recently, she and Sarewitz have been granted $100K in seed funding to co-design an initiative within GIOS to amplify and mobilize future-oriented research and practice. The resulting proposal will be eligible for a multi-year award of several hundreds of thousands of dollars.

More significantly for the persistence of many of its educational innovations, however, is that associate director for outreach Wetmore has been tapped by Stanford University, which is leading a proposal to recompete the National Nanotechnology Infrastructure Network (NNIN), to be its coordinator for social and ethical implications, with Bennett as his associate. If successful, the next generation NNIN's SEI component, estimated at about $600K per year, will including many of the formal and informal educational components that CNS-ASU has pioneered and extend them across the more than one dozen participating universities. In preparation for this proposal, the current NNIN has offered to move the SEI coordinator role from Cornell for Wetmore.

9. Research Program, Accomplishments, and Plans

RTTA 1: Research and Innovation Systems Analysis (RISA)

Personnel – faculty and senior participants

Jan Youtie (Georgia Tech, senior researcher, Enterprise Innovation Institute and adjunct associate professor of Public Policy) (team co-leader; GT Co-PI; CNS-ASU Co-PI)
Jose Lobo (ASU, associate research professor, School of Human Evolution and Social Change) (team co-leader)

Alan Porter (Georgia Tech, professor emeritus, ISYE and Public Policy)
Juan Rogers (Georgia Tech, associate professor, Public Policy)
Philip Shapira, (Georgia Tech, professor, Public Policy) (GT PI)
Deborah Strumsky (University of North Carolina, Charlotte, assistant professor, Geography)

Other Personnel – graduate students (4), undergraduate students (2), visiting scholars (3)

Goals. The overarching goal of RTTA 1/RISA is to characterize the technical scope and dynamics of the NSE enterprise and the linkages between it and a variety of public values and outcomes. A major research theme – RTTA 1/1: Organization, Structure, and Trajectories of Emerging Nanoscience – characterizes the NSE enterprise and its dynamics through data-mining techniques such as bibliometric and patent analysis, as well as through text-mining, interviews, and other methods. The strategic areas of emphasis are: the organization, structure and trajectories of emerging nanoscience and nanotechnology enterprise and application. A second major activity – RTTA 1/2: Nanotechnology Enterprise and Applications – will develop real-time strategic intelligence about nanotechnology commercialization in the US and globally, through methods including those above but also through the creation of a corporate panel data set.

Research Accomplishments and Plans, RTTA 1/1.

RTTA 1/1 Organization, Structure, and Trajectories of Emerging Nanoscience originally constructed a large-scale set of global databases of nanotechnology research publication records comprised of 1.6 million articles including 950,000 from the Web of Science's Science Citation Index (SCI) and others from INSPEC and Compendex, covering the period 1990-2012. In addition to the publication database, we also have developed a patent database that includes 90,000 nanotechnology patent applications and grants (from 71 patent offices worldwide including USPTO, EPO, WIPO, Chinese State Patent Office) and 91 countries covering the 1990-2011 (January) time period.

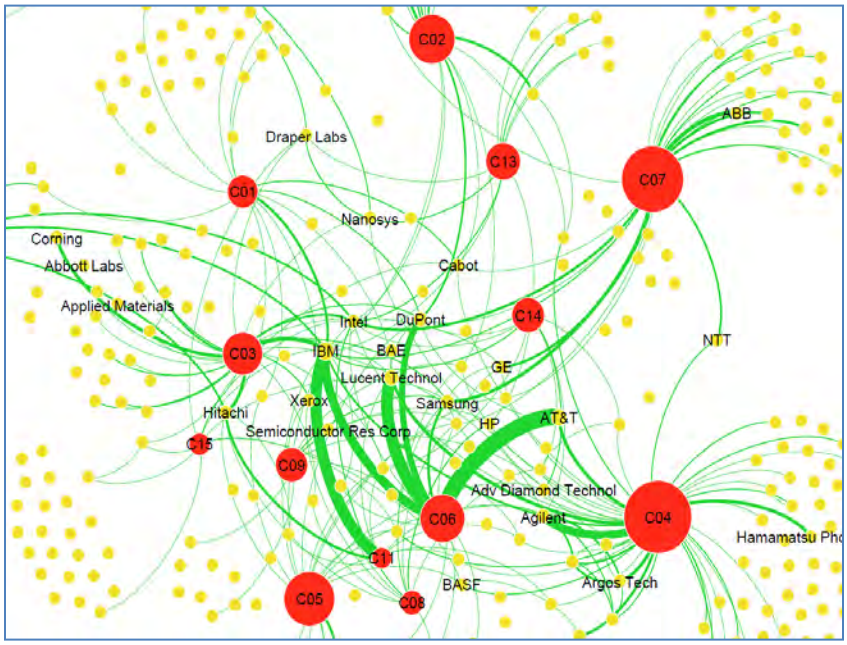
The database originates out of a two-stage bibliometric search method that was developed and published in Porter et al. (2008) and updated in Arora et al. (2012). This method is emerging as a public tool that other research groups are using or adapting. The article describing the database has garnered 196 citations in Google Scholar (as of Mar 12) and 77 citations in the Web of Science. Researchers associated with the Euro Nano Observatory compared six search approaches in preparation for its research monitoring activities and found that five of the six,

including our approach, converge on a similar definition (Huang et al. 2008). As a result, the Euro Nano Observatory (a Framework Programme 7 project involving 16 partners from 10 European nations; see http://www.observatory-nano.eu/project/) is following our search approach as its benchmark for monitoring nanotechnology R&D.

A major effort in the recent year was a review of our bibliometric search method in light of changes to the emerging nanotechnology domain. Several analyses were conducted in support of these changes: (1) examination of the top keywords in 2009 in which we apply a simple nano* search term in our existing 2009 global nanotechnology publication database to understand upwardly trending keywords; (2) analysis of the share of "nano-ness" of keywords based on the number of hits in the 2009 global nanotechnology publication dataset, compared to the number of hits in a random set of general scientific articles; (3) an examination, for new upwardly trending search terms, of cited references to determine if the cited references include an article in the existing global nanotechnology publication database. Results indicated that although there are new terms that have arisen in the last several years not fully captured in the original bibliometric search method, e.g., graphene and mesoporous silica, the share of terms captured with the nano* prefix has increased since 2006 to account for nearly 80% of articles by 2010.

Selected findings from this research in the reporting year include:

- The nanotechnology research enterprise is marked by the rise of nanobiotechnology publications and the global frontrunner position of China as indicated by absolute publications (over 20,000 publications in 2010) but not by citations (Arora, Porter, Youtie, and Shapira 2012).
- Green nanotechnology applications – particularly in solar cells, photovoltaics, batteries, fuel catalysts, and water filtration – have the potential to make significant contributions both to addressing green challenges and to fostering sustainable economic development but attention has to be given over the life cycle to the energy and resource requirements to initially produce nano-scale materials, to the sources of energy (renewable or non-renewable) required for their large-scale manufacture, to the fate and disposition of nanomaterials during and after use and associated environmental, health, safety and societal implications, and to broader societal values and considerations (Shapira and Youtie 2012).
- Green nanotechnology patents have the same number of inventors as the average green patent, but more claims, more citations, and more technology codes and thus may be more "inventive" or "novel" (Lobo and Strumsky in preparation).
- Research centers as a policy tool in the US



National Nanotechnology Initiative (Rogers, Kay, Youtie, 2012). Using a database that compares nanotechnology research centers to other research centers and unaffiliated researchers, this study indicates that many companies are using the nanoscale science and engineering centers as a network (refer to Figure).

- Graphene applications involve companies that specialize in the technology and those who offer a wider range of applications (Arora, Ma, Gao, Shapira, Youtie 2013).
- While graphene as a whole is experiencing concurrent scientific development and patenting growth, country and application specific trends offer some evidence of the linear and double-boom models (Shapira, Youtie, Arora 2012)
- Sectoral differences in the financing and technology approaches exist between nanobiotechnology, nanoenergy, and nanoelectronics firms. Nanobiotechnology firms are more likely to rely on venture capital; whereas, customer sales and international partners are more prevalent among nanoenergy and nanoelectronics firms (Youtie, Hicks, Shapira, Horsley 2012).

Several new research papers are in the pipeline, including:

- The cognitive geography of nanotechnologies and knowledge flows (Porter and colleagues). This strand of research seeks to use overlay maps, citation analysis, and case studies to examine the flow of knowledge across disciplines in nanotechnology.
- The percentage of articles referencing terms with the "nano*" prefix have risen four-fold, with these references migrating from general scientific concepts to specific applications; new nano* term references have declined in recent years (Arora, Youtie, Porter, and Shapira 2012 under review).
- The share of publications in the active nanotechnology and beyond domain has increased modestly, suggesting that a portion of nanotechnology research and patents are engaged in next generation R&D (Suominen, Li, Shapira, Youtie, in process).
- Social science research in the nanotechnology domain has risen by more than an order of magnitude from 2008 to 2012 (Carley, Youtie, Shapira, Porter, in process).
- Nanotechnology publications with authors from university, industry, and government organizations have greater value than those with less diverse sectoral participation, controlling for discipline, total number of publications, and other factors (Carley, in process).

Research Program, Accomplishments, and Plans, RTTA 1/2

One activity of RTTA 1/2 is the creation of a panel of nanotechnology corporate enterprises, that is, a set of corporate enterprises which have "entered" nanotechnology as evidenced by a nanotechnology publication authored or co-authored by an individual in a corporate enterprise and/or a nanotechnology patent assigned to a corporate entity. The notion behind the corporate panel is to track changes in panel companies nanotechnology activities over time. We developed a database of 120,000 records (57,000 publications and 63,000 patents from 18,000 companies). This database was used to select the US portion of the corporate panel, which is comprised of 125 large US nanotechnology companies and 125 small and medium-sized US nanotechnology enterprises (SMEs). A large company is defined as one that is mentioned in the EU Industrial R&D Investment Scoreboard and the Global Forbes 2000. Our corporate panel includes 125 large US nanotechnology enterprises, which fall (based on their industry classification) into six

different segments: (1) industrial equipment, (2) electronics/energy/ICT, (3) health/medicine, (4) materials/chemicals, (5) transportation/aerospace, and (6) food/other consumer. The panel also includes 125 SMEs which fall (based on their industry classification or market offerings) into the first four segments; we did not find a sufficient number of SMEs in the latter two segments to populate them. These 250 large and small US nanotechnology enterprises have been matched with companies in the same segments outside the US.

We use this panel to address research questions such as: (1) What kinds of linkages do these companies have with universities and other research institutions? (2) How is strategy for introduction of nanotechnology-enabled products and materials construed in the face of uncertainty? (3) Where do these companies and their products fit in the global supply chain and where is inventive activity geographically located? (4) What international boundaries are these supply chains crossing and what role do consumer values and demand play? (5) What kinds of employment and training needs and issues do these companies face? and (6) How does nanotechnology-related governance and regulation affect the plans and practices of these companies? Three publications in the pipeline in this line of research are:

- One in ten small and medium-sized nanotechnology firms are involved in a merger or acquisition; these mergers and acquisitions involving nanotechnology firms provide complementary capabilities and serve as an innovation source to larger acquiring companies (Youtie and Kay, under review).
- Two different strategic approaches are employed by small and medium-sized enterprises to enter the domain of nanotechnology: an early-entry strategy is associated with nanotechnology research and discovery and possibly use of nanotechnologies to enhance properties of products; and a later-entry strategy associated with a strong focus on intensive patenting activity (Kay, Youtie, Shapira, under review).
- A segment of small and medium-sized enterprises chooses to publish rather than patent in nanotechnology (Li, Youtie, Shapira, in process).

A second activity of RTTA 1/2 is characterizing the nature of the nanotechnology enterprise and its applications through patent analysis. A team consisting of RTTA 1 co-leader Lobo at ASU and other senior personnel Strumsky (at North Carolina, Charlotte) uses two new patent databases constructed with other NSF support – one on patent applications submitted to the U.S. Patent Office matched with granted patents, and the other a database on the technology codes used by the Patent Office to classify the technologies utilized by a patented invention. Lobo and Strumsky have calculated patent success rates and measured the technological complexity of nanotechnology patents. Results from this research, indicating that patent applications in the area of nanotechnology have a lower success rate than the norm and are more technologically complex than the average patent, were presented at the Transatlantic Conference on nanotechnology held at Georgia Tech in Mar 10.

Lobo and Strumsky have also examined the presence of nanotechnology in US patents classified as "green." The classification of US patents as green is one that the research team has developed previously based on one produced by the Patent Office but augmented after discussions with personnel from the Patent Office, NSF, and the White House Office of Science and Technology Policy. The results from this work have been included as part of a comprehensive report on the "Green Economy" which the Brookings Institution released in Jul 11 and a Brookings working

paper on the "geography of green patenting." Lobo and Strumsky are preparing a report on "How Green is Nano?" as a CNS-ASU report. Preliminary results indicate that green nanotechnology patents have the same number of inventors as the average green patent but more claims, more citations received, and more technology codes, suggesting that these patents are substantially more inventively novel than the average green patent. Lobo and Strumsky also co-authored a report with Brookings' staff on the contribution of patenting in the US to economic prosperity at the national and urban level; nanotechnology is among the specific technologies the report examined. The US Patent and Trademark Office will incorporate some of the report's methodology and findings into a report it is preparing for Congress on the economic benefits of patenting to the nation.

Building on these results, Strumsky (PI), Lobo and Doyne Farmer (University of Oxford and Santa Fe Institute) have received a 3-year project funded by the Department of Energy on "Forecasting technological progress in alternative energies." In part of the research, they will specifically examine applications of nanotechnology to alternative energy technologies. This project was one of three selected by DOE as the social science research component of its new "Sun Shot" program.

Contributions to "ensemble-ization" or other center-wide activities.

- RTTA 1/1's co-authorship of a paper with RTTA 2, based on merging data from the scientists' survey with information from the global nanotechnology publication database on the presence of nanotechnology environmental, health, and safety entries in the cited references of articles co-authored by these scientists;
- RTTA 1/1 provided bibliometric analyses for TRC 2;
- RTTA 1/1 researchers contributed 3 chapters to TRC 1-led *Yearbook* and provided bibliometric data for TRC 1 case studies;
- RTTA 1/2 is examining the "green" nature of nanotechnology applications in conjunction with TRC 2.

In addition, RTTA 1/1 (Shapira, Youtie) met with colleagues at CNS-Santa Barbara December 7-9 2012 to share research directions and data issues and make plans for joint research projects. Following this meeting, RTTA 1/1 shared publication and patent data with CNS-Santa Barbara, submitted a joint proposal to the NSF STS program, and developed a list of potential joint papers.

RTTA 2: Public Opinion and Values

Personnel: Faculty and senior participants
Dietram A. Scheufele, RTTA 2 co-leader (Wisconsin, John E. Ross Professor, Life Sciences Communication)
Elizabeth Corley, RTTA 2 co-leader (ASU, Lincoln Professor of Policy, Ethics and Emerging Technologies, Associate Professor, School of Public Affairs)

Dominique Brossard (Wisconsin, Professor, Life Sciences Communication)
Michael A. Xenos (Wisconsin, Associate Professor, Communication Arts)
Other Personnel: post-docs (0), graduate students (15; 3 paid, 12 not), undergraduate students (0)

Goals. The overall goal of RTTA 2 POV is to monitor, among both the public and scientists, the understanding of and values relating to NSE and its potential societal outcomes, track these variables over time, and examine the role of the media in reflecting and influencing them. POV comprises a set of inter-related research themes around the public, NSE researchers, and the media. RTTA 2/1 Public Opinion Polling is the major project, conducting nation-wide public opinion polls to understand, at an aggregate level, the public's knowledge of and values regarding nanotechnologies. RTTA 2/2 Scientists' Opinions and Values is a research theme that conducts polls of NSE researchers to understand their perceptions and values regarding nanotechnologies. RTTA 2/3 Media Influence is a research theme that tracks media stories of nanotechnologies and, using a quasi-experimental design, attempts to understand how various media frames for nanotechnology stories can influence the knowledge and opinions of the public.

Research Accomplishments and Plans, RTTA 2/1.

As part of the Public Opinion Polling research, Corley & Scheufele have capitalized on their experiences with some of the earliest public opinion surveys on NSE (e.g., Scheufele & Lewenstein, 2005) and have continued to develop and refine ways of measuring attitudes, information seeking, and policy stances. This methodological work is a necessary condition for doing sophisticated basic research. But it has also allowed the POV team to assist other researchers across the globe (e.g., Université de Caen Basse-Normandie, France; Poznan University of Economics, Poland; and Dublin City University, Ireland) by sharing instruments and expertise. During YR 8 of the CNS-ASU grant, the POV team has also been able to provide real-time feedback to policy makers when they need specific information about policy-relevant public attitudes.

RTTA 2/1 has completed two general, full-scale public opinion data collections: in Jul. 2007 and Jan. 2012. The 2007 survey was a CATI survey with a combined RDD and listed household sample conducted May – Jul 07 (N=1,015; margin of error, +/- 3%). The 2012 survey was conducted by Knowledge Networks (N=2,806; margin of error, +/- 2%), and it embedded experimental manipulations into a nationally representative online survey. This new approach has three analytic advantages: First, it allows us to examine different subpopulations – serving goals of TRC 1 by including those that have been traditionally underserved by science communication efforts (defined by gender, age, ethnicity, or other factors). Second, the large sample is divided into three, nationally representative samples, each focused on a separate technology (nanotechnology, synthetic biology, and nuclear energy) to help us examine the processes of opinion formation and market dynamics surrounding nanotechnology in comparison to other technologies. Third, we embedded a series of experimental manipulations in each of the issue-specific subsamples. By drawing on the external validity of nationally representative samples and the internal validity of random-assignment experiments, we are able to capitalize on the advantages of both methods and build a deeply granular understanding of the cognitive and affective processes that lay publics use to make sense of emerging technologies.

We also continue to coordinate our data collections with related efforts at Wisconsin, Singapore, Rutgers, and elsewhere in order to build comparable data sets that can be used for comparative quantitative work down the road. Because RTTA 2/1 has played a prominent role in sharing these innovations with other scholars, the leaders of the POV team serve as consultants or co-PIs on other related NSF and USDA grants. This methodological outreach is being formalized by RTTA 2/1 researchers through the formal archiving and sharing of data collection instruments.

RTTA 2/1 has developed several analytical themes in its research, including religiosity and public acceptance of nanotechnology, widening knowledge gaps about nanotechnology, and risk and benefit perceptions about nanotechnology. While the former two have inspired interactions with TRC 1, the latter has resulted in interactions with RTTA 2/2 and with RTTA 1. In YR 8, publications drawing on the first data collection have continued as have analyses of the Jan. 2012 data. Analyses from the Jan. 2012 data collection have resulted in numerous conference presentations, as well as a number of journal articles that are currently published, under review, or in preparation. The data from the Jan. 2012 survey are also forming much of the basis for the dissertation of doctoral candidate Michael Cacciatore.

Religiosity and Public Acceptance of Nanotechnology

As with many other political and scientific issues, citizens rely on cognitive shortcuts or heuristics to make sense of issues for which they have low levels of knowledge. These heuristics can include predispositional factors, such as ideological beliefs or value systems, and also short-term frames of reference provided by the media or other sources of information. By combining CNS-ASU public opinion survey data from the US with Eurobarometer surveys about public attitudes toward nanotechnology in Europe, Scheufele, Corley and colleagues (2009) concluded that respondents in the United States are significantly less likely to agree that nanotechnology is morally acceptable than respondents in many European countries. These moral views correlated directly with aggregate levels of religiosity in each country, even after controlling for national research productivity and measures of science performance for high-school students. Building from this work, the Jan. 2012 data collection examines how American audiences process moral vs. amoral media frames related to emerging technologies. Results from this project suggest that we may be witnessing both framing and boomerang effects depending on the degree to which media frames match value predispositions, including religiosity and political ideology.

Widening Nanotechnology Knowledge Gaps

RTTA 2/1 research on the change in nanotechnology knowledge among the public over time has generated some particularly important results for TRC 1 and outreach. In particular, Cacciatore, Scheufele, & Corley (forthcoming) found that there are widening gaps in knowledge about nanotechnology since 2004 between the least educated and most educated members of the US public. Americans with at least a college degree have shown an increase in understanding of the new technology, while knowledge about nanotechnology has declined over time for those with education levels of less than a high school diploma. Closing these informational gaps among public audiences is a necessity, especially in light of a US budget that has reduced spending for "educational and social dimensions" of nanotechnology in recent years. There is a real urgency to find ways of communicating effectively with all groups in society. Unless researchers find ways to close these learning gaps, we may create two classes of citizens – those who are able to make informed consumer and policy choices about these new technologies, and those who simply cannot. Cacciatore, Scheufele, & Corley also concluded that the Internet is one of the most effective methods in closing gaps and informing the less educated about nanotechnology.

Risk and Benefit Perceptions

RTTA 2/1 research has produced multiple continuous streams of research that have contributed to the literature about how nanotechnology was covered in media and how audience characteristics interact with these messages to shape attitudes about nanotechnology. For example, Scheufele and colleagues (2007) demonstrated that nanoscientists are more optimistic than the public about the potential benefits of nanotechnology; however, for some issues related to the environmental and long-term health impacts of nanotechnology, nanoscientists were significantly more concerned than the public. Therefore, RTTA 2/1 researchers concluded that nanotechnology may be one of the first emerging technologies where researchers have observed this trend of scientists' being more concerned about some risks than the public. Building on this research, more fine-grained analyses have shown that when making risk judgments, nanotechnology experts use trust in scientists to make decisions while the public uses religious beliefs as heuristic cues. Although deference to scientific authority, science media use, and trust in scientists shape perceived benefits in both scientists and the public, these heuristic cues influence public perception to a larger extent than experts' perceptions.

RTTA 2/1 has also examined the changing nature of risk and benefit perceptions to conclude that as the field of nanotechnology matures, public opinion research focused on judgments about abstract risks and benefits, rather than attitudes toward specific applications, is less useful. Recent RTTA 2/1 research shows that individuals who associate nanotechnology with particular areas of application, such as the medical field, take risk perceptions much more into account when forming attitudes than respondents who do not make these mental connections. Therefore, the RTTA 2/1research program increasingly focuses on assessing measurement tools for the field of public opinion about emerging technologies more broadly.

Research Accomplishments and Plans, RTTA 2/2.

RTTA 2/2 has also completed two national-level nano-scientist surveys: in Jul 07 and Oct 11. The 2007 survey was a mail survey of leading US nano-scientists (N=363; AAPOR RR-3: 39.5%). The 2011 data collection was conducted as a mail survey of leading US nano-scientists (N=444; AAPOR RR-3: 31.6%). The content of the 2011 survey was slightly different from the 2007 survey, focusing on more granular perceptions about the risks and benefits of nanotechnology, nano-regulation, nanotech worker safety issues, public engagement, and the ethics of nanotechnology laboratory practices.

Risk, Benefits, and Regulation of Nanotechnology

The RTTA 2 team considers regulation of nanotechnology to be an important area for study because even though there is a high degree of scientific uncertainty about the risks of nanotechnology, policy-making cannot be placed on hold until risk assessments are complete. In the absence of risk assessment data, decision makers often rely on scientists' input about risks and regulation to make policy decisions. RTTA 2/2 research has shown that nanoscientists are more supportive of regulating nanotechnology when they perceive higher levels of risks; yet, their perceived benefits about nanotechnology do not significantly impact their support for nanotech regulation. The research also finds that male nanoscientists are less supportive of nanotech regulation than their female peers and materials scientists are more supportive of nanotechnology regulation than scientists in other fields.

In addition, Corley & Scheufele concluded that the leading U.S. nanoscientists see the areas of surveillance/privacy, human enhancement, medicine, and environment as the nanotech application areas that are most in need of new regulations. Based on the 2007 survey results, Corley, Scheufele and Ho (2009) found that in addition to risk perceptions, nano-scientists use their economic and social values to make decisions about nanotech regulation, and that surveillance/privacy, human enhancement, medicine,

and the environment are the application areas in which nano-scientists see the greatest need for new nanotechnology regulations.

Most recently, Kim, Corley & Scheufele (2012) used the 2007 results to explore the perceptions of nano-scientists regarding the regulation of nanotechnology, with a particular focus on the governmental level (local, national, or international) at which the scientists believe nanotechnology regulation should be implemented. This regulatory discussion is important because international regulations are often difficult to adopt and implement; yet, local or state-level regulations could lead to the nanotechnology equivalent of the Pollution Haven Hypothesis (PHH). The results indicate that some scientists support local-level nano-regulations, but most scientists support the regulation of nanotech at the national or international level.

Kim, Corley & Scheufele (2012) found that there are three distinct categories of nano-scientists that have unique perspectives on regulation: "cautious innovators," "nano-regulators," and "technology optimists." The "cautious innovators" are more supportive of implementing nano-regulations at the local level. Additionally, these scientists think that public opinion is more important than scientists' opinions for research decision-making and that we depend too much on science and not enough on faith. This group is also more likely than their peers to support the regulations of academic nanotech research. The second group of scientists is the "nano-regulators." These scientists are more likely to say that the government should protect the public from unknown nanotech risks. Also, these "nano-regulators" are more supportive than their peers of nano-regulations at the national and international level. Lastly, they are more likely to support the regulation of commercial nanotech research. While many scientists acknowledged the importance of nanoregulation, some scientists are less supportive of restricting nanotech advancements using regulations – i.e., the "technology optimists." These scientists are more likely to think that advancing nanotechnology is more important than protecting society from the potential nano-risks. Also, these scientists tend to think that scientists know best when it comes to making scientific decisions that can impact the public.

Perceptions of Media Coverage

Exploring public perceptions and scientists' perceptions about media coverage of nanotechnology – as well as the public communication of research – were also key focal areas for the RTTA 2/2 team in the 2007 data. Using the 2007 survey results, Corley, Kim and Scheufele (2011) also explored leading U.S. nano-scientists' perceptions about media coverage of nanotechnology and the public communication of research findings, concluding that leading U.S. nano-scientists perceive an important connection between the public communication of research findings and public attitudes about science. Additionally, there is a significant relationship between the scientists' perceptions about media coverage and their views on the timing of public communication; scientists with positive attitudes about the media are more likely to support immediate public communication of research findings, while others believe that communication should take place only after research findings have been published through a peer-review process. In addition, leading U.S. nano-scientists tend to view media coverage of nanotechnology as less credible and less accurate than general science media coverage. These results indicate that leading US nano-scientists do feel a sense of responsibility for communicating their research findings to the public, but attitudes about the timing and the pathway of that communication vary across the group.

An Updated View of Nanotech Regulation Perceptions

The RTTA 2/2 team is currently analyzing and publishing from the 2011 scientist survey. Corley & Scheufele are currently working on an article for a special issue of *Review of Policy Research* that uses the 2011 data to explore nano-scientist perceptions about existing nanotechnology policies, the development of new nanotech policies, levels of governmental regulation, current and future risk levels

for public exposure to nanomaterials, we well as mandatory policies about the implementation of safe lab practices for federally funded nano-research.

Perceptions about Worker Safety, Gender, and Social Responsibility

In addition to exploring the scientists' perceptions about pressing policy issues mentioned above, Corley & Scheufele are working on three new articles using the 2011 scientist survey that will explore 1) gender differences in nano-scientists perceptions about nanotech regulation, 2) scientists' perceptions about worker safety issues in both the laboratory and manufacturing environments, and 3) scientists' perceptions about social responsibility issues related to their nanotech research, respectively. These three articles will be under review at peer reviewed journals within the next three months.

Research Accomplishments and Plans, RTTA 2/3.

Finally, RTTA 2/3 continues to analyze media content in three different outlets. First, we continue to use the infrastructure built during the first five years of CNS-ASU funding to analyze in real time content data from small, medium-sized and large newspapers in the US. Papers from this work appeared in disciplinary journals (e.g., *Journalism & Mass Communication Quarterly*) and also in outlets specific to particular scientific fields (e.g., a piece on food nanotechnology in *Appetite*). Second, RTTA 2/3 partnered with the UW NSEC on Templated Synthesis and Assembly at the Nanoscale to purchase access to Crimson Hexagon. This software license allows us to analyze content streams in real time from all online and social media outlets (including Twitter, Facebook, blogs, online newspaper sites etc.). RTTA 2/3 continues to collect and mine data for traditional media, but our collaborations with the UW NSEC have allowed us to provide real-time insights into the ongoing debates around nano that are unique in the field of the social studies of science. An article comparing online and offline media environments was recently published in *New Media & Society*. Finally, students at UW have begun to use the content analytic tools we built as part of CNS-ASU to branch out into other fields of research. Maria Stubbings worked on a content analysis of media coverage of gene patenting in the US; she defended this work in May 2012. More recently, an article examining Twitter discussions surrounding nanotechnology was accepted for publication in the *Journal of Nanoparticle Research*, while an analysis of social media content is included in Cacciatore's dissertation project.

Contributions to ensemble-ization or other Center-wide activities

RTTA 2/2's study of nanotechnology risk perceptions has led to collaborative work with RTTA 1 (specifically Youtie & Shapira) to better understand the relationship between societal perspectives held by nano-scientists and their publication actions (Youtie et al. 2011). This collaborative research between RTTA 1 and RTTA 2/2 has explored the relationship between scientists' risk perceptions about nanotechnology and their actions in citing nanotechnology environmental, health, and safety (EHS) publications. RTTA 2 has also collaborated with the Social Implications of Nanotechnology Group, part of the University of Wisconsin Nanoscale Science and Engineering Center (NSEC). These collaborations can be seen in many of the publications and conference presentations noted below.

RTTA 3: Anticipation and Deliberation

Personnel: Faculty and senior participants
Cynthia Selin, RTTA 3 co-leader (ASU, assistant professor, CSPO, School of Sustainability)
Kelly Rawlings, RTTA 3 co-leader (ASU, assistant research professor, School of Public Affairs)

Prasad Boradkar (ASU, associate professor, School of Design)
Adelheid Fischer (ASU, Manager, InnovationSpace, School of Design)
Sidnee Peck (ASU, program manager, W.P. Carey School of Business)
Angela Pereira (European Commission, Joint Research Centre)

Other Personnel: Post-docs (2); grad students (4); undergraduates (12 in InnovationSpace).

Goals. The central goals of RTTA 3 are to appreciate multiple, plausible visions of nanotechnology-enabled futures, elucidate public preferences for various alternatives and, using such preferences, help further refine future visions and enhance contextual awareness. RTTA 3 consists of four tightly integrated approaches that address research, education, and outreach. RTTA 3/1 Futures of Foresight explores and assesses alternative approaches to imagining plausible nano-enabled futures. RTTA 3/2 InnovationSpace is a collaborative undergraduate design course among ASU's Schools of Design, Engineering, and Business in which transdisciplinary teams of students create product designs, marketing plans, and engineering models of potential products within a framework of responsible innovation. RTTA 3/3 Probing Future-Oriented Deliberation is plans to probe in experimental settings the frameworks, inputs, structures and qualities of future-oriented deliberation. RTTA 3/4 Futurescape City Tours (FCT) builds on the foregoing to implement a large-scale citizen engagement activity that includes independent and joint deliberation of six groups of locally representative lay citizens from across the US on issues related to nanotechnology and the city.

Research Accomplishments and Plans
As revealed in the Timeline below, the major focus for YR 8 is on RTTA 3/3 and RTTA 3/4 with sustained support of InnovationSpace (3/2).

<table>
<tr><th></th><th>Year 6</th><th>Year 7</th><th>Year 8</th><th>Year 9</th><th>Year 10</th></tr>
<tr><td>RTTA 3.1 Methods</td><td colspan="3">Future of Foresight: Plausibility Project, Strategic Interviews, Case Profiles, Library, Book Development, Gaming workshop</td><td></td><td></td></tr>
<tr><td>RTTA 3.2 ISpace</td><td colspan="4">Nano and the City Themes: Energy, Transportation, Infrastructure, Waste; Design Portfolios</td><td></td></tr>
<tr><td>RTTA 3.3 Probes</td><td></td><td colspan="3">Emerge Workshops as Deliberative Experiments: Protocol and Tools, Design and Development, Experiments and Analysis</td></tr>
</table>

RTTA 3.4 TOURS		DESIGN PRINCIPLES, LITERATURE REVIEW, PILOT (NOV. 2012), DEVELOPMENT, TOURS (OCT. 2013), ANALYSIS & DISSEMINATION

Research Accomplishments and Plans, RTTA 3/1.

This section describes two major research thrusts in Futures of Foresight: the more theoretical PLAUSIBILITY PROJECT, the more methodological MEDIATING FUTURES. The YR 7 cornerstone RTTA 3 activity was EMERGE, a large-scale interdisciplinary collaboration and event that explored anticipation, deliberation and emerging technologies. Initially conceived as an RTTA 3/1 project due to its focus on crafting novel scenaric devises, given that it involved quasi-experimental settings where different methodological approaches were employed, it is now covered in RTTA 3/3. One exceptional component of Emerge, the ASU Art Museum Exhibition, is covered here.

THE PLAUSIBILITY PROJECT

The Plausibility Project seeks to better understand the meaning and significance of plausibility through questioning the ways individuals and communities know, explore, assess and shape futures across time, cultures and professional practices. In YR 8 the Plausibility Project continues to explore the conceptual and methodological implications of plausibility and knowledge quality and foresight research and practice. With Angela Pereira of the Joint Research Centre of the European Commission, Selin has continued efforts on the special issue in the *International Journal for Foresight and Innovation*. The authors of contributed articles convened in Ispra, Italy for a writing workshop sponsored by the Joint Research Centre of the European Commission in collaboration with the CNS-ASU. This workshop, lead by Selin and Pereira in May 12, built on the Plausibility workshop (YR 5) and the Institute of the Protection and Security of the Citizen's (JRC) emerging research programme on societal challenges of emergent technologies. We explored future-oriented research and its relationship to and role in policy formation.

In addition to the special issue, Selin and Rafael Ramirez of University of Oxford completed an article on the etymological history of plausibility and how different scenario practitioners take up the term variably in planning.

MATERIAL DELIBERATION & MEDIATING FUTURES

This methodologically focused research thrust explores how diverse media (visual, numerical, experiential) represent technology futures. We combine field studies, case studies, experimental settings, and site visits to catalogue and assess scenario activities used to improve decision-making and reflexive learning in a variety of settings. We focus on new and emerging media for future-oriented research, including scenario performance, 3-D interactive modeling, video and film, and physical models of proto-type designs. RTTA 3/1 also develops a range of visual/digital and material/tactile "scenaric devices" to contribute to a variety of CNS activities. In this section, we highlight several key activities and ongoing projects advanced in YR 8 that investigate the future of foresight.

Mediating Futures Book Project

Much of the research conducted under RTTA 3/1 on the futures of foresight will be synthesized in a book under development by Selin, Davies, Pereira, Gano and Lim. To date, we have outlined each case, developed a table of contents and drafted the introductory chapter. We hope to submit this manuscript to MIT Press under their Leonardo Book series that focuses on art, technology and science by YR 9.

Material Deliberation

As part of this research theme, we have been developing the notion of material deliberation which informs many of the activities of RTTA 3. Following on this work, CNS postdoctoral scholar Davies (now at University of Copenhagen) has prepared for publication an article builds on STS scholarship on public participation in science to reflect on the role that the material and affective play in practices of public engagement. In this piece, "Knowing and Loving: Public Engagement as Material and Affective Practice," Davies argues that participatory processes should be understood as constituted by embodied experience, objects, and affects as well as by discourse, offering up three sets of reflections to make this point.

Additionally, Selin, Gano and Davies chaired three panels at the EASST/4S conference in Copenhagen (Oct 12). The panel, entitled, (*Re)designing public engagement: innovation in practice and analysis*, which invited papers that explored work that incorporates not just rational debate but other forms of knowing and interacting; in analyses which look not only at information flows but at affective and material characteristics of engagement practices; and in theoretical reflections which radically re-imagine what 'public engagement' could be. We invited discussions of engagement as chaotic, pervasive, emotional, or informal – as saturated by nonhuman actors, perhaps, or as a hobbyist leisure activity. Such accounts might include, but are not limited to, substantive foci on spontaneous forms of public engagement, such as activism or protest; hacking, making, and other sites of lay technoscience; policy-oriented engagement which incorporates attention to the visual, site-specific, or creative; or analyses of the material, affective or temporal configurations of public engagement activities.

Making and Hacking Research Project

One of the questions this work on material deliberation suggests is what it means for participants in public engagement to engage with the materiality of technoscience, as well as the discourses that surround it. What happens, in other words, within public sites that incorporate material practices of science (how do publics experience such practices? How do they respond? What new meanings are construed?)? Hacking, in providing a site in which publics engage in sustained and in-depth hands-on 'tinkering', presents a key case for exploring this question and thereby grounding the experimental deliberative processes that RTTA 3 is focus upon. Conz and Davies completed fieldwork in mid 2012. The dataset involved four different US locations (Phoenix, San Francisco, Boston, and New York), 13 hackerspaces, and 30 interviews. They also collected photos and ephemera (stickers, leaflets, flyers) and took fieldnotes at each hackerspace. As such, we have a comprehensive dataset that represents a cross section of US hacking and making activity.

Analysis of this is ongoing. A first sweep of the interview transcripts was completed in late 2012, and confirmed initial assessments of the key themes and dynamics present in this community related to governance, culture and the dynamics of citizen science. Continued work with this data is feeding into a number of ongoing projects in Copenhagen and into research proposals. In addition, an article manuscript is in development providing a descriptive account of US hacking and making, and will be targeted to *Science as Culture*.

Hacking and making intersects with a number of CNS research interests, beyond the pursuit of material deliberation. Additionally CNS researchers have argued that informal science communication, engagement or leisure practices can be construed as democratically valuable through both their deliberative facets and their role in societal capacity building. Again, hacking and making provides a case study for exploring these concepts by raising questions around the democratic traction of such leisure-oriented practices and the degree to which they are, or could be, understood as forms of real-time technology assessment.

EMERGE

In YR 7, the main activity for RTTA 3/1 involved collaborating in the design, planning, coordination, and hosting of a large ASU-wide event called: *Emerge*: Artists and Scientists Redesign the Future. *Emerge* was a large-scale interdisciplinary event that explored anticipation, deliberation and emerging technologies. Given the success of CNS's Emerge, ASU leadership mandated Emerge '13 and this CNS-instigated event is proposed to occur annually. In 2013, Emerge focused on "The Future of Truth" was co-directed by RTTA 3's prior co-leads Lim and Sarewitz, with many CNS-ASU faculty and students participating. Due to the quasi-experimental set up of the Emerge workshops, in YR 8, we are accounting for the bulk of YR 8's *Emerge* activities in RTTA 3/3.

Curating *Emerge*

Materials, scenaric devices and other artifacts from *Emerge* were collected in an exhibition at the ASU Art Museum. The *Emerge* gallery offered up *Emerge's* discoveries and creations, giving public audiences an opportunity to sample the futures discussed. The gallery was designed less as a presentation and more of an interactive experience that sought to enable diverse audiences to experiment with alternative modes of looking at the future. The gallery was presented in four main sections. The first focused on narrative and invited museum visitors to imagine the look and feel of the future and to envision how their families, work life and relationships might be different. Several *Emerge* workshops explored the narratives and emotions our future lives might hold, asking what kinds of stories will become commonplace, and what the texture and pattern of everyday life will be. Whether considering Arizona's energy future or the development of empathic robots, participants emphasized the importance of imagining the future in technicolor, with images, sketches and stories. The second area of the gallery, drawing on the Making and Hacking research project and the notion of material deliberation, focused on hand-on experiences. *Emerge* participants dug deep into the everyday objects and places we take for granted and asked them to think with their hands, and to design the mundane surroundings of tomorrow. Some worked on a small scale: cups, flowers, snacks and scratch cards. Others thought on the level of the monumental, and asked what might endure beyond our contemporary civilization. All investigated the materiality of future life. The gallery space offered the opportunity to build objects that one might find in the future, and display it. The third segment of the gallery focused on 'Embodying the Future.' Exploring the kind of future we want shouldn't involve only our minds, or our hands, or our eyes. *Emerge* also included workshops in which participants used their whole bodies to investigate potential futures through games- virtual and real-life- or within immersive spaces. One *Emerge* workshop used a dome to immerse participants in the immensity of the universe – and then discussed our (future) place in it. The last area of the gallery featured the installations, architectural projections, costumes of the giant spiders and other fantastical creatures. Drawing from the final evening of *Emerge* that featured live performance, audio and projection with crowd-sourced data, *Immerge* was an immersive, carnivalesque glimpse of the future which shifted with the ebb and flow of audience movement and participation. The exhibition was co-curated by RTTA's Selin and Davies as well as ASU faculty Kelliher and Byrne. The exhibition was open from April - August 2013.

Research Accomplishments and Plans, RTTA 3/2.

InnovationSpace is an entrepreneurial joint venture among the Herberger Institute for Design and the Arts, Ira A. Fulton Schools of Engineering, and W.P. Carey School of Business at Arizona State University. The goal of this transdisciplinary education and research lab is to teach students how to develop products that create market value while serving real societal needs and minimizing impacts on the environment. The two-semester InnovationSpace course satisfies the studio, capstone and thesis requirements for senior majors in each unit. In addition, many of the students are Barrett Honors College

students and write their honors theses about their InnovationSpace work. In the course, cross-functional teams of students drawn from industrial design, visual communication design, business and engineering use a product-development model known as Integrated Innovation to research, develop, test and refine real-world product concepts for paying sponsors including, in recent years, CNS, Intel, and Herman Miller. Since 2006, CNS-ASU has supported the work of three transdisciplinary teams (a total of 12 students) annually.

CNS-ASU has partnered with InnovationSpace to investigate nano-based technologies that ensure the freedom, privacy and security of citizens (AY 06-07), to visualize socially beneficial opportunities for nanotechnology in the areas of human health and enhancement (AY 07-08), to develop product concepts that utilize nano-enhanced solutions for ensuring equitable access to clean energy (AY 08- 09), and to develop product concepts that utilize nano-enhanced solutions for addressing urban sustainability in relation to waste management, energy efficient transportation and energy awareness (AY 10- 11). In AY 11-12, students focused on nanotechnology solutions to public health with special emphasis on clean water, safety of emergency services, and drug abuse prevention. In AY 12-13 currently in progress, the students have been developing nano-enabled products and services to address the problems of household and office waste, indoor pollution and the urban heat island effect. For the last two years, the student teams have been tightly aligned with the TRC 2 program. InnovationSpace is led by Boradkar, and CNS researchers Guston and Selin liaise regularly with the students. Wetmore (TRC 1) and Bennett, as well as Wiek and Foley (TRC 2) each have had significant interaction with the students. In contrast to previous years, student teams are focusing more on near-term, entrepreneurial projects ready for market.

Outcomes from InnovationSpace include not only invention disclosures made to AZTE (12 from previous years and three more expected this year), but also spectacularly detailed documentation of the student-led innovation process known as Innovation Proposals. These include summaries of user research, product renderings and prototypes, engineering specifications, branding and communication strategies, ecological impact assessments and business plans.

Research Accomplishments and Plans, RTTA 3/3.
Emerge took place on the ASU campus 1-3 Mar 12 and brought together artists, scientists, engineers, students, and educators in an attempt to "redesign the future" by thinking critically about the future of emerging technologies. At the heart of *Emerge* were nine simultaneously run workshops designed as social science experiments in futures thinking and practice. Each workshop employed a different foresight methodology to engage an interdisciplinary group in creating games, products, monuments, images and stories in an effort to reveal the texture and feel of emerging futures. The workshops were an important example of future-oriented discussion and deliberation which moves away from the purely logical, discursive, and technical to incorporate attention to the material, affective and creative aspects of the futures afforded by contemporary scientific research. CNS researchers have argued that this move is a vital next step in public and stakeholder engagement with (science) policy (see Davies et al. 2012). Building on this theoretical work, we used *Emerge* as a case study of such future-oriented deliberations, and we developed a research engagement around it that sought to explore how the quality of deliberation is affected by the incorporation of the material, affective and creative. This effort took the form of an "event ethnography." A team of ethnographers – largely graduate students in relevant disciplines from around ASU – was recruited and trained in ethnographic (participant-observation) techniques. They observed each of *Emerge's* nine workshops with an eye to the material culture it involved, the meanings participants constructed around it, and the dynamics of participation. The research team produced a dataset of several hundred pages of field notes, notes from informal interviews, and research photos and sketches; these are in the process of being written up for publication. Preliminary findings show that the unique flows of material cultures influence workshop dynamics, offering constraints as well as opportunities. While each workshop employed a different process and had unique outcomes, some new

dynamics were observed chiefly around the formation of technical cadres and new kinds of experts. There was a more nuanced drawing out of affect, and hands-on techniques seemed particularly helpful.

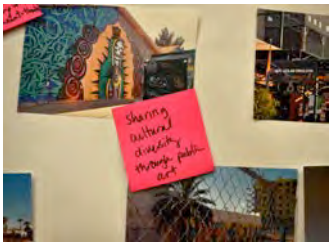
Full analysis of the *Emerge '12* ethnography will be included in a special issue in *Futures*, led by Selin, currently under way. There are currently six manuscripts being developed from workshop leads or ethnographers that probe the quality and effectiveness of the future-oriented method employed.

In March 13, the second annual *Emerge* focused on the "Future of Truth." CNS faculty member Prasad Boradkar (of RTTA 3/2) led a workshop entitled "The Future of Making: Craft + Rapid Prototyping?" The workshop brought skilled traditional craft workers (glass designer Jenine Bressner, leather artist Ken Evans, and woodworker Richard Althenhofen) – who make authentic, one-off goods – together with designers who use rapid prototyping technologies to imagine a new sort of creative process for the way we might make things in the future. The two forms of making—craft and rapid prototyping—bespeak profoundly different worlds and realities and approaches to the authentic and the truthful. In this workshop, participants used craft techniques that have been unchanged for centuries, as well as more recently available 3D printing machines to create new hybrid objects in an attempt to imagine how we will shape our material world in the future.

Research Accomplishments and Plans, RTTA 3/4.
Futurescape City Tours (FCT) is a distributed, deliberative activity that expands on the successes of the NCTF by increasing the experiential richness and contextual relevance of the deliberative process. Research and practice around innovative forms of public engagement with technoscience have been a key component of RTTA 3. Specifically, CNS-ASU researchers are investigating how to move "beyond discourse" within deliberation so as to incorporate the material, visual, and affective. These ideas have been discussed at a theoretical level in two recent papers (Davies and Selin 2012; Davies et al 2012), but CNS-ASU is also exploring how to put this thinking into practice at the level of particular deliberative processes. Thus, similar to the NCTF, small groups of citizens in different cities across the country will join together to deliberate in the FCT. Using multi-media, reflective writing, and a walking tour, the project seeks to enables citizens to explore their local surroundings, visualize how these might change as a result of nanotechnologies, and deliberate about technological choices, preferences, complexities, and outcomes. The FCT will involve direct and in-depth interaction with decision-makers in urban communities. As outlined in the timeline above, FCTs are scheduled for Fall 13.

In YR 8, RTTA 3/4 conducted a pilot in the City of Phoenix. The Futurescape City Tours pilot evoked a set of methods that takes seriously citizen-driven agendas, the importance of place and materiality, the relevance of multiple timescapes, and a creative use of multi-media tools. In addition to new tools, the FCT integrated stakeholders and S&T experts into the deliberation process. Through the use of these alternative approaches to public engagement, the FCT Pilot demonstrated how the method works to build capacities among participants to appreciate the trade-offs, path dependencies and choices surrounding nano and their city. The project presented several core questions for participants to consider:

- Sustainability and equity: How can new technologies support desirable futures?
- Making technology visible: How can we better notice taken for granted technological systems in the city?
- Capacity building for anticipatory governance: What skills are necessary to be involved in the development of new technologies and bridge the divide between experts and citizens?



The FCT pilot started with an Orientation session that aimed to establish citizen-set agendas regarding curiosities and concerns about emerging technology and the urban environment. The citizen group played the Nano Around the World game co-developed by CNS researchers and afterward were provided with Background Material (http://futurescapecitytours.weebly.com/resources.html) that included many of the research and media products developed with the CNS. From the interests articulated by the citizens, CNS researchers then designed a walking tour of the city where participants where invited to use cameras and reflective writing to document, observe, question, and point out the places in their city where they see the past persisting, the present embodied, and the future emerging. Along the way, they met with a variety of scientific experts and civic stakeholders to discuss their concerns and question the role of technology in the city. In the third session, the citizens deliberated using their photographs to relay their views. The Pilot concluded with a gallery show in downtown Phoenix, during the 'First Friday' Art Walk, that displayed the citizens' photographs and notes in an interactive fashion, inviting new publics to comment and critique their visions. This exhibition was our first attempt at a public presentation for the material deliberations of FCT. For 2013 we are planning a larger event which will synthesize the material deliberations of all six sites.

In Spring 13 the researches involved in the Pilot are analyzing the process and findings of the tour and a preparing several research articles. The following abstracts have been submitted to the Society for the Social Studies of Science annual conference and capture the current interests:

Mediating Urban Imaginaries: Designing and Doing the Futurescape City Tours
Obduracy and Malleability in the City: Public Engagement with Nanotechnology
The Futurescape City Tours: Material Deliberation in Public Engagement
Seeing the City: Photography as a Place of Work
Public Engagement as Capacity Building

<u>Civic Capacity Building</u>
Preliminary analysis of the tours showed several key indicators of civic capacity. Participants made new connections between each other and between the experts, organizers, and panelists. One of the panelists mentioned exchanging contact information in order to further pursue common interests with two participants. Participants had opportunities to interact with others from different backgrounds and each participant brought different experiences and perspectives to the deliberation. When asked what was most inspiring or interesting about their tour experience, two participants mentioned that it was really "about the people and not the technology." An important aspect of this network/ relationship building revolved around the interaction with experts. Several of the experts had an opportunity to talk informally with each other and with participants and a few even continued the tour with us after their presentations. These interactions appeared valuable and educational to the experts and panelists as they learned more about citizens' concerns and were presented with the challenge of making technical information accessible and useful to citizens.

In a slightly different vein, walking through the city provided participants an opportunity to observe what one participant called the "hierarchy of values" are apparent in the way we organize space. The tour helped identify "what's important and how it manifests itself in our environment". This connection between values, technology and the urban environment was an important theme shot through the tours. Another important theme was that of systems. Interconnections between issues and people- Participants

discussed an increase in critical awareness and a more thorough systems view and ability to see how issues and systems are interrelated and connected. As one participant mentioned when discussing what they appreciated about the tour: "to be able to see the interconnectivity of all the systems- to connect them visually and physically."

We also account for the building of civic capacity in relation to our participants' attention to politics. One citizen noted as a result of learning about nanotechnology and the city: "Our policymaking processes are remarkably slow in comparison to the processes for technology and innovation." Many participants throughout the tour expressed an increased awareness of the importance of citizens getting involved. As one participant explained when discussing what was important about the tour: "the engagement piece- how do we accelerate it (civic engagement) so we can be a participant in those decisions."

By drawing in Rawlings into RTTA 3, the CNS and particularly the Futurescape City Tours project, benefits from her research activities into capacity building and, more broadly, deliberation and civic engagement. In the reporting year, Rawlings published "Attending Tocqueville's School: Examining the intrapersonal, political, and civic effects of nonprofit board participation" in *Administrative Theory & Praxis*, which introduces the idea of civic capacity and explores the wide range of potential intrapersonal, political, and civic effects of public participation. It also aims to advance alternative locations for participation and engagement beyond the formal political arena and emphasizes capacity building as a critical element for sustaining democratic governance. In YR 8 Rawlings has served as the Research Project Manager, International City/County Management Association's (ICMA) Center for Management Strategies & Alliance for Innovation's Promoting Citizen Engagement as a Leading Practice Project. For this work, Rawlings brought together leading scholars and practitioners in the field to identify emerging and best practices in the areas of civic engagement, participatory governance, deliberation, and public participation. She also conducted a content analysis and review of existing knowledge and practice and developed and recommended curriculum and research methodologies for advancing knowledge related to citizen engagement programs. Rawlings also in YR 8 developed and edited a comprehensive research report on *Civic Engagement* for the 100th Arizona Town Hall. In this capacity, she also wrote the introductory chapter that explored many of the central ideas and theories related to civic engagement and participation.

FCT and Informal Science Education Collaborations

The goal of FCT is to create a deliberative event that is more than a one-time only research center sponsored event. We believe that the FCT could become a programming activity for informal science educators at museums and science centers. Museums and science centers in the U.S. have increasingly begun hosting events focused on adults in which participants interact in a more deliberative, dialogue-based mode. These events often try to link visitors to events and issues in their local communities, provide them access to the community experts and leaders who most directly shape community policy, and enhance citizen's abilities to more effectively integrate their interests into the changes, use, and policies of their local environment. In an attempt to harness some of this momentum with the ISE community, we have been consulting and collaborating with museum leaders and educators throughout our development of the FCT. In the fall of 2012 we invited Robert Garfinkle and Pat Hamilton from the Science Museum of Minnesota (SMM) to discuss some of the challenges of public programming for adults focused on science-in-the-making. In addition, we have invited Stephanie Long, also of SMM to participate in our partner training in April. Long has served as an important member of the Nanoscale Informal Science Education Network's Forum Team and as such has important knowledge about adult programming and issues associated with science in society. In addition to these three experts, we are coordinating with the Public Engagement with Science Community of Practice of the Association of Science-Technology Centers (ASTC) to create an online webinar and discussion blog for members of ASTC interested in learning more about the FCT as a public engagement activity suitable for ISE institutions. This online forum will also allow us to continue to adapt the FCT to ISE sites.

National Citizens' Technology Forum (NCTF)

While no longer a funded project, publishing activities related to the NCTF continue. In the last year, Cobb and Gano published findings that revealed whether Americans who had participated in structured deliberation about emerging technologies (NCTF) thought their experiences should be emulated and institutionalized to address the societal impact of new technologies. In this unique study, researchers interviewed participants nearly two years after the event rather than immediately post-process. They were also asked to explain their opinions using an open- ended survey format, which generated a qualitatively rich dataset. Nearly all respondents recommended future consensus conferences, and their reasoning echoed scholarly distinctions between public understanding of science (PUS) and public engagement with science (PES). The paper concludes with a discussion about whether we can generalize from our results beyond the NCTF or the American political context. A second manuscript following on the NCTF is under preparation by Cobb and Gano, and the former will present the data analysis at the upcoming Midwestern Political Science Association Meeting. Guston also published an article that reviews most of the accomplishments and challenges of the NCTF, as well as CNS-ASU's turn toward ISE and material deliberation, for the special twentieth anniversary issue of *Public Understanding of Science*.

Contribution to "ensemble-ization" or other center-wide activities.

RTTA 3/1 is involved in the activities of the TRC 2, participating in workshops and drawing from research materials to augment the tours. To create the background materials for the Futurescape City Tours, we drew on multiple resources from the Center, including research from RTTA 1 and 2. Researchers from TRC 2 participated in the design and deployment of the Futurescape City Tours. Selin and Rawlings each gave a Science Café presentations and contributed to other Center wide activities like the CNS Winter School.

RTTA 4: Reflexivity and Integration

Personnel – faculty and senior participants

Erik Fisher, RTTA 4 leader (ASU, assistant professor, Political Science and CSPO)
Elizabeth Corley, RTTA 4 co-leader (ASU, associate professor, Public Affairs)

Ira Bennett (ASU, assistant research professor, CSPO)
Dave Conz (ASU, assistant research professor and lecturer, CSPO and Bachelor of Interdisciplinary Studies)
David H. Guston (ASU, professor, School of Politics and Global Studies, CSPO)
Cynthia Selin (ASU, assistant research professor, CSPO)
Jameson Wetmore (ASU, assistant professor, School of Human Evolution and Social Change and CSPO)

Other Personnel – graduate students (20), post-doc (1)

Goals. RTTA 4/1 documents the influence of CNS-ASU research and engagement activities on the knowledge, values, and choices of NSE researchers and others. RTTA 4/2 develops and implements the integrative agenda of anticipatory governance through field research, methodological refinement and other interactive and collaborative work that CNS-ASU performs with NSE researchers. RTTA 4/3 studies the meaning and implementation of integration and reflexivity in the sphere of science policy. Projects under the RTTA 4 rubric include: annual interviews with collaborating NSE researchers; laboratory studies and engagements, including the associated STIR project (and previously, the Tubes in the Desert project and the associated Ethics in the Lab project); co-curricular activities including the DC Summer Session; and various projects that characterize, map and assess the integration of societal dimensions into NSE research and policy, including the supplement awarded in YR 8 to study the impacts and outcomes of CNS-ASU activities.

Research Program, Accomplishments and Plans.

RTTA 4/1: Annual Interviews and Impact Assessment
In order to document and assess the influence of Center activities on the NSE researchers with whom we collaborate, we implement an interview protocol annually each spring/summer/fall. This protocol has focused on the knowledge, identity, and practices of our collaborating scientists, particularly around their understanding of the societal aspects of their work. We conducted baseline research in Sp 06 and subsequent rounds in Sp 07, Sp 08, Sp 09, Sp 10/Fa 10 and Sp 11/Fa 11. In Fa 12, we began preparing for a much broader survey that will include not only NSE researcher but all Center participants.

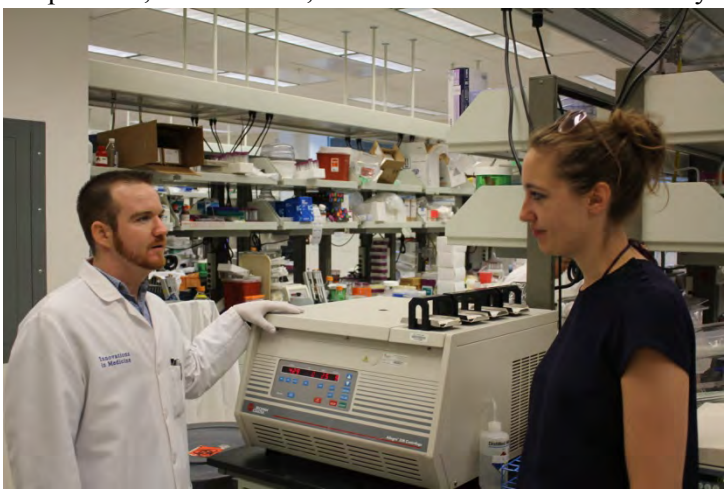
Last year we reported on changes in NSE graduate student perspectives on the connections between broader societal considerations, their own research and future career plans as a result of interacting with CNS. We also reported on differences in interdisciplinarity as experienced between two sub-groups: ASU researchers and STIR project participants. In Y8, we began laying the foundations for a major expansion in terms of the number of Center participants and the types of impacts beyond those on NSE research, education and workforce practices. This expansion builds on the Center's initial focus on respondents from the Biodesign Institute, which was expanded in Sp 09 to include the School of Life Sciences, the College of Engineering, the School of Design, and other academic units on two ASU campuses. In Fa 12 we hired postdoc Michael Reinsborough to assist Guston, Corley and Fisher in performing an impact assessment that will survey all Center (N>700) participants and include follow-up interviews. The survey instrument was nearing its final form as of Mar 13 and we plan to send out the first invitation in Apr 13.

RTTA 4/2: Laboratory Engagement Studies

CNS-ASU has created a set of laboratory studies and engagements. These studies are not traditional laboratory ethnographies with a focus on observation and explication, but rather efforts to integrate social science and humanities with NSE research. In previous years, the Center reported on the integrative efforts of Fisher's STIR project; of Wetmore and McGregor in the Woodbury lab; of Fisher in the Center for Integrated Nanotechnologies (CINT) in the Department of Energy's Sandia and Los Alamos National Laboratories; of Selin in the Johnston lab; of Fisher in the Lindsay lab; and of Conz in the Tubes in the Desert project.

The STIR Project

As previously reported, Fisher is PI and Guston Co-PI on the Socio-Technical Integration Research (STIR) project. Since 2009, under Fisher's direction, STIR has coordinated a set of twenty-eight comparative, international, intervention-oriented "laboratory engagement studies" in North America, Western Europe, and East Asia. To date the project has mentored and trained twenty-two (22) graduate students or "STIRers"—including twenty (20) doctoral students and two (2) masters students. They are divided into a "core" group of ten original project investigators and twelve "associated" investigators who have since joined the program. STIRers are trained in Fisher's midstream modulation framework and integrative decision protocol, which are used over the course of each 12-week study in the attempt to conduct socio-technical collaborations, study the social and cultural conditions that prohibit and enable them, and assess the policy and political relevance of their outcomes. Fisher has also worked closely with four (4) postdocs on project-related research. (See **Education** for a list of the 22 participating STIR students and 4 post-docs by institution.)



STIR laboratory engagement studies have been completed in the Curtiss, Johnson, Lindsay, Seo, Vermass, Westerhoff and related laboratories at ASU alone. Beyond ASU, STIR engagement studies have been completed in 20 additional laboratories around the world. This brings the number of labs in the STIR network to 26. To date, 28 studies have been completed, not counting Fisher's 3 pilot studies or 4 "STIR inspired" studies by postdocs and others outside the US.

Major activities in Y8 include training for new studies, the commencement of new studies in Japan and Norway, research into the experience of STIR investigators and filming of a long awaited documentary.

During Fall 12, Fisher held bi-weekly research meetings focused on extending STIR studies beyond the laboratory and in defining the broader scholarly field of socio-technical integration. Meetings involved training ASU doctoral students Carlo Altamirano and Miles Brundage and recent PSM graduate Cameron Keys for 3 more associated studies. A fellow of the Solar Utilization Network (SUN) IGERT (#1144616; Wim Vermass, PI; Guston, co-PI), Brundage will perform STIR "rotations" across a series of laboratories and other organizations that span university research, industrial development, and public use and regulation of nanotech-based research, tentatively focusing on the intersection of solar energy/photovoltaics and robotics/AI. Working with Weik, Altamirando plans to adapt STIR techniques to broader engagement activities and incorporate them into Weik's Reinvent Phoenix project, which

brings together citizens, business owners, city planning officials and others to identify possibilities for sustainable solutions across diverse perspectives.

Keys commenced his study March 2013 (in Tsukuba, Japan). He will be working with the Advanced Scanning Probe Microscopy group, Advanced Nano Characterisation Center (ANCC), Sengen site of National Institute for Materials Science (NIMS). Unfunded collaborator Nydal is overseeing an extended laboratory engagement at the Norwegian University of Science and Technology.

Under the guidance of Fisher and unfunded collaborator Tom Seager, ASU doctoral student Eric Kennedy began developing a select bibliography of socio-technical integration for an upcoming workshop in May that will constitute the 5th project workshop and will be held in conjunction with other "communities of integration." The goal of the workshop is to define an emerging scholarly field and sketch an overarching research agenda based on its stocktaking of integration forms, methods and purposes.

Fisher and ASU doctoral student Brenda Trinidad developed initial conceptual themes for a mediated reflexive ethnography of STIR investigators' experiences in conducting laboratory engagement studies as embedded scholars working side by side with natural scientists and engineers in pursuit of collaborative inquiry. A review of documents already produced by individual STIR researchers, workshop presentations, and one-on-one interviews conducted by Trinidad produced several ideas that were distilled into six broad themes (difference, construction, transformation, conditions, relationships and identity). These themes provided the starting point for developing a survey based primarily on thematic questions. The survey was administered to STIR investigators in early 2013. Trinidad and Fisher plan to produce a draft manuscript based on the survey results for circulation and discussion at the May project workshop.

STIR project results have produced strong indications of both the possibility and the utility of socio-technical integration through social science-natural science collaborations. In particular, we identify the following integration capacity-building outcomes:

> *Reflexive awareness:* For instance, laboratory researchers have realized that there are inconsistencies in their views about the role of science in society.
>
> *Changes in practice:* For instance, interactions with STIRers have sparked new research ideas, catalyzed laboratories to engage in outreach activities, and occasioned debates about and changes in human and environmental health and safety practices—from lab coats and safety gloves to nanomaterial waste disposal practices.
>
> *Residual effects:* For instance, laboratory participants have returned to contact several STIRers, either with further observations and requests in relation to the broader aspects of research or with invitations to participate in collaborative publications.

Table RTTA 4-1: STIR at a glance. Each row indicates a "core" student investigator.

	Social Science	Site 1	Site 2	Physical Science
US Investigators	STS	Tempe	Beijing	BioPhysics
	Political Science	British Columbia	Oxford	Fertility
	Public Affairs	Denver	Belfast	Materials
	Anthropology	Berkeley	Basel	Synthetic Biology
	STS	Tempe	Seoul	Chemistry & Bio
Non-US Investigators	Philosophy	Tempe	Madrid	Physics
	Business	Leeds	York	Manufacturing
	Philosophy	Golden	Dalian	Fuel Cells
	Political Science	Walloon	Flanders	Nano/bio
	Biotech & Society	Delft	Tempe	Microbiology

In Y8, Dutch doctoral student and unfunded STIR investigator Steven Flipse and co-authors describe an application of STIR methods within a private biotechnology research organization. While there have been a handful of other STIR efforts within industrial labs, Flipse was the first to conduct two paired industrial lab studies. His *Science and Engineering Ethics* article documents how, by the end of the study, all five participating industrial researchers had came to see integration practices as "part of" their daily job. (At the beginning of the study, only one of the five participants viewed integration this way.) Integration also led to perceptible increases in project performance and quality, while simultaneously making innovation practice more socially desirable. Flipse et al. state that "collaborative activities such as Midstream Modulation convert theoretical notions of responsible innovation as suggested in science policies to practical implications on the R&D working floor" (Flipse et al., 2013).

In a paper published in *Research Policy*, unfunded collaborators Krsto Pandza and Paul Ellwood use observations from their paired STIR studies to argue that "the nascent process of institutionalizing responsible innovation requires studying the interplay between strategic and ethical agency" (Pandza and Ellwood, 2013). They suggest that whether researchers experience responsibility as problematic or unproblematic relates to its congruence across different types of agency and the implications this holds for professional identity.

Also see Rodriguez et al. (2013) in *Research Policy* on socio-technical integration in the European R&D system, discussed below.

Previously, we reported on the four STIR workshops Fisher organized, Fisher's site visits and various education and outreach activities as well as research collaborations that allowed mentorship of STIR graduate students. In Y8, STIR continued to provide opportunities for and make contributions to graduate mentoring, training and professional development. In addition to the Fa 12 bi-weekly STIR lab meetings that were held for 5 doctoral students, all of whom regularly met individually with the PI; Fisher worked closely with visiting international students Miao LIAO (Tsinghua University) and Cecilie Glerup

(Copenhagen Business School) in Sp 12. Honors student Seth Reeker who took Fisher's graduate course documented his use of the STIR protocol in his capstone project. Reeker used the protocol without a collaborator and found that it enabled learning and deliberation about a wider set of societal values and complexities than traditional project management tools and techniques. Fisher continues to interact regularly with project investigators around the country and globe in order to develop their ideas and publications, including for the planned edited volume.

STIR has to date produced 50 publications, including 10 peer-reviewed journal publications. In Y8, this included publications in *Research Policy, Science and Engineering Ethics* and *Expert Review of Molecular Diagnostics.* In Y8 both Lucivero and Flipse successfully defended their dissertations. Several more journal publications and book chapters are in preparation or under review. The project has produced more than 70 professional presentations and conference papers. Y8 activity in this area included invited papers for the NBIC2 workshop at the NSF and for the Science of Science and Innovation Policy PI Conference at the National Academies, among others.

The findings of the STIR project are potentially relevant for informing and perhaps even guiding policy aspirations for "responsible innovation." Previously we reported on Fisher's and Guston's involvement in various workshops and meetings on this in the US and Europe. In Jan 12, through the CSPO/ASU DC office, we helped organize a US-UK dialogue and meeting with approximately two dozen program officers that circulated the 5 minute STIR video we reported on last year. This led to an invitation from the NSF Engineering Directorate to Sarewitz, Guston and Fisher to led an information session on Responsible Innovation in April 2012. As mentioned above, the paper by Panzda and Ellwood (2013) analyzes the interplay between strategic and ethical agency in aspirations for responsible innovation; and Fisher et al. (2012) draws on anticipatory governance to present a synthesis of novel policy approaches that could directly inform nanodiagnostics for theranostics medicine and potential postgenomics healthcare futures.

In Summer 2012, Fisher and Keys travelled to the Netherlands to take part in filming for a documentary on modern laboratory life. Fisher was filmed training and interacting with Keys, STIR alum Daan Schuurbiers and others who were interested in applying STIR/MM techniques in their filmed interactions with scientists. Producer Frank Theys will travel to Japan in Summer 2013 to film Keys during his study.

The STIR project is co-funded for 3 years at $540,000 through several NSF programs: Science, Technology and Society; Biology and Society; Mathematical and Physical Sciences and Society; Science of Science and Innovation Policy; and Office of International Science and Engineering. Additionally, through an international network that PI Fisher has cultivated since joining CNS-ASU in Aug 06, STIR project collaborators have expended approximately $500,000 to support and continue the non-NSF funded aspects of the project and will likely contribute more, bringing the total project funding to over $1M (not including administrative and financial support from CNS-ASU).

RTTA 4/2 is also involved in the development of co-curricular activities meant to integrate societal aspects of nanotechnology into the education of NSE research students. The principle activities in the past and present reporting years, such as the DC Summer Session, are reported on in **Section 11 Education**.

RTTA 4/3: Integration Policy Studies

RTTA 4/3 conducts a number of integration policy studies that characterize, map and assess the integration of societal dimensions into nanotechnology policy and R&D processes in the US and Europe.

Previously we reported on Fisher's NNIN award, which funded fieldwork at 5 co-located NSEC and NNIN sites and the Fisher et al. (2010) analysis of over 1,000 NSE policy documents. In Y8, as part of

the STIR project, Rodriguez, Fisher and Schuurbiers find evidence in a paper for *Research Policy* that the increasing policy emphasis on socio-technical integration in European R&D system is confirmed at the level of resource allocation. They analyze nearly 2500 research solicitations from controversial areas of science and technology taken from over a decade of project-level solicitations. They identify four distinct types of integration (socio-ethical, stakeholder, socio-economic and industrial) that occur either as core or parallel components of R&D solicitations. Quantitative analysis reveals an overall trend towards increasing integration. However, solicitations integrating industrial and socio-economic aspects substantially outnumber those integrating socio-ethical and stakeholder aspects—by a 2 to 1 margin. They also find that integration has become significantly more pervasive over time, shifting from the periphery to the core of R&D practices (Rodriguez et al., 2013).

Continuing Integrative Outcomes

Previously we reported on Schuurbiers' consultancy efforts aimed at responsible innovation, on Fisher's research collaborations with Lindsay and with Mahajan; and on various papers, workshops, and on the construction of a large database; on Selin's collaboration with Johnson. Y8 continued to see a demand for training in and opportunities to conduct laboratory engagement studies using the STIR and midstream modulation approach. It also saw Fisher and Woodbury collaborate on developing provocative scenarios of nanodiagnostics for theranostics medicine based on work done in the Woodbury lab (Fisher et al., 2012)

Contribution to "ensemble-ization" or other center-wide activities

RTTA 4 continues to work with RTTA 1, 2 and 3 in several projects, including the utilization of multi-level PVM findings both to understand and to justify the scope and nature of integration activities at the micro-level; interviews with STIR researchers, participating laboratory directors and cognizant science policy actors who have experience with integration from STIR and/or PVM frameworks. These interviews, several of which have been filmed, are the subject of separate research projects by doctoral students (including the now commenced documentary). As mentioned above, in Y8, Fisher, Keys and Schuurbiers participated in initial filming for Theys' documentary *Lab-life* and plans are being finalized for Theys to film Keys during his STIR study in Japan. In Y8 Fisher worked with undergraduate Perez to continue research conceived with Anderson and Radatz that assesses integration in NSF NNI solicitations, thus combining RTTA 2 and 4. Additionally, in a collaboration that draws on TRC 2, in YR 7 Fisher and Wiek have been working with Altamirano to expand STIR into the urban context for nanotechnology governance. Similarly, Fisher and Guston are working with Brundage to incorporate STIR and midstream modulation activities into field sites that are intended to link together university, private, and government actors who are anticipated to be involved in the emergence of solar / nano-technological / robotics trajectories. Three attendees at the CNS Winter School have reported making plans to incorporate STIR methods and/or concepts into their upcoming research. Finally, Guston, Corley and Fisher have been working with Reinsborough to develop and administer a Center impact assessment that combines efforts of RTTA 2 and 4.

TRC 1: Equity, Equality and Responsibility

Personnel – faculty and senior participants

Susan Cozzens, TRC 1 co-leader (GA Tech, professor, Public Policy, TPAC)
Jameson Wetmore, TRC 1 co-leader (ASU, associate professor, Human Evolution and Social Change, CSPO)

Personnel – graduate students (4), undergraduate students (1), post-docs (1)

Goals. The goals of TRC 1 Equity, Equality and Responsibility are to study ways that NSE reflects social and economic inequalities and contributes to increasing or decreasing them in different national contexts; to identify how the concepts of equity, equality, and responsibility are being applied in the development of NSE; and to explore ways to ensure that NSE can contribute to equity, equality, and responsibility as public values. These goals include concerns about equity in the distribution of the conduct of NSE research and commercialization of NSE-enabled products as well as in the distribution of risks and benefits from consequent innovations, both domestically and in developing countries. Activities include developing options for NSE researchers to act responsibly toward such concerns.

Research Accomplishments and Plans

A major accomplishment of TRC 1 over the past twelve months has been the successful promotion and placement of core TRC 1 members in desirable academic jobs around the world. Co-leader Cozzens became Vice Provost for Graduate Education and Faculty Affairs at Georgia Tech. Co-leader Wetmore was promoted to Associate Professor with tenure at ASU. Former post-doctoral fellow Harsh accepted a tenure-track assistant professor position at the Center for Engineering and Society at Concordia University in Montreal. There, he uses the TRC 1 concepts of equity, inequality and development in a 300-level technology and society course for computer scientists at Concordia. He is also supervising a PhD student examining gender in nanotechnology innovation who will conduct bibiliometric and patent analysis in collaboration with TRC 1 graduate students. Former graduate student Cortes-Lobos successfully defended his dissertation, "Nanotechnology Research in the US Agri-Food Sectoral System of Innovation: Toward sustainable Development," and is now professor at the Technology Management Graduate Program at the Universidad de Talca in Santiago, Chile. In May he begins teaching a course on agri-food that will incorporate material from TRC 1. Former graduate student Soumonni now has a tenure track faculty position at the University of Witwatersrand in Johannesburg, South Africa. Through bi-monthly skype calls coordinated over four countries on three continents, all of these scholars continue to collaborate with the TRC1 project from their new positions.

Since the development and publication of the second *Yearbook on Nanotechnology in Society: Nanotechnology and the Challenges of Equity, Equality and Development* (2011), TRC 1 has shifted its work to analyzing the unequal conditions and consequences of emerging nanotechnology applications in developed and developing countries. Because of limited funds, the decision was made to focus these efforts on two country case studies: the United States and South Africa. Asking these questions in the US is an obvious responsibility of the Center. We chose South Africa as an example of a developing country with NSE programs explicitly focused on benefits for poor communities, and because of existing connections and preliminary fieldwork.

In Jul 11, the TRC 1 research team conducted a two-week research trip in South Africa. The major finding was that while there have been only a few isolated cases where South African researchers have explored pro-poor nanotechnologies, there have been signs in other areas that nanotechnology is being

used as a way to further equity efforts in the country and beyond. First, many of the researchers we spoke with have been careful to work in areas that can further build up areas where South African corporations already have skills and experience, especially petrochemicals and mining. Building on existing strengths looks to be a way that South African researchers can more immediately contribute to the country's economy. Second, many South African researchers are using nanotechnology as an opportunity to help build technical expertise throughout the continent, as every lab that we visited included researchers from several countries across Africa.

While we continue to develop the case, our focus has largely transitioned to the United States. Woodson, advised by Cozzens and supported by an NSF graduate fellowship, has interviewed researchers, local government officials, and industry professionals involved with nanotechnology for water application. He is currently developing a dissertation that will examine the pro-poor aspects of nano-health research, and he also helped supervise an NNIN REU student. Soumonni, supported by CNS-ASU for part of the past year, analyzed the RTTA 1 publication database with respect to nano energy and characterized the contribution of the private sector, universities, and government agencies to nano-energy research in the US. He has developed datasets of the worldwide patent record in nano-energy from another database provided by RTTA 1. He has also conducted numerous interviews with actors involved in nano-energy in the US and carried out a comparative study of nano-energy in China and South Africa, which he presented at the Globelics Doctoral Academy in Rio de Janeiro, Brazil in August 2012. Cortes-Lobos, advised by Cozzens and supported through her work at Georgia Tech, has collected data and conducted interviews with 24 researchers, federal agency managers, and NGO representatives in the US agri-food nanotechnology system, focusing on the role played by system's different actors in setting the public research agenda.

In each of the three application areas and in both country cases, the team has found that since Salamanca-Buentello et al.'s 2005 article about how nanotechnology could help achieve the UN's Millennium Development goals, a significant mismatch persists between what nanotechnology could have done and what has actually been explored. Georgia Tech graduate student Castillo has also been analyzing the workforce implications of these case study topics, focusing on developing indicators of the potential employment effects of nanotechnology in the US. He has used the companies TRC 1 has already identified from bibliometric data and is using IMPLAN to simulate the potential impacts of changes in employment in these nanotechnology-infused sectors.

The team's current focus is developing a short course to train young scientists and engineers about engaging with disadvantaged communities. These community engagement workshops are being designed to give scientists and engineers a basic introduction to the skills needed to successfully develop technological systems that can help the disadvantaged. The workshops – tentatively to be held in Arizona, Atlanta, and South Africa – will help scientists and engineers find ways of working with local people, finding out what needs they have, and together develop sustainable solutions to these problems. The goal of these workshops is to develop and propagate ways to avoid the repeated failures of technological development work around the world. Over the past year, Cozzens has had two meetings with Leslie Petrik at the University of the Western Cape about the possibility of connecting nanotechnology to poor communities in South Africa, and a plan is emerging to offer the short training as part of the new master's course in nanotechnology being offered there in conjunction with three other universities. Other GA Tech groups involved in community and public interest outreach, including Computing for Good and the Westside Alliance, will be involved.

The equity card game initially created in fall 2011 has been fully developed with assistance from the Nano-scale Informal Science Education Network (NISE Net) and rebranded as "Nano around the World" [http://nisenet.org/catalog/programs/nano_around_world]. The game not only introduces audiences to the wide variety of current and potential future nanotechnologies, but also conveys the basic lesson that the

vast majority of nanotechnologies do not and will not benefit people in developing countries unless we focus more effort on their needs. Wetmore has played the game with groups at high schools, science cafes, and undergraduate classrooms and used it as a training tool for professionals interested in integrating a social understanding of nanotechnology into their work at museums and the 2013 CNS winter school. The 2013 NISE Net Nanodays kit included a child-friendly version of the game, "You Decide," distributed to over 200 science centers [http://nisenet.org/catalog/programs/exploring_nano_society_-_you_decide]. Both games are available for free download on the NISE Net website.

It appears as though the TRC 1 work in Africa will yield an important spinoff project. Wetmore, Harsh, and an ASU colleague Gregg Zachary applied for NSF funding in August 2012 to conduct research on the ways in which sub-Saharan Africans are developing their own capacity to research and implement computer science. We have been told that the grant application entitled "The Construction of Computer Science in Kenya and Uganda: Innovation, Capacity, Policy, Identity" is high on the program's priority list to fund, but due to various budget concerns no official answer has yet been given. While Harsh and Zachary's expertise in this area was developed over the past decade in a variety of projects, the TRC 1 research trip to South Africa furthered this knowledge and cemented the team's commitment to the area.

In the past year, TRC 1 research has led to at least a dozen professional talks and seven peer reviewed articles. Cozzens was co-chair of the 2012 Gordon Research Conference on Science & Technology Policy and worked to make sure there was a prominent panel on "Inclusive Innovation for Inclusive Development." Cozzens also gave the plenary talk at NanoAfrica 2012 last April. Wetmore will also be integrating many of the lessons learned into a series of Study Abroad programs he will be running this summer to New Zealand, Morocco, Spain, and the UK. Early in the development of TRC 1, Wetmore also focused efforts on the relationship between nanotechnology and religion, culminating in the publication of a book chapter and a peer reviewed journal publication in the past year.

Contribution to E2E, "ensemble-ization" or other center-wide activities.

Over the past year TRC 1 has worked extensively with RTTA 1 to determine what types of nanotechnology are being developed that could assist the developing world in dealing with water, food, and energy issues and where these technologies are being developed. Harsh has also used the data to help determine which corporations are involved in these processes. In addition, TRC 1 has been working with Wiek and Foley to strengthen the equity component in TRC 2's work in the Gateway community. This work culminated in a co-authored article recently published in *Nanoethics*.

TRC 2: Urban Design, Materials, and the Built Environment ("Nano and the City")

Personnel – Faculty and senior participants

Arnim Wiek, TRC 2 leader (ASU, assistant professor, School of Sustainability)
Sander van der Leeuw, TRC 2 co-leader (ASU, professor and Dean, School of Sustainability)

David H. Guston (ASU, professor of politics and global studies; director, CNS-ASU)
Darren Petrucci (ASU, professor of architecture, The Design School)
William Heywood (ASU, assistant clinical professor, The Design School)
Renata Hejduk (ASU, associate professor, The Design School)
Alex Gino (ASU, faculty associate, School of Art)

Personnel – graduate students (3), undergraduate students (2)

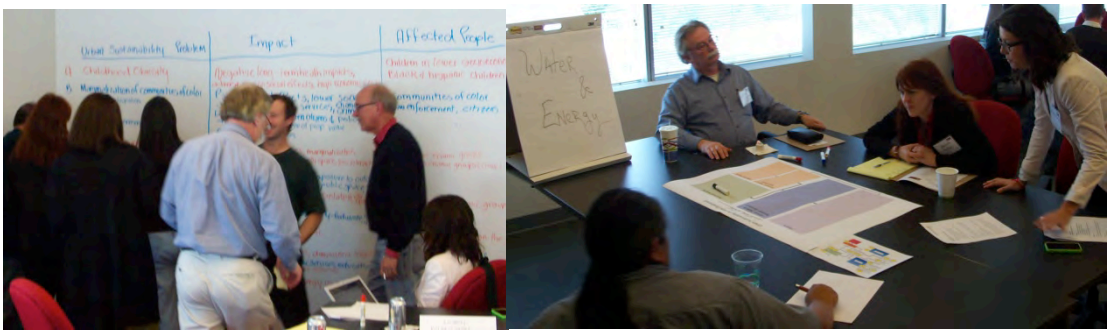
Goals. The goal of TRC 2 Urban Design, Materials, and the Built Environment is to investigate the nano-enabled city of the future, addressing the links among NSE, the built environment, social structures, and sustainability. TRC 2 will map out the diversity of problem perceptions, future visions, value-laden sustainability appraisals, and related implementation strategies across various stakeholder groups. We will engage in deliberative research with various urban communities, including public policy makers, business people, scientists and engineers, interest groups representatives, and citizens from the Phoenix Metropolitan Area. The goal of our research is to use the deliberative and visioning capacities developed through anticipatory governance to identify points of consensus as well as contest that might foster or hamper progress towards a sustainable co-evolution of NSE, the built environment, and societal needs.

Research Accomplishments and Plans

Nanotechnology in City Environments (NICE) Database
Continuing work begun in the previous year, two undergraduate students and one graduate student under the direction of Wiek implemented a structured data collection for the Nanotechnology in City Environments (NICE) database. The NICE database catalogues academic research, public reports, advertising materials, technical specification, and theorized implementation of nanotechnology captured in an urban context. The database is being compiled by undergraduate and graduate students and reviewed by experts with layman's terms summarizing the technological applications. The NICE database is an interactive catalogue of nanotechnology applications with particular attention being paid to functionality, mechanisms, potential benefits, potential hazards, urban domain, development stage, and substitution properties. The database has been used as a resource for CNS-ASU in a nanotechnology assessment. The website is starting to reach interested scholars, professionals, and the general public. From March to August 2012 the site averaged 31 unique visitors per month. In the following six-month period the average jumped to 130 unique visitors per month. Visitors are logging in from the U.S., India, United Kingdom, Iran, Taiwan, Brazil, China, Germany and Canada. The database has been continuously updated and built out during this time period. The uptick in visitors seems to be a reflection of the publication of the website's address in the *Journal of Nanoparticle Research* in August 2012. (Also see **Section 12 Outreach and Knowledge Transfer**).

Reconciling Supply of and Demand for Urban Nanotechnologies
The two workshops held in Spring 2011 offered a rich dataset of urban sustainability syndromes and validated and augmented the research team's listing of nanotechnologies with high importance for urban sustainability. This research activity resulted in presentations by Guston at the 8th Annual US-Korea NanoForum on Nanotechnology for Sustainability. Additionally, co-leader Wiek and graduate student Foley presented the findings at the 3rd Annual S.NET conference in Fall 2011. The results have been

reported in an article, authored by Wiek, Foley, and Guston that was published in the *Journal of Nanoparticle Research* in 2012 (See Publications).



Participants at the workshop informed TRC 2 understanding of the complex urban sustainability challenges facing Phoenix through various plenary and breakout activities.

The process of reconciling the supply of nanotechnology solutions with the demands of mitigating urban sustainability challenges has developed through a set of public engagements in Phoenix: the walking audits in the Gateway community; the stakeholder workshop at City Hall as part of the 'Future of Phoenix' studio; public engagements at the M52 Superfund Site; the stakeholder workshop as part of the study on 'Nanotechnology Innovation in Metropolitan Phoenix'; as well as expert and stakeholder workshops as part of the study crafting 'Governance Scenarios for Urban Nanotechnologies'.

Walking Audits

The research team explored a novel method for bringing together academic researchers, private sector, and community-based professionals to assess the intersection of urban sustainability syndromes and nanotechnology solutions. This multi-disciplinary, multi-actor engagement activity took a group of twenty-one social scientists, engineers, health professions, energy entrepreneurs, and community advocates on two-hour walking audits in the Gateway Corridor in Phoenix. The group divided into three sub-groups, focused on the food-health nexus, the M52 water contamination (see below), and the energy supply-demand dynamics. These groups were each composed of one TRC 2 based researcher (Wiek, graduate student Foley, and graduate student Braden Kay), two "guides" from the community, and three or more other participants. TRC 2 researchers from sought to facilitate dialogue, while navigating the urban terrain, and allowing spontaneous occurrences to drive conversations. This approach addressed problems from a place-based ("on the ground"), real-time context, while mitigating typical power asymmetries between experts and community members. The facilitators played a critical role to facilitate rich dialogue on the reconciliation between urban sustainability syndromes and nanotechnology solutions. Wiek has conducted three additional walking audits in the Gateway Corridor, Sky Harbor Neighborhood, and Roosevelt Row Community to build upon this experience and method of community engagement. A publication is in preparation for the next Yearbook of Nanotechnology in Society (in preparation). The chapter will detail this novel approach to expert–citizen engagement in place-based settings, which allows for experiential learning across disciplines and stakeholder groups.

TRC 2 co-leader Wiek welcomes the participants and introduces the walking audits in front of the Gateway Community College.

Graduate Studio 'The Future of Phoenix'

The Spring 2010 graduate studio lead by Wiek and Selin in concert with the Phoenix City Planning Department (which approached CNS-ASU about anticipatory governance) shaped the new *Phoenix General Plan Hearing Draft*. A second graduate studio on the neighborhood scale initiated by Wiek in Fall 2010 continued in Spring 12. While the content was largely focused on the demand for solutions to urban sustainability problems, it also developed our understanding of the most pressing urban sustainability problems, initiated the discussion about potential nanotechnology application (supply-side) to the superfund site in central Phoenix, and expanded our network of urban communities willing to further collaborate with TRC 2. More about this studio, "Sustainable Solution Options for Phoenix," is reported in the **Section 11 Education and Training**. Results of this work were published in the journal *Sustainability Science* in 2012.

Research and city collaborations continue and have moved forward through the "Reinvent Phoenix" grant, a $2.9M grant won by the City of Phoenix in collaboration with Arizona State University (PI: Wiek; Co-PI: Aaron Golub, School of Sustainability & School of Geographical Sciences and Urban Planning) and other partner organizations, funded through the "Sustainable Communities" program of the U.S. Department for Housing and Urban Development. The project runs from 2012 to 2014 and promotes a new model for urban development in Phoenix – one that improves quality of life and environmental performance while maintaining desirability and attainability for diverse groups of residents and stakeholders. The project focuses on Phoenix' light rail corridor and engages more than a thousand residents and stakeholders. The project builds on previous community-based planning research for the Phoenix' General Plan Update, co-sponsored by the Center for Nanotechnology in Society (mentioned above).

M52 Superfund Site

The third of these public engagements is a project operating at the community and metropolitan scale related to the Motorola 52nd Avenue (M52) Superfund site. The aim of this research is to connect the initial and continued engagement with community members through the TRC 2 activities with a renewed commitment to specifically address the M52 superfund site. First, we aim to significantly increase the number of community members (currently less than 10) involved in the problem-solving cycle of Superfund site remediation and mitigation, considering the possibilities of enhanced remediation capacities offered by nanotechnology. Second, we aim to involve vulnerable (low income) groups and minorities. Third, while the community is a central player, it is not the only one, and successful Superfund site remediation and mitigation require connecting the community to government agencies and the business sector in productive and goal-oriented ways that should consider nanotechnology-based remediation techniques that are novel and may confront regulatory barriers. Fourth, the projects seeks to build the community's capacity to participate in the full problem-solving cycle of Superfund site

remediation and mitigation, i.e., from problem-framing and articulation of concerns to the assessment of intervention options (including nanotechnology). All research activities are guided by the principles of anticipatory governance. The goal is to build community's capacity to create coherent and plausible future visions that can guide community development beyond remediation and mitigation to consider emerging technologies within the community, such as nanotechnology. This effort has produced a conference paper titled, "Can nanotechnology decontaminate water in a morally contested context?" co-authored by Foley, Rushforth, Kay and Wiek, which was awarded second place in the student paper competition at the IEEE-ISSST conference, primarily an engineering conference (see Awards and Honors).

In Spring 2012, an interdisciplinary team of graduate students including Foley (lead), Tomasz Kalinowski (CNS-Biodesign Fellow), Richard Rushforth, and supported by Wiek, were awarded a GISER grant. The graduate students facilitated a participatory technology assessment workshop at the M52 Superfund Site that attracted citizens, environmental advocates, regulatory agencies, and engineering consultants who represent the responsible parties. The workshop focused on exploring a particular nanotechnology-based remediation technology, the *in situ* microcosm array (ISMA), which was developed, in part, by Kalinowski. The participants provided feedback, critique, and recommendations for the continued development of the ISMA. This was the first opportunity for these stakeholders to co-define, through negotiation and deliberation, the social, technological, and environmental problems at the M52 Superfund Site and to explore remediation options.

Outcomes from the workshop included a follow-up presentation by graduate student Kalinowski on October 24, 2012 to the full Community Involvement Group (CIG) hosted by the Environmental Protection Agency (EPA). Secondly, Rushforth and Foley visited the local BioScience High School to share information with students working on the M52 Superfund Site in December 2012 (see Education and Outreach). Outcomes from the initial workshop, in terms of academic contributions, were delivered at the Dupont Summit 2012 held at the Carnegie Institution for Science in Washington, DC on December 7, 2012. Further, the workshop contributed to a dissertation chapter authored by graduate student Kalinowksi that addresses the ethical, legal and societal implications of the ISMA.

Nanotechnology Innovation in Metropolitan Phoenix

We conducted a study to better understand existing and potential capacities for how different groups participate and collaborate in the governance of nanotechnology in metropolitan Phoenix. Our intent was to assess the actor network operating within the metropolitan area while documenting prominent case studies of nanotechnology diffusion into urban environments around the world. For investigating such governance structures, including distributed roles, responsibilities, and capacities for choice and action, we used a methodology that combines actor network analysis with perception analysis. A series of forty-five semi-structured interviews with key stakeholders elicited perceptions and cross-perceptions of governance roles, responsibilities, and capacities for choice and action. The interviews led to a stakeholder workshop that explored coordinated and collaborative arrangements for nanotechnology governance in cities, focusing on Phoenix. These interviews have also provided data for dissertation work by graduate student Foley. The assessment informs the scenario study detailed below. Two publications, one co-authored by Foley and Wiek, and one co-authored by Foley, Wetmore, Bennett stem from the interviews and are under review and published, respectively.

In the past year, TRC 2 sought to apply an agent network approach to explore orientation and robustness of different governance arrangements. The findings of the empirical study in Phoenix indicate that the triple helix (industry, government funders, and academic research institutions) are closely aligned, yet risk managing organizations (insurers, non-governmental organizations, and government regulators) are only loosely connected to the core network. Results also illustrate disconnects between government funding and government regulatory agencies. These findings were taken and compared to findings from Switzerland (research conducted by Wiek and published in 2007). The findings show a transverse

relationship between the cultural attunement to government funding and government regulatory agencies when comparing Metropolitan Phoenix and Switzerland. Graduate student Foley presented this research at the AAAS Conference in Boston in February 2013 (see Honors and Awards).

The research team has initiated an appraisal of the governance of nanotechnology innovation at the urban level, using metropolitan Phoenix as a case study. The appraisal started with three literature reviews in risk governance, anticipatory governance, and sustainability-oriented governance. Those three bodies of literature were synthesized and then aligned with actors and phases throughout the innovation process. The research compared statements of responsibility offered by participants against a tiered set of evaluative criteria. Findings indicate that economic values dominate actors' current responsibilities and that societal and ecological values are present, however severely underrepresented in the data from Phoenix. Initial results were presented at the inaugural Sustainable Nanotechnology Organization's conference in Washington, DC in November 2012. An article on the comprehensive set of responsibilities and the empirical case study is in preparation.

Governance Scenarios for Cities (Phoenix)
TRC 2 has begun integrating literature on the future projections of nanotechnology innovation with stakeholders' perspectives to develop socio-technical scenarios in Center YR 7. The scenarios focus on the governance of the nano-enhanced city (reference year 2050) and are tested against criteria of consistency, plausibility, and diversity (using the plausibility concept developed by Wiek et al.; publication currently under review). TRC 2 has involved stakeholders from the Phoenix metropolitan area in various activities including, interviews, workshops, science cafés and the Futurescape City Tour as deliberative settings to engage the future. RTTA 3 partnered with TRC 2 in the development and exploration novel methods for effectively constructing, communicating, and visualizing future states and development paths through the Futurescape City Tour. The scenarios have recently been introduced into a studio course offered through ASU's Design School. Graduate students have started to develop urban design proposals and other imaginative concepts of the nano-enhanced city based on the scenarios and their components, including societal drivers, innovation models, nanotechnology applications, and urban sustainability challenges. The urban designs transition from the neighborhood to the city level in the design elements. The students reimagine the urban design impacts of various types of nanotechnology. The proposals are reviewed by an interdisciplinary group of scholars from across CNS and ASU. Students have also been tasked to specify the design proposals for one neighborhood in the Phoenix metropolitan area. Place-specific renderings act as localized visuals and narratives that allow people to observe, experience, interact in, and consider options on a level that is meaningful to them and relevant for their decisions. In partnership with ASU's Decision Theater, the students have presented their design proposals through visuals and renderings, and received concentrated feedback from the interdisciplinary review team. Based on this work, a set of publications, presentations, and future citizen engagements are planned.

Design students discuss first set of urban design proposals with CNS-ASU director Guston and instructors Darren Petrucci, Renata Hejduk, and Wiek in the Decision Theater.

Future Research Plans

In YR 9 of the Center, the fourth year of our research plan, we will use the previous research results on current, future, and ideal innovation processes and governance arrangements to conduct transformative research. Such research intends to make more direct progress towards sustainable anticipatory governance of nanotechnology in urban environments. The guiding idea is to investigate intended or real shifts of the current governance regime (in Phoenix) towards sustainable anticipatory governance, using governance principles as well as 'best practices' in technology governance from Europe. In research settings that range from natural to quasi-experimental (pilot projects), the exploration goes into the strategies, tactics, roles, barriers, assets, and so forth necessary to initiate and maintain such shifts. These shifts are specifically targeted to modify the unfavorable actor constellations identified through our previous research, including missing stakeholders, non-fulfillment of required governance functions, non-availability of required knowledge systems, and deviations between self- and cross-perception. In collaboration with ASU's Decision Theater, we will conduct a series of deliberative workshops with stakeholder groups that allow experiencing such alternative (e.g., highly collaborative) governance arrangements. We currently explore a closer collaboration with TRC1 that would allow for exploring these shifts not only in low-income communities in Phoenix, but also in the global south. In both cases, large parts of society are excluded from participating in the dominant governance arrangements that are driven by commercialization and market forces. The study would investigate in real-world setting the conditions and impact of alternative models of governance, including social entrepreneurship and anticipatory governance.

Other Collaborations

In follow-on to its YR 6 lecture series on Emerging Technologies and the Future of the City, TRC 2 collaborated with Steven Moore (UT-Austin), who is principal investigator of an NSF-funded workshop, *Designing Climate Change Policy for Architecture: An Interdisciplinary and International Approach*. In September 2012, Moore conducted a workshop – partially derived from conversations Moore had with Center faculty, including Wiek, Guston, Miller and Petrucci, during his December 2010 visit for the lecture series. The workshop brought together researchers in architecture, design, engineering, and the social sciences to examine opportunities for creating sustainable and resilient infrastructure in the face of the challenges of climate change. Themes included designing and constructing "smart" buildings, achieving net zero carbon habitation, adapting infrastructure to climate change, and learning lessons from other technologies. Miller attended and presented two talks on design for urban adaptation and lessons

from large-scale technological failure for factoring the social facets of technology into design projects. The workshop led to the development of a number of longer-term initiatives focused on enhancing urban sustainability, including initial steps toward a research network of urban sustainability researchers, a long-term urban technology and sustainability research proposal, and a project to evaluate the diffusion of technology policy for sustainable urban infrastructure.

Contributions to "ensemble-ization" or other center-wide activities

Operating in Center-wide fashion has been a goal of TRC 2 from its inception. Between RTTA 1 and TRC 2, graduate students Sanjay Arora and Foley with support from co-leaders Youtie, Shapira and Wiek have been conducting interviews and bibliometric research on nanotechnology in the construction sector. This work builds off conference posters and a publication is in preparation. Further collaboration between Jose Lobo (RTTA 1) and Foley are revolving around nanotechnology patents in Arizona and qualitative narratives about innovation dynamics in Phoenix. Graduate students Foley and Kim (RTTA-2) will be collaborating on a conference presentation at the May 2013 conference on the Governance of Emerging Technology. Wiek and Selin (RTTA 3) facilitated mutually supportive efforts to explore the future of Phoenix through the FutureScape Walking Tours and the Governance Scenarios of Phoenix. In a joint effort to expand CNS's capacity in Socio-technical Integration Research (STIR) and understand the dynamics of nanotechnology innovation in urban sustainability, Wiek and Fisher (RTTA 4) launched a pilot project and graduate student Carlo Altamirano Allende started to incorporate elements of the STIR protocol into Reinvent Phoenix research activities. To integrate and develop synergies between TRC 1 and TRC 2, graduate student Foley has frequented TRC 1 planning and research strategy meetings. Wiek and Wetmore (TRC 1) are pursuing a research agenda that will result in comparable datasets between emerging urban and rural nanotechnology application in developing and developed countries. Foley has also initiated successful integrative research projects with CNS-Biodesign fellow Kalinowski and CNS-FSE fellow Wender. These integrative efforts have resulted in a publication and a dissertation chapter.

10. NSEC Diversity Progress and Plans

Progress Toward Enhancing Diversity

Since its founding, the Center has worked to enhance the diversity of its leadership, faculty, postdoctoral, graduate, and undergraduate researchers. The Center has put significant effort into recruiting women and individuals from underrepresented groups. These efforts have included working with the ASU Hispanic Research Center to conduct workshops and courses oriented toward graduate and undergraduate students from underrepresented groups, as well as efforts to ensure appropriate advancement of faculty and postdoctoral researchers through promotion and increasing involvement in Center leadership. While the Center's diversity has improved significantly since its inception, in the recent year there has been only a modest improvement in racial and ethnic diversity and a modest decrease in gender diversity overall (while gender diversity remains strong in leadership positions).

Center efforts have worked especially well in recruiting women into Center activities at all levels. NSECs are expected to be model programs and to meet or exceed national percentages for the inclusion of women and underrepresented groups in science and engineering. At all levels, the current percentage of women in the Center exceeds the relevant national equivalent percentage in science and engineering fields. The Center has also made progress with regard to Hispanic participation, especially in recent years. In terms of Center leadership, postdoctoral, and graduate student participation, the Center exceeds (and in some cases significantly exceeds) the national percentage for Hispanic teachers in colleges and universities. The percentage of graduate students from underrepresented groups also exceeds the percentage of doctoral degrees awarded nationally to students from under-represented groups. See Tables 4A and 4B for an overview of Center personnel. See also Tables 3A and 3B for graduate student participants in Center degree and certificate programs.

As directed by the NSEC diversity reporting requirements, we compare our data below with data from national science and engineering statistics, as provided by the National Science Foundation. For comparison, we have used data from NSF's *Women, Minorities, and Persons with Disabilities in Science and Engineering* (http://www.nsf.gov/statistics/women/) updated January 2013 (with most data from 2010). The data available from this report is not symmetrical with respect to women and minorities nor the social sciences and science and engineering more broadly. We have therefore used the statistics available. Thus, our comparison categories vary somewhat.

Leadership: Center leadership has transitioned from its first phase (YRs 1-5) to its renewal phase (YRs 6-10). The Center's leadership initially included two women of six principal investigators (Carlson, Schneider) and three women of eleven leaders of the six RTTA and TRC research programs (Corley, Hogle, Schneider), for a total of five of seventeen (29%). At the time of the YR 8 review, three women serve among the six renewal PIs (Corley, Meldrum, Youtie) and five women serve among twelve RTTA and TRC research program leaders (Corley, Cozzens, Rawlings, Selin, Youtie), for a total of six of fifteen Center leaders (40%). Of these individuals: Corley began as an assistant professor and faculty researcher and is now a tenured associate professor, research program leader, and co-PI; Cozzens began as a faculty researcher and is now a research leader; Selin began as a postdoctoral researcher and is now a tenure-track assistant professor, research program leader, and assistant director for outreach; Youtie began as a faculty researcher and is now a research program leader and co-PI. Rawlings is joining the Center as a research professor and research program leader. Meldrum joined the Center as co-PI.

Research program leaders currently also include one Hispanic (Lobo), for a total of one of fifteen (7%) – an improvement over the lack of any members of underrepresented racial or ethnic groups among the original leadership team, but a drop from YR 8 with the departure of Lim from the Center's leadership team.

The percentage of women in Center leadership roles is above the percentage of doctoral level women in US universities with very high research activity (33%, NSF Table 9-21). The Center's Hispanic leadership for the renewal period slightly exceeds the percentage of doctoral level Hispanics in US universities with high research activity (4%, NSF Table 9-21). For the social sciences specifically, these numbers across all US colleges and universities are 38% for women and 5% for Hispanics.

Faculty and Professional Participants: From YR 1 to YR 7, the Center increased the number (and percentage) of women faculty involved in Center research and activities (non-leadership) from an initial seven (7 of 31, 23%) to 194 (194 of 507, 38%) active faculty and professional collaborators. YR 8 participation rates were lower, as we did not co-sponsor three major conferences, as we had in YR 7. Participation of faculty and professional participants was 204 total individuals, with 71 women (35%).

The Center has also increased the ethnic diversity of faculty and professionals involved in Center research (non-leadership). The Center faculty initially included five Asian Americans (5 of 31, 16%) and zero from underrepresented groups (0 of 31, 0%). The Center faculty and participants at the end of YR 7 included 2 Native Americans, 3 African Americans, 39 Asians, 9 Hispanic, and 1 disabled, for a total of 54 individuals (out of 507, 11%). In YR 8, participants included 1 Native American, 1 African American, 18 Asians, and 7 Hispanic, for a total of 27 (out of 204, 13%), for an increase of 2%.

Overall, the diversity of the Center faculty and professional participants stayed roughly the same, as gender diversity dropped by 3% while racial diversity increased by 2%. The percentage of women faculty in the Center slightly exceeds the percentage of women holding science, engineering, or health doctorates in US faculty positions in very high research activity universities (33%, see notes under Center leadership). The percentage of Hispanic faculty in the Center is slightly less than the percentage of Hispanic faculty according to the same metric (4%, see notes under Center leadership).

Postdoctoral Researchers: Since its inception, the Center has increased the diversity of women in postdoctoral research positions. Initially, the Center had one woman postdoctoral researcher (Selin) out of four (25%), who has subsequently been promoted to tenure-track assistant professor and has become a research program leader. At the end of YR 7, the Center had seven women out of sixteen (44%). In YR 8, we increased this percentage slightly to 6 out of 13 (46%).

Center progress in enhancing the racial and ethnic diversity of its postdoctoral researchers has been somewhat but not fully satisfactory. The Center has increased the number of Asian and Asian American postdoctoral researchers involved in the Center, from one in its initial year (1 of 4, 25%) to three in YR 8 (3 of 13, 23%), while adding two Hispanic postdocs (2 of 13, 15%). Unfortunately, the Center has not increased the number of African-American, Native American, or Pacific Islander postdoctoral researchers from its initial zero.

The percentage of women postdoctoral researchers in the Center equals the percentage of women in postdoctoral positions in the social sciences (47%, NSF Table 8-1).

Graduate Students: The Center has seen significant progress since its inception in improving the gender, racial, and ethnic diversity of its graduate students. At its inception, among its active graduate researchers, the Center had eight women graduate students (8 of 28, 29%) and eight Asian or Asian American graduate students (8 of 28, 29%). At the close of YR 8, the Center has thirty-four women (34 of 83, 41%), twenty-four Asian or Asian American (20 of 83, 24%), one African American (1 of 83, 1%), and five Hispanic (5 of 83, 6%) active graduate students among its researchers. In addition, Center degree programs and certificate / training programs have involved forty-seven women (47 of 113, 42%), four African American (5 of 113, 4%), one Native American (1 of 113, 1%), twenty-one Asians (21 of 113,

19%), and fourteen Hispanic (14 of 113, 12%) students. Total minority participation in these programs equaled thirty-three (41 of 113, 36%), an increase from both initial levels and YR 7.

The percentage of women graduate students involved in Center research is lower than the percentage of women graduate students in the social sciences nation-wide (54%, NSF Table 3-5). The percentage of under-represented minorities (26/83, 31%), collectively, is above the share of under-represented minorities among social science graduate students nationally (22%, NSF Table 3-1).

Undergraduates: The Center has made some progress in improving the diversity of its undergraduate researchers. At its inception, the Center had two women undergraduate students (2 of 8, 25%), three Asian or Asian American undergraduates (3 of 8, 38%), and no other students from under-represented groups. At the end of YR 8, the Center has seven women undergraduate students (7 of 31, 23%), four Asian (4 of 31, 13%), one African American (1 of 31, 3%), one Pacific Islander (1 of 31, 3%), and three Hispanic undergraduate students (3 of 31, 10%). Total minority undergraduates equaled nine (9 of 31, 30%).

Plans Going Forward

While the Center has performed strongly on diversity during its first eight years, meeting and, in many cases, exceeding relevant national percentages, we are not yet satisfied. We have therefore established a strategic plan for the renewal period on diversity that aims to further improve the Center‘s diversity profile.

Overall Objectives: The Center‘s overall objective with respect to diversity is to be a model for incorporating diversity among Center participants. To achieve this, we propose to pursue the following specific goals:

1. To maintain and continue to advance high levels of Center diversity in those areas documented above where Center diversity currently exceeds appropriate national levels;

2. To seek opportunities to recruit new Center participants, where appropriate, who will enhance the diversity of the Center in those areas where the Center is currently lower than appropriate national levels; and

3. To enhance graduate and undergraduate participation among students from underrepresented racial and ethnic groups.

Strategic Opportunities: Looking forward to the final two years of the Center’s NSF-supported activities, we propose to focus on a small number of concentrated activities that we think will make a concrete difference in the short term to enhancing the Center’s diversity while laying important infrastructural foundations for improving long-term diversity in the field.

1. Further strengthen our engagement with the Hispanic Research Center. The Center has an established a relationship with the Hispanic Research Center (HRC) at Arizona State University, through which the Center has built a growing number of contacts with students from African American and Hispanic backgrounds. In YR 7, CNS taught a 7-week course on nanotechnology in society (described in the **Outreach** section) to 12 ASU graduate students in the sciences and engineering from underrepresented backgrounds. The course was very successful, with several of the students following up and participating in Science Outside the Laboratory, Chemistry 501, led by Bennett and Wetmore, and other Center activities. We will teach the 7-week HRC course again in YR 9, continuing to encourage active engagement by participating students with ongoing Center opportunities.

2. Focus recruiting, funding, and other resources for the Winter School on students from underrepresented groups.

3. Develop and implement targeted recruiting efforts for the new Graduate Certificate in Responsible Innovation and the minor in Science & Technology Policy. We will organize and host recruiting events with HRC, American Indian Studies, and the American Indian Policy Institute, among others. We will coordinate diversity recruiting for the minor with the School of Public Affairs.

4. For YR 9, we are currently recruiting in collaboration with the School of Social Transformation for a visiting assistant professor in science, technology, and social transformation. We will actively solicit applications from underrepresented minorities. This person will teach relevant courses in this area, which we will use to help strengthen recruiting into Center educational programs.

5. We will create a small undergraduate research program for underrepresented minorities designed to provide students with research training and mentorship that will help prepare them for graduate school.

6. We will set aside discretionary funds of $10k to $20k to support these activities.

Networking for Diversity: As part of its efforts, the Center has begun to develop networks of potential partners for enhancing Center diversity. We will use these networks for a variety of recruiting purposes. We have developed connections with the following programs:

- The Hispanic Research Center, Arizona State University
- The Engineering Education Outreach program, Georgia Tech
- The Humanitarian Engineering program, Colorado School of Mines
- The Ethics of the Nanoscale Nanotechnology Undergraduate Education program, Auburn University and Tuskegee University

In addition, through Gregor Wolbring, a CNS consultant, we have made initial contact with several disability studies programs that may offer potential sites for recruiting students with disabilities.

- The Rehabilitation Counseling Program, California State University, Fresno
- Department of Rehabilitation Counseling, Virginia Commonwealth University
- The Ohio STEM Ability Alliance: STEM Degrees and Careers for Ohioans with Disabilities‖ Project, Ohio State University

11. Education

CNS-ASU is involved in extensive formal and informal educational activities from undergraduate curriculum to graduate student and post-doctoral training and mentoring, and from science and engineering practitioner training to collaborations with science museums. Many of these activities are tightly integrated with research and outreach activities, and most maintain as their central focus the building of broader societal capacity for anticipatory governance. Thanks to its many innovative programs, CNS-ASU is being recognized as a national leader in two particular areas of education. First, through activities like co-sponsoring the "Congress on Teaching the Social and Ethical Implications of Research" in November 2011, CNS-ASU is developing and promoting education programs that introduce science and engineering graduate students to the social implications of their work, as well as developing a community for the scholars that do this work. Second, through collaborations with the Nanoscale Informal Science Education Network (NISE Net), especially a new training program for museum, CNS-ASU is developing and promoting new ways to make the societal aspects of science and technology accessible to science museum audiences.

Disseminating the CNS Education Models

CNS is increasingly being seen as a leader in educating scientists and engineers in the societal aspects of their work. CNS scholars and educators are increasingly being asked to present the education activities sponsored by CNS so that others can learn from and sometimes emulate them. In the reporting year, Megan Palmer, Deputy Director of Practices at the Synthetic Biology Engineering Research Center (SynBERC), has frequently consulted with CNS about ways to develop education programs for her Center and made an extended visit to Tempe in Apr 12 to gain further insight into CNS-ASU's educational programs. This visit include extensive time with Wetmore and Bennett examining the approaches used in the Science Outside the Lab workshops that were developed and supported by CNS-ASU. Erik Aarden, a Marie-Curie post-doctoral fellow from Aachen University in Germany and visiting scholar at Harvard University spent several days following CNS-ASU scholars around observing teaching and pedagogical approaches. Through Spring 12, TRC 2 co-leaders van der Leeuw and Wiek collaborated with six universities from Canada, Mexico, South Africa, Germany, Sweden, and Japan to disseminate the teaching and research of sustainability scientists across the globe.

In previous years, Bennett and Wetmore had a number of conversations with Christine S. Jones, Assistant Director of the Center for Science, Mathematics and Technology Education at Colorado State University about their teacher education programs, and Bennett participated in one of their teacher training workshops in Summer 10. Janet Kourany, for instance, relates that our programs are functioning as a model for similar programs being developed at the University of Notre Dame, and that the sophistication of the CNS models has caused them to reevaluate what they propose. Kathleen Eggleson, also from Notre Dame, recently did a follow-up visit to further develop the efforts of the Reilly Center for Science, Technology & Values as well as the ND Nano Initiative.

CNS-ASU scholars Harsh and Wetmore also collaborated on a grant proposal to the UK Economic and Social Research Council that brought two researchers, Jane Calvert and Emma Frow, from the University of Edinburgh to ASU for three weeks in Fall 10 to learn about the variety of training programs CNS-ASU has developed for graduate students in the sciences and engineering. Guston visited Edinburgh later in Fall 10 and Harsh and Wetmore visited in Su 11 to learn more about the activities in Edinburgh and further spread the education work being done at CNS-ASU. Mary Sunderland, a visiting scholar at UC Berkeley's Office for History of Science and Technology who is developing Berkeley's College of Engineering ethics education program, has also consulted closely with CNS-ASU researchers on the models and strategies we have developed.

In Spring 10, Wetmore organized a panel at the annual meeting of the American Association for the Advancement of Science to showcase many of the education programs developed at CNS-ASU. The program included Bennett and former graduate student Benn as a speaker and focused on the benefits that scientists can generate when they not only talk, but also listen to policymakers and the public. In Fall 11 Wetmore also organized a panel on Teaching Social and Ethical Implications of Research to Scientists and Engineers at the Society for Social Studies of Science in Cleveland.

While all of these conference panels and individual consultations have been useful, ultimately CNS-ASU decided that a major event was needed to bring together the large number of scholars who work in the area, disseminate models developed at ASU, and foster further collaborations. Therefore, in Nov 11, CNS-ASU hosted with the EESE grant (Herkert, PI), the National Nanotechnology Infrastructure Network, and NISE Net a Congress on Teaching the Social and Ethical Implications of Research. The event was the first of its kind in the United States. While the original hopes were that 50 people would attend, it attracted over 100 scholars from across the country including engineers, social scientists, ethicists, graduate students, postdocs, museum professionals, and a panel of young speakers who work for nonprofits that promote SEI education. The primary goal of the Congress was to disseminate the models developed and the lessons learned on how best to encourage graduate students to consider and grapple with the broader implications of their research. To that end, the NNIN held the annual meeting of its Societal and Ethical Implications working group at the event. A number of CNS-ASU education programs were presented including: the one credit courses; the laboratory engagement program; the embedded social scientist course model; study abroad programs facilitated by CNS scholars including Harsh, Bennett, and Wetmore; the collaboration with University of Edinburgh scholars Frow and Calvert; a number of the activities co-developed with NISE Net; and the evaluation efforts conducted by the EESE project. A concluding panel composed of three graduate students who had participated extensively in CNS-ASU education programs (Tracy Niday, Kiera Reifschneider, and Jessica Corman) provided an important capstone to the Congress by demonstrating the ways in which scientists and engineers have shaped their research and career trajectories as a result of their interactions with CNS. The response by the participants was overwhelmingly positive, and it is likely that the event will be repeated, perhaps on a bi-annual basis.

Post-doctoral training and junior research scholars. CNS-ASU has put significant effort into building a cohort of talented junior scholars who are developing not only research skills but collaborative and leadership skills as well, including current post-doctoral scholars Michael Reinsborough (PhD Belfast) and Katherine de Ridder-Vignone (PhD Cornell). Researchers Barben (Free University-Berlin, Political Science & Sociology), Bennett (ASU, Chemistry), Conz (ASU, Sociology), Davies (Durham, Science Communication), Fisher (Colorado, Environmental Studies), Harsh (Edinburgh, STS), Selin (Copenhagen Business School, Knowledge & Management), and Wetmore (Cornell, STS) were all initially hired at the post-doctoral level at ASU. Another postdoctoral researcher, Hannot Rodriguez-Zabaleta (Philosophy & Risk Assessment), joined ASU through an award from the Basque Government and has collaborated in Center research with Fisher. The Center has also provided training to post-doctoral fellows at the University of Georgia (Catherine Slade [Georgia State], under the direction of Bozeman on RTTA 1/2), Georgia Tech (Jue Wang [GA Tech], under the direction of Shapira on RTTA 1/1 and Sonia Gatchair [GA Tech], under the direction of Cozzens on TRC 1), and Wisconsin (Jason Delborne [Berkeley], under the direction of Kleinman on RTTA 3/4 and Ramya Rajagopalan [MIT], under the direction of Fujimura on former TRC 2).

These scholars have made significant advances professionally and many have taken core leadership roles in CNS initiatives:

- Eight are now in tenured or track positions: Barben at Aachen University of Technology (Germany) in a tenured position supported by the Association of German Engineers; Wetmore, now tenured, at ASU in the School of Human Evolution and Social Change; Fisher at ASU in the

School of Politics and Global Affairs; Delborne at Colorado School of Mines in Science, Technology, Society and Policy; Wang at Florida International University in Public Administration; Slade at the Hull College of Business at Augusta State University with an affiliation with the Medical College of Georgia; Selin in a tenure-track position shared between ASU's School of Sustainability and the Consortium for Science, Policy and Outcomes; and Harsh at the Center for Engineering and Society at Concordia University.

- Bennett and Conz have been promoted into research faculty positions at ASU in CSPO, and Conz is also a lecturer in ASU's Bachelor of Interdisciplinary Studies program.
- Four have taken on formal leadership roles in the Center: Wetmore is currently a co-leader of TRC 1 and associate director for outreach, Fisher is currently a co-leader of RTTA 4 and associate director for integration, and Selin is a co-leader of RTTA 3 and associate director for anticipation. Bennett leads the DC Science Outside the Lab Policy Workshop and is the assistant director for education. Others have led particular projects: Conz led a CNS research project in RTTA 4 in collaboration with the Biodesign Institute's Tubes in the Desert Project, and Davies led the private sector engagement activity but has transitioned into a research fellow position on scientific social responsibility at the University of Copenhagen.
- Two have obtained additional external support for CNS-associated activities:
    - Fisher is PI on the $540K socio-technical integration research (STIR) award, which extends the Center's integration agenda that Fisher pioneered as a CNS-funded doctoral student at Colorado. Fisher was also PI on a National Nanotechnology Infrastructure Network (NNIN) award that seeks to "Document Integration" at several NSEC and NNIN sites.
    - Wetmore has been co-PI on three grants: a $300K NSF award from the Ethics Education in Science and Engineering (EESE) program that develops, teaches, and assesses several models of micro- and macro-ethics instructional activities for graduate students; a second $300K NSF award from the EESE program to develop CITI modules that address macroethics; and a $700K NSF award to create and support a Professional Science Master's Program in Solar Energy Engineering and Commercialization that has a substantial ethics and policy curriculum, work that is now led by Bennett.

Many of the activities encompassed by all four of these grants have roots in the Center's program. Others are active in initiating and collaborating on new research proposals as well.

- Fisher and Selin are both collaborators on an $820,000 award from the Research Council of Norway to Norwegian researcher Roger Strand that incorporates intellectual approaches in integration and foresight that they, respectively, have pioneered.
- Several have been involved in editing the Center's *Yearbook of Nanotechnology in Society*: Fisher, Selin and Wetmore (2008) edited the first volume. Wetmore edited the second volume (2011) with Cozzens, and Bennett edited the third volume with Hays, Robert and Miller (2012). Barben and de Ridder-Vignone are editing the fourth volume with Miller.

Graduate Education and Training. CNS-ASU organizes a variety of graduate education and training activities, aimed at several audiences. The first audience is the graduate students involved in the Center's core research activities. While only some of these students have been directly supported in graduate assistantships by CNS, many others have drawn on CNS research to develop their theses, received CNS travel funds, and been involved in the Center's events. In the reporting year, the Center has been training:

- At ASU, seven doctoral students:
    - Conley (Politics and Global Affairs), who has completed her STIR research and has been working on her dissertation;
    - Gano (HSD), who completed her second year paper on the RTTA 3- and TRC 2-related Transition Towns movement, has been collaborating with Cobb at NCSU on a follow-on article and manuscript to the NCTF project, has been assisting ECAST on the World

Wide Views on Biodiversity project, and who has taken a professional librarian position at Amherst College;
    - Trinidad (funded; HSD), who has been assisting both Fisher on RTTA 4 interviews and Wetmore and Bennett on the Informal Science Communication Program;
    - Luk (HSD), who has completed her second year paper on STIR research and is nearing completion on her doctoral research;
    - Kim (funded; Public Affairs), who is completing his comprehensive exams and performing research for RTTA 2;
    - Sadowski (S&TP), who has been admitted to the doctoral program in Human and Social Dimensions of Science and Technology, has been working with Guston on the associated award, "Anticipatory Governance of Complex Engineered Nanomaterials;" and
    - Foley (funded; Sustainability), who has been working with Wiek and Guston on urban level governance, will incorporate TRC 2 research into his dissertation to be defended in May 13.
- Current updates on earlier ASU students include:
    - Pirtle, who completed his undergraduate degrees in mechanical engineering and philosophy in May 09, a master's degree in civil and environmental engineering in May 10, and served a Fulbright Fellowship in Mexico with Guillermo Foladori on the responsibilities of nanoscientists, is now a Presidential Management Fellow at NASA.
    - Parsi, who performed (original) TRC 1 research with Guston and took a hiatus to successfully pursue his JD at the University of Michigan, is defending his dissertation in Politics and Global Affairs in Apr 13 on a topic related to human identity, enhancement, and biology.
    - Hays, who completed his doctoral degree in Politics and Global Affairs in Dec 09 on a topic in (original) TRC 1, served in Washington, DC with the New America Foundation as the lynchpin of its Future Tense collaboration with ASU and Slate.com. He is now in the first year of a three-year post-doctoral fellowship at the University of Bergen, Norway.
    - Valdivia (Public Affairs), who completed his doctoral degree in May 11 on a topic in TRC 1, "Equity Considerations in the Assessment of the Bayh-Dole Act," is now a technology policy fellow at the Brookings Institution.
    - Anderson (Public Affairs), completed his master's degree in May 10, has a chapter in the third volume of the *Yearbook,* co-authored a paper with Fisher related to RTTA 1 and RTTA 4 research, and is completing his doctoral research at the University of Georgia working with Bozeman.
    - Nulle (Global Technology and Development), who completed her master's degree in May 10, has a chapter in the third volume of the *Yearbook*.

At Wisconsin, eight doctoral students (Binder, Choi, Dudo, Ho, Dalrymple, Shih, Hu, and Hillback, in Life Sciences Communication and Journalism and Mass Communication) have been working with RTTA 2 data, and several of these have received Center support through graduate research assistantships. Five of this group have so far secured faculty positions, including:

- Ho, who graduated in 2008 with a PhD in Journalism and Mass Communication and is now a tenure-track assistant professor at Nayang Technological University in Singapore;
- Binder, who graduated in 2010 with a PhD in Mass Communications and is now a tenure-track assistant professor at NC State University;
- Dudo, who graduated in 2011 and now holds a tenure-track position at the University of Texas at Austin;
- Dalrymple, who also finished in 2011 and is an assistant professor at the University of Iowa; and
- Cacciatore, who finished in 2012 will be an assistant professor at the University of Georgia.

Other doctoral students trained at Wisconsin include: Leung, who completed his PhD in Sociology (2008) using CNS data and is now an assistant professor of Health Management and Informatics at the University of Missouri School of Medicine; and Jason Gallo, graduated with a PhD from Northwestern and is now employed at the Science and Technology Policy Institute, a privately-operated FFRDC, in Washington, DC. Noel Benedetti defended her M.S. degree using RTTA 2 data in 2010 and works as a technology consultant. Researchers and graduate students at Wisconsin also regularly participate in informal science outreach efforts, including Wednesday Nite at the Lab and the Wisconsin Literacy speaker series. Several students contributed entries to the *Encyclopedia of Nanoscience and Society*. Almost all peer-reviewed publications by RTTA 2 include graduate student authors. In Summer 10, RTTA 2 researchers also spearheaded the first online course in Science, Media & Society at UW-Madison, offered exclusively through iTunesU with select lectures being publicly available to all audiences. The Holtz Center for Science and Technology Studies at WU also just accepted a proposal from Scheufele to teach a course in "Science and Society," which is jointly offered for students in Life Sciences Communication and Science and technology Studies. This course attracted over 100 students in its first offering.

At Georgia Tech, three doctoral students (Carley, Arora, Li), two visiting doctoral students (Yi Zhang and Xiao Zhou of Beijing Institute of Technology of the Chinese Academy of Science), one master's student (Horsley), and two undergraduates (O'Brien, Skolky) worked with RTTA 1, with a focus on CNS-ASU themes, data and analyses, many toward their theses. RTTA 1 senior faculty and students meet on a regular basis (complete group meeting every Friday morning) for progress reviews, discussion of projects, publications, methods, and new ideas, mentoring, and (occasionally) hosting visiting speakers. All RTTA 1 doctoral students have participated in the initial meetings of the new Innovation Co-Laboratory (Georgia Tech, University of Manchester, and Beijing Institute of Technology), which has a focus on developing joint projects (in the nanotechnology and society domain) and doctoral training. Public Policy PhD student Yu Meng also worked with the RTTA 1 group.

One doctoral student (Carley) will graduate in Spring or Summer 13. Recent graduate Tang (Public Policy) is an assistant professorship position in public administration and policy at the Shanghai University of Finance and Economics, and Kay (Public Policy) has a post-doctoral fellowship with CNS-UCSB. Tang and Meng completed research on a Robert W. Gore award ($10,000) from the Chemical Heritage Foundation to undertake case studies of nanomaterials innovation in China. Based on RTTA 1 research, Arora, Carley, Kay, Tang, Meng, and Horsley authored or co-authored one or more journal submissions, journal papers or book chapters this year. Benn (a recent CNS-ASU PhD+ at ASU) was also a co-author with members of the Georgia Tech group.

TRC 1 at Georgia Tech supports four graduate students. Graduate student Thomas Woodson, advised by Cozzens and supported by an NSF graduate fellowship, is currently developing a dissertation that will examine the pro-poor aspects of nano-health research. Woodson also helped supervise an NNIN REU student. Rodrigo Cortes-Lobos, advised by Cozzens and supported through her work at Georgia Tech, has spearheaded the work on agri-food. In January 2013 he successfully defended his dissertation, "Nanotechnology Research in the US Agri-Food Sectoral System of Innovation: Toward sustainable Development," and he is now professor at the Technology Management Graduate Program at the Universidad de Talca in Santiago, Chile. Diran Soumonni was supported by CNS-ASU funds for part of the past year. During that time he has spearheaded the energy side of the comparative nano project. While Soumonni now has a tenure track faculty position at the University of Witwatersrand in South Africa he continues to work on nano-energy in South Africa and the US. Rafael Castillo has focused on developing indicators of the potential employment effects of nanotechnology in the US, using our three illustrative areas of application: water, energy and agri-food. Graduate student Ravtosh Bal, previously supported by CNS-ASU, has completed her dissertation, which provides a detailed analysis of equity in interactions at two NCTF sites. She successfully defended in Spring 2012. Bal as accepted a position as a Research

Associate at the Duke Center for International Development (DCID), Sanford School of Public Policy, Duke University, Durham, NC.

The Center supported graduate students at other institutions in the organization, conduct and analysis of the National Citizens' Technology Forum, including: Amy Barr (Sociology, University of New Hampshire), now a Visiting Assistant Professor at St. Lawrence University, Christina Ndoh (Public Administration, North Carolina State University), John Willingham (Political Science, North Carolina State University), Mark Philbrick (Environmental Science, Policy, and Management, University of California, Berkeley), and Javiera Barandiaran (Environmental Science, Policy, and Management, University of California, Berkeley). Philbrick and Barandiaran (2009) have published on their activities and have contributed multiple entries to the *Encyclopedia of Nanoscience and Society*. Philbrick is currently an AAAS fellow with the Department of Energy.

The associated STIR project, through a variety of workshops, group meetings, regular correspondence and one-on-one sessions, as well as site visits by PI Fisher, has trained and mentored the following twenty (20) doctoral students (six of whom have received their degrees so far) and two master's students (who have received their degrees): Carlo Altamirano, ASU; Miles Brundage, ASU; Antonio Calleja-Lopez, University of Seville; Shannon Conley, ASU; Paul Ellwood, University of Leeds; Steven Filpse, Delft Technical University; Cecilie Glerup, Copenhagen Business School; Birgitte Hansen, Copenhagen Business School; Cameron Keys, ASU; Byoungyoon Kim, Rensselaer Polytechnic Institute; Miao Liao, Tsinghua University; Federica Lucivero, University of Twente; Christine Luk, ASU; Bastien Miorin, Grenoble; Robin Phelps, University of Colorado; Daan Schuurbeirs, Delft Technical University; Anthony Stavrianakis, UC Berkeley; Frank Theys, Katholieke Universiteit Leuven; François Thoreau, University of Liège; Brenda Trinidad, ASU; Michiel Van Oudheusden, University of Antwerp; Qin Zhu, Dalian University of Technology. In addition, STIR has also involved the participation of four post-docs (one of whom has since joined the private sector): Dorothy Dankel, Ana Delgado, Hannot Rodriguez, and (former participating PhD student) Daan Schuurbiers. As a result of STIR-related work, Fisher also served/serves on graduate committees of Calleja-Lopez, Conley, Keys, Phelps, Theys, Van Oudheusden and has provided formal feedback to the graduate advisors of Glerup, Kim, Liao, Lucivero, and Miorin.

At ASU, the second graduate student audience has been NSE researchers themselves. For these students, CNS-ASU created the CNS-Biodesign Fellows program, in which CNS pays one-third of their support. These students then participate in CNS-related curricular and co-curricular activities and perform what we call the PhD+, adding societal implications material to their doctoral research. The Center has graduated three PhD+ students: Troy Benn (Environmental Engineering; Westerhoff lab); Jason Lappe (Chemistry and Biochemistry; Woodbury lab) and Quinn Spadola (Physics; Lindsay lab). This year CNS is sponsoring two Biodesign Fellows: Tomasz Kalinowski (Biodesign; Halden lab) has been working together with TRC 2 graduate student Foley on the M52 site and has completed research on his PhD+ dissertation chapter, which he will defend in April 13. Rebecca Allen (Biodesign, Curtiss lab) is working with RTTA 3 to conduct market research on solar energy products in order to evaluate compatibility between community demand and product availability.

In its renewal period, CNS-ASU expanded the Fellows program to attract students from ASU's Ira A. Fulton Schools of Engineering. The Center's CNS-FSE Fellow, Ben Wender (Civil and Environmental Engineering, Seager Lab) started in Fall 11. In addition to integrating anticipatory approaches into his life cycle assessment, Wender has also been an active collaborator between CNS-ASU and the new QESST ERC. Wender along with Foley developed and delivered a session at the Winter School on interdisciplinary collaboration, and he will defend his master's in passing in April 13.

The success of the PhD+ has generated a great deal of interest beyond CNS-ASU. CNS researchers Guston, Miller, Bennett, and Wetmore, have been invited to participate on a number of technical grant

proposals over the past year and support for future PhD+ students was written into several of these proposals. In addition, the CNS researchers at Georgia Tech have begun to implement their own program. CNS-ASU has turned the existing PhD+ program into a certificate open to graduate students in engineering and the natural sciences in "Responsible Research and Innovation." The Provost has approved the certificate proposal, and it will commence in Fall 13.

A number of the education activities originally developed by CNS to help graduate student scientist and engineers understand the social and ethical implications of their work were rolled into the Ethics in Engineering and Science Education (EESE) grant, on which Wetmore is a co-PI. In one activity, Bennett participated in the Biological Design Graduate Program's core course, "Fundamentals of Biological Design II." Bennett attended every class and uses the presenter's remarks as entry points into discussions of social, ethical or political aspects of research with the class and presenter. The response by the presenters has ranged from hesitant to fully embracing the conversation. From these interactions, several potential collaborations with presenting faculty have developed. The interactions with the students in the course resulted in recruiting Kalinowski and Allen as CNS-Biodesign Fellows.

A second CNS/EESE collaboration involves laboratory engagement. During Fall 09 and Spring 10, Wetmore and McGregor worked with Steven Helms-Tillery's neuroscience lab. They worked with the lab participants to reflect on the social and ethical implications of their research including the potential military uses and issues surrounding primate research. During Fall 10 Wetmore and McGregor worked with Patrick Phelan's solar engineering lab where they discussed how different social and political changes would promote and inhibit the spread of solar power. In Fall 09 Wetmore was asked to consult on the development of a similar program at the University of Rothenburg in Germany. In Summer 10 he presented the model at the Annual Symposium of the International Research Training Group, ran the first laboratory session, and served as consultant to the program through its successful completion. This success of this activity has led to continued working relationships with PIs and students and it has been written into a handful of grants.

A third CNS/EESE collaboration is the series of one-credit courses entitled "Science Policy for Scientists and Engineers" that has been taught by Bennett, Posner and Wetmore nearly every semester for the past five years. It is a 1-credit seminar for NSE graduate students to explore questions and issues of science and technology policy in society that are relevant to their own research. Again this year the course was filled to capacity. The interactions with the students in the course yielded the first CNS-FSE Fellow, Moran, and it has drawn a number of other students into the Informal Science Communication Project. Because Posner left ASU and because of ever-increasing demands on their time, Bennett and Wetmore developed a new model for this year's course. In 11 and 12, a biochemistry graduate student, Kiera Reifschneider was so interested in ensuring that the course was taught that she served as a co-instructor, helping to determine the year's theme and facilitating much of the logistics required to keep the class running.

The evaluation data generated under the EESE is impressive. Four models were evaluated – the embedded course (Bennett in Biodesign), a stand-alone course (Posner, Wetmore and Bennett 1-credit), laboratory engagement (Wetmore and McGregor in labs of Helms-Tillery and Phelan), and a hybrid course (Ellison and Herkert). Pre- and post- tests were given to all students involved. All four models were found to have a statistically significant and positive effect in helping students be more ethically sensitive, have more knowledge of relevant standards, and have better ethical judgment. These results are not typical for traditional responsible conduct of research courses and demonstrate the valuable contributions of these education approaches. The success of this EESE grant led to a second NSF EESE grant to develop macroethics modules for the online CITI program.

In Summer 12, CNS-ASU conducted three separate sessions of "Science Outside the Lab: A Policy Dis-Orientation" for graduate students, reflecting a rapidly growing interest among NSE students and faculty. Developed and taught by Wetmore and Bennett and held in Washington, DC, the course offers graduate NSE students a chance to leave the lab for two weeks to explore the relationships among science, policy and societal outcomes. Students meet government officials, lobbyists, staffers, regulators, journalists, academics, museum curators, and others who fund, regulate, shape, critique and study science, and they engage in hands-on policy learning through tours and exercises like a mock congressional hearing where students present their ideas for new policies to congressional staffers in the House Science Committee's hearing room.

The previous success of the DC program has inspired a number of faculty to include funding for students to participate in it in their ERC, IGERT and education grant proposals. ASU currently has two Professional Science Masters programs – one in Science & Technology Policy and one in Solar Power Engineering and Commercialization – that require all of their students to participate in the DC program.

Bennett now leads the summer session programs, but brings in additional help to facilitate them. In Summer 12 CNS faculty Wetmore, CSPO Professor of Practice Gregg Zachary and former CNS post-doctoral fellow Delborne, assisted with one session each. Each session is also facilitated by a student liaison who has participated in CNS immersion projects, taken multiple courses, and been mentored by Bennett and Wetmore. In Summer 12 there were three students who had gained the skills, knowledge, and enthusiasm about the social and political implications of nanotechnology to serve as a student leaders: Aubrey Wigner (PhD student, Human and Social Dimensions of Science and Technology, ASU), Jessica Corman (PhD student, School of Life Sciences, ASU), and Kiera Riefschnider, Chemistry and Biochemistry, ASU).

In Summer 13, CNS-ASU will once again conduct three sessions of Science Outside the Lab. Because of the success of the two PSM degree programs that require participation in the program, this year there will be one session dedicated to each of them. The first session will focus on solar energy policy. The second session will be tailored to the needs of the PSM in Science and Technology Policy and will include natural scientists and engineers. And the third session will focus on sustainability policy and will happen for a week each in Washington DC and in London UK. The programs were filled by the end of Mar 13 and prospective paying applicants have been turned away for lack of space.

In Fall 09, CNS researchers Wetmore, Bennett, and doctoral student Trinidad began to collaborate with Trevor Thornton and the ASU node of the National Nanotechnology Infrastructure Network (NNIN). The collaboration has resulted in two major programs: First, CNS-ASU now contributes the Social and Ethical Implications training required of all researchers who seek to use the ASU NNIN facilities. The training is part of the standard NNIN lab safety training that occurs at least once a month. Bennett, Wetmore, and doctoral student Trinidad have all served as instructors in the course (discussed further below).

Second, the ASU NNIN Node cosponsors with CNS-ASU the ASU Informal Science Communication Program for graduate students. The program offers training sessions every two weeks for students in how to communicate with the general public about science and engineering and then gives them the opportunity to gain important practical experience by presenting their work on the floor of the Arizona Science Center. The basic idea behind the program is to help young scientists develop valuable communication skills. The added bonuses are that the public gets to know about the cutting edge research being done at ASU and the students are asked difficult questions about the social and ethical implications of their work that they must develop good answers to. The program began in Mar 10 and students present at the museum monthly.

CNS scholars at Georgia Tech have also been helping to facilitate education in the social sciences for grants that are primarily technical in nature. Shapira, Youtie, and Porter have been collaborating with Elsa Reichmanis, Professor, Chemical and Biomolecular Engineering, Georgia Institute of Technology on a new IGERT Program entitled Nanostructured Materials for Energy Storage and Conversion and have participated in the Program's inaugural seminar series by introducing students to "Trajectories of Global Nanotechnology Commercialization."

Four years ago, CNS-ASU developed a partnership with a new degree program the Professional Science Masters in Nanoscience, led by the Department of Physics and the Department of Chemistry and Biochemistry, to offer a 2-credit graduate course in the societal aspects of nanotechnology. Bennett has taught this course for the program in each of the past four years.

Three years ago, Wetmore collaborated with Patrick Phelan to develop and run a new Professional Science Masters in Solar Power Engineering and Commercialization. The curriculum of the PSM, sponsored in part by a $700K NSF PSM grant, has a significant focus on the ethical and political issues inherent in solar power. Wetmore has taught a 2-credit graduate level class on Solar Energy Policy with Mike Pasqualetti for the first two years after program was created. This class in the past has evaluated and offer suggestions to the Arizona Science Center's "Solarville" exhibit. All students enrolled in the program will be participating in the DC summer session, which will continue to be a required component of the curriculum.

The third graduate student audience at CNS-ASU consists of those students in traditional departments and schools, as well as those in interdisciplinary programs, who are interested in CNS-related coursework. CNS-ASU faculty have established twelve graduate courses at ASU:

- In Spring 13, TRC 2 co-leader Wiek and Darren Petrucci, former director of the Design School, are offering "Design Thinking, Sustainability, and the Future of Nanotechnology in the City" in a cross-listed course between the School of Sustainability and the School of Design. The course brings together fourteen graduate students who are redesigning the architecture and urban form of Phoenix to reflect the four scenarios generated TRC 2 researchers. The course takes a complex systems approach to design and draws upon societal context, innovation models, nanotechnology applications and urban sustainability problems to inform the urban design proposals in preparation by the studio.
- In Spring 12, Selin developed and taught a research studio class through the School of Arts, Media and Engineering that explored the observation, documentation, analysis and summarization of large-scale collaborative events. Students in the class are trained either in ethnographic methods or observational media documentation and will apply their skills in the field at the *Emerge* event (see **Section 9 Research Program, Accomplishments, and Plans**, RTTA 3). Subsequent to the event, and using the collected data, the students will then spend the remainder of the semester designing and developing a physical gallery exhibition, participating in the creation of a dynamic online media archive, and/or contributing to analysis of the *Emerge* event as a novel form of future-oriented deliberation."
- In AY 11-12, Guston developed and taught with CSPO Professor of Practice Gregg Zachary the two-semester sequence, "Science and Technology Policy" and "Advanced Science and Technology Policy," the core sequence for the STP PSM. The course achieves a novel synthesis of analytic and communication approaches and explores key tools like real-time technology assessment and anticipatory governance, as well as substantive topics like DIY biology and manufacturing, derived from the CNS agenda. Guston taught the sequence solo in AY 12-13.
- In Spring 11, Fisher developed a new course entitled "Analysis of Scientific and Technological Innovation Systems," primarily for graduate students in the PSM in Science and Technology

Policy Program. A number of HSD students have taken the course as well. The course draws on a number of Fisher's research projects within CNS.

- "Future Scenarios, Anticipatory Governance, and Sustainability – Urban Development in Phoenix" was offered by TRC 2 co-leader Wiek and RTTA 3 co-leader Selin in Sp 10. The course engaged 22 graduate students from five ASU graduate programs in systematically crafting visions of sustainability for Phoenix and developing governance strategies for transformative change. The course also integrated the theme of urban socio-technical systems and emerging technologies. As the course was embedded in a collaborative research project with the City of Phoenix to inform the adaptation of the General Plan, the course facilitated research in teams and involved faculty across ASU as well as stakeholder groups across the city. The course built capacity in anticipatory governance and attracted students to engage in subsequent research. Moreover, it created a network among stakeholders, professionals, and decision makers in Phoenix interested in "Nano and the City." In Spring 11, ASU awarded the course its President's Award for Sustainability. In Spring 12 Wiek reworked the course into "Sustainable Solutions: Options for Phoenix," to continue to engage graduate students in TRC 2 research. Three walking audits that brought together researchers, Kay and Wiek, with graduate students and community members has strengthened the novel methodology of walking audits to co-train community and academic actors on the complex, place-based urban sustainability syndromes, while seeking solutions (including nanotechnology).
- Wetmore created a new course in Spring 10 entitled: "Introduction to Analyzing Sociotechnical Systems," offered in the School of Human Evolution and Social Change. Not only were a number of nanotechnology topics covered, but students were also assigned a research project to develop a demonstration for NanoDays 2010. This class also fulfills a core requirement of the Professional Science Master's Degree program in Science and Technology Policy offered by CSPO. Wetmore taught this course again in Fall 10 and Spring 12 and attracted a number of HSD students as well.
- In AY 09-10, Boradkar developed a training program akin to InnovationSpace but for graduate students. Two students under his direction have performed additional research, design and development on nanotechnologies previously conceived by the undergraduate InnovationSpace students.
- "Nanotechnology: Law and Regulation," was taught by Marchant in the Sandra Day O'Connor School of Law in Spring 10. Several other CNS-ASU faculty participated in the course, including Guston, Robert, and Selin. As a major project the students explored potential regulatory and liability issues in the scenes developed by NanoFutures.
- "Governing Emerging Technologies," taught in Fall 08 and Fall 09 through the School of Politics and Global Studies by Guston and in Fall 10 and Spring 12 by Fisher, explores the Center's core concept of anticipatory governance and synthesizes many of the Center's findings. Students in the course were tightly integrated into the Center's activities, e.g., participating in the Oct 08 Visioning Workshop and the Nov 09 Equity Workshop. Several other CNS-ASU faculty have participated in the course including Conz, Corley, and Selin. This class also fulfills a core requirement of the Professional Science Master's Degree program in Science and Technology Policy offered by CSPO.
- "Energy and Energy Policy," taught by Bennett in Spring 09, is a 1-credit seminar for PhD students in chemistry that explores the dynamic interplay between scientific research, technological innovation, policy development, and cultural change surrounding large-scale energy system change in the 21st century.
- "Science, Technology and Developing Areas," a one-credit course offered through the Department of Chemistry and Biochemistry and the School of Human Evolution and Social Change, was developed in F 09 by Harsh and Wetmore to work through TRC 1 topics with graduate students. The course attracted graduate students from the social sciences, natural

sciences, and engineering and explored the myriad issues that must be addressed for technical assistance to truly benefit the disenfranchised.

- "Nanotechnology, the Brain, and the Future," taught in the School of Life Sciences and the School of Politics and Global Studies, is a variable-credit course offered by Miller and Robert (Fall 07, Spring 08, Fall 08) as part of the E2E project. Students and faculty used it to prepare research projects for E2E and the CNS All-Hands meeting.
- "Science, Technology & Societal Outcomes," taught in the School of Life Sciences and the School of Human Evolution and Social Change by Wetmore and Bennett was offered in Spring 06 and Spring 07.

The Center has also been an integral part of the development of a new doctoral program at ASU, the Human and Social Dimensions of Science and Technology (HSD), which was approved by the Arizona Board of Regents in Dec 07 and matriculated its first class in Aug 08. CNS Associate Director Miller directs the HSD PhD program, and Guston, Robert, Sarewitz, Corley, and Wetmore serve on its Executive Committee. Other CNS faculty, including Fisher and Selin serve as members of its Graduate Faculty. In addition to the summaries of HSD students who are working specifically with CNS-ASU provided above, numerous other HSD students have participated in CNS-related activities over the life of the Center, including the scenario-based solar-to-fuels workshop, the anticipatory governance visioning workshop, CNS-ASU All-Hands meetings, and *Emerge*.

While the vast majority of classroom-oriented activities at CNS-ASU have occurred at ASU, in Summer 10 co-PI and RTTA 2 co-leader Scheufele and his Wisconsin team created an on-line class, Science 2.0: Media, Politics, and Emerging Technologies, for both graduate and undergraduate students, offered over iTuneU. This course is the third that CNS-ASU affiliates have offered completely on-line, with Harsh's undergraduate Science and Democracy in Winter 10 and Hays' Human Enhancement and Democracy class in Summer 10.

Undergraduate Education and Training. CNS-ASU organizes a variety of undergraduate education and research training experiences. In the current year, a major achievement the Center has contributed to has been the creation of an STS minor that will launch next year. Although there are none in the current year, in previous years, numerous undergraduates have written honors theses with CNS faculty, and undergraduates – mostly from the W.P. Carey School of Business – also complete honors theses in conjunction with their InnovationSpace coursework.

Previous honors students are also publishing their thesis research in CNS publications:

- Arielle Silverman, whose undergraduate thesis in Biology and Society surveyed a population with visual impairments about their attitudes toward nano-enabled therapies and enhancements in conjunction with TRC 2, published her work in the third volume of the *Yearbook*;
- Tobie Milford, whose undergraduate thesis in Religious Studies reviewed public participation in science literatures and analyzed TRC 1's Nanotechnology and Religion workshop, published his work in the third volume of the *Yearbook* and has written several entries for the *Encyclopedia of Nanoscience and Society*. Milford's undergraduate thesis also helped to win the Kelly Maxwell Outstanding Graduate Student Award from the Intergroup Relations Center Awards Committee and the Religious Studies award for "Outstanding Concurrent Major."

CNS has supported several undergraduate student interns since the last annual report: Catherine Hoke (Private Sector Engagement project/workshop, RTTA 3 book project, and TRC 2, Nano and the Future of the City database project), Keith Martin (Outreach support, including the videotaping and editing of all presentations and special projects), and Evan Taylor (TRC 2, Nano and the Future of the City/database development project). Tai Wallace worked on generating content for the TRC 2, Nano and the

City/database development project. Wallace graduated in December, 2012 and has since been hired by the Arizona Department of Environmental Quality in the air quality division in special applications unit.

In addition to the numerous undergraduate courses developed in the first five years of CNS – including "Perspectives on Nanotechnology," "Justice and the Future," "Learning Community: Nanotechnology in Society," "Human Enhancement and Democracy," "Global Environmental Politics," "Technology and Society," and "Science and Democracy" – nanotechnology and society issues were newly integrated into two other undergraduate courses. Harsh revised the "Science and Democracy" course for Winter 10 as a 3-credit online course with interactive and video-enhanced oral exam modules, and Hays will taught an online version of Human Enhancement and Democracy in Summer 12. In Spring 11, Miller, Bennett, Harsh, and Wetmore developed a new, 125-student undergraduate course entitled "Introduction to Science & Technology Policy," which integrated discussions about nanotechnology into each of the course's five focal topics: health, food, military, economy, and environment. The course is being offered in Spring 13 by another CSPO professor, Mary Jane Parmentier.

CNS-ASU's long-standing relationship with InnovationSpace continued this year. InnovationSpace is a two-semester long, transdisciplinary course collaborative among the ASU Schools of Design, Engineering, and Business. It satisfies the design or project requirements for senior majors in each school by creating cross-functional teams who use an Integrated Innovation model to research, develop and refine real-world product concepts for paying sponsors. In AY 12-13 currently in progress, the students have been developing nano-enabled products and services to address the problems of household and office waste, indoor pollution and the urban heat island effect. For the last two years, the student teams have been tightly aligned with the TRC 2 program (See **Section 9 Research Program, Accomplishments and Plans** RTTA 3/2).

During summer 2012, the Georgia Tech contingent of TRC 1 served as mentor to one of the NNIN's two REU students focused on the societal and ethical implications of nanotechnology. Duy Do, an electrical engineering major at San Antonio College, spent the summer in Atlanta studying the websites of about 60 companies doing research on water, agri-food, and energy nanotechnology. He researched the ways in which these companies were using nanotechnology and whether their products would affect equity issues. He presented his work in a report – "Nanotechnology Companies in the U.S.A: A Web-Based Analysis of Companies and Poverty Alleviation" – at the NNIN's August REU convocation in Atlanta.

K-12 Education.

TRC 2 has been actively engaging with science educators and students at the Bioscience High School through various partnerships and exchanges. Bioscience High School is a public high school in Phoenix that is a magnet for college bound students interested in science, technology, engineering and math (STEM) education opportunities. TRC 2 is building upon existing relationships held by co-leader Wiek and faculty at the school. This past academic year faculty from the Bioscience served as speakers at the monthly Science Café Series (see **Outreach** section). Additionally, graduate student Foley and fellow graduate student Rushforth offered presentations to the entire sophomore class on the M52 Superfund Site. Bioscience High School has committed to taking on the M52 Superfund Site as this year's annual project for students to investigate the technical, scientific and social uncertainty that generate misunderstandings and perpetuate a lack of trust between regulatory agencies and citizens. That initial visit was followed by a presentation by graduate student Foley and the Maricopa County's Sustainability Manager, Jonce Walker on the impact of the built environment on urban sustainability challenges. The Phoenix metropolitan area is located almost entirely within Maricopa County making the co-presentation between neighborhood and metropolitan scales apparent and meaningful for students. This co-presentation strengthened the ties between TRC 2, Maricopa County and Bioscience High School.

In the following weeks, the Bioscience High School welcomed the entire student body of the CNS Winter School on Anticipatory Governance for an exchange between graduate students and high school students. The Bioscience High School students were given the opportunity to interview the Winter School graduate students. This opened the doors for cultural exchanges, mentoring about future educational opportunities and helped students involved in the Winter School to reflect upon and communicate their work. These engagements continue to lead to opportunities for participation in the Bioscience High School Community Resource Forum for Bennett and other CNS-ASU faculty and student interested in outreach to pre-college institutions.

In a previous reporting year, CNS-ASU described the development of a graduate course that provided in-service K-12 teachers with research experiences and also helps them develop curricular materials for their own K-12 classrooms on societal aspects of nanotechnologies. CNS did not offer a version of the course in the current reporting year. Two teachers participated in the course in Spring 09, one in-service and one who is in the nano-science professional master's degree program and does not currently teach. The value of the course is demonstrated by continuing follow-ups by in-service teachers with Bennett, who has consulted with some of those in the course about the development of curricular materials and visited classrooms at Mesa High School and its Biotech Academy. In one of these classes the in-service high school teacher from Bennett's Nanoscience in Society course had her students choose specific technologies and analyze the social, political, and cultural aspects of that technology and then promote a policy position through an oral presentation to their class and prepare a letter to a congressional representative. Bennett was also a principal in the Citizens Engagement Program with High School Students in conjunction with CSPO and ECAST (see **Section 12 Outreach and Knowledge Transfer**).

CNS-ASU has also arranged for its Science Cafés, held monthly during the academic year in conjunction with the Arizona Science Center (see below) to provide in-service teachers with continuing education credit. In addition, CNS co-director Miller served as a primary consultant to two chapters (4 and 13) in *The Big Ideas of Nanoscale Science and Engineering* (Stevens et al. 2009) published by NSTA Press for K-12 science teachers. These chapters are based, in part, on a guide to nanotechnology in society education produced by CNS (Miller et al. 2007). Much of the work done with NISE Net and the Arizona Science Center (see sections above and below) reaches K-12 audiences. It is also the case that one of the target audiences for the *Encyclopedia for Nanoscience and Society* (Guston 2010) is high school students and teachers.

Informal Science Education. CNS-ASU has begun to have a significant impact on informal science education nationally through its partnership with the Nanotechnology Informal Science Education Network (NISE Net) to incorporate research on the ethical and societal implications of nanotechnology into museum programs and exhibits around the country. Early in its operation, CNS produced a guide to this topic (Miller et al. 2007) that NISE Net distributes as part of its Forums Guide and NanoDays Kit. This guide has also been distributed widely to science museums at NISE Net meetings and is available on the CNS-ASU website for download. In addition, NISE Net Director Larry Bell, who has attended nearly all of the CNS All-Hands Meetings and serves on the CNS Board of Visitors, has identified anticipatory governance as a central theme for future NISE Net programming and, more broadly, as the basis for a new model for the role of science museums in informal science education (Bell 2008). Most significantly are the series of workshops currently being planned in conjunction with NISE Net to train museum staff in how to facilitate conversations about nanotechnology and society. Details of this strong collaboration can be found in **Section 12 Outreach and Knowledge Transfer**.

Practitioner Training. The Center has developed and piloted training modules in the ethical and societal implications of nanotechnology for scientists and engineers working in user facilities at the DOE Center for Integrated Nanotechnologies (CINT) and the National Nanotechnology Infrastructure Network (NNIN).

For the first few years, NNIN user facilities were strongly encouraged to use the video (created by Guston and others) and a survey was conducted to evaluate their experience. Respondents at 9 of the 11 user facility sites in the NNIN indicated that they were already using the video, and an additional site indicated that it would be doing so from this point forward. Four sites indicated that the video had been presented at a total of 117 training sessions, with the other sites indicating that users watched the video individually, with no formal records being kept. The sites indicated that approximately 1000 NSE researchers in total had watched the video. The actual use of the video varied. Some sites merely made the video URL link available. Other sites asked users to verify via a signature that they had viewed the video. Others required users to watch the video in groups. One group indicated that questions and comments sometimes follow, and one group indicated that they always follow the video with group discussion.

While the video remains on the NNIN website for use at some sites, after much deliberation NNIN has decided that face-to-face discussions of SEI issues would better engage the researchers at its user facilities. Wetmore attended a workshop in Jan 10 at Cornell University and Bennett attended a workshop in Oct 10 at Washington University in St. Louis to help inject CNS-ASU experience and knowledge into NNIN training across the country. Wetmore, Bennett and Trinidad have developed a thirty-minute module that is presented in conjunction with the health and safety training that all users of the ASU NNIN facility must successfully pass. The module introduces researchers to the practical implications and applications of CNS research and findings, while also making them aware of the support CNS can offer to young scholars in the form of PhD+ opportunities and coursework.

Wetmore and Sarewitz also participated as Faculty in the *IHEST European Summer School: Which Place for Science in the Public Debate?* at the Saline Royale d'Arc et Senans, France in Summer 10. This summer school was established in large part to help local and national French officials reflect on the protests during the government's effort to solicit input into its nanotechnology decisionmaking process. The summer school resulted in a publication that included Wetmore and Sarewitz's lectures in French.

Winter School

In the Winter 13 CNS-ASU hosted its first Anticipatory Governance of Emerging Technologies Winter School at the Saguaro Lake Ranch in Mesa Ariz. It was attended by 14 junior scholars (graduate students or Ph.D.s less than three years out) and by faculty from all of the RTTAs and TRCs as well as the assistant and associate directors. The student participants represented 13 institutions from 4 countries. In the spirit of the Gordon Research Conference, intense topical sessions were interspersed with activities designed to build the group into a cohort and take advantage of the natural resources at the Ranch. The post-school evaluative session indicated that general format and topics were appropriate and facilitated a cohort model of learning that was deemed successful by participants. Based on feed back from this session and other comments CNS will conduct another Winter School in Jan14.

Table 3A: Education Program Participants, Irrespective of Citizenship

		Gender		Race					Mixed-incl.	Mixed-				
Student Type	Total	Male	Female	NA	PI	AA	C	A	NA,PI,AA	C,A	Not Provided	Other Non-US	*Ethnicity Hispanic	Disabled
Enrolled in full degree programs														
Undergraduate	12	10	2				10	2						
Masters	32	17	15	1		2	23	6					5	
Doctoral	48	28	20			3	37	8					6	
Enrolled in NSEC Degree Minors														
Undergraduate														
Masters														
Doctoral														
Enrolled in NSEC Certificate Programs														
Undergraduate														
Masters														
Doctoral	17	9	8				14	3					3	
Practitioners taking courses	4	2	2				2	2						
Enrolled in NSEC Programs														
Undergraduate														
Masters														
Doctoral														
Practitioners taking courses														
K-12 (Pre-college) Education														
Teachers														
Students														
Total	113	66	47	1		5	86	21					14	

Table 3B: Education Program Participants, U.S. Citizens or Permanent Residents

		Gender		Race					Mixed-incl.	Mixed-				
Student Type	Total	Male	Female	NA	PI	AA	C	A	NA,PI,AA	C,A	Not Provided	Other Non-US	*Ethnicity Hispanic	Disabled
Enrolled in full degree programs														
Undergraduate	12	10	2				10	2						
Masters	28	15	13	1		2	22	3					4	
Doctoral	37	18	19			1	33	3					3	
Enrolled in NSEC Degree Minors														
Undergraduate														
Masters														
Doctoral														
Enrolled in NSEC Certificate Programs														
Undergraduate														
Masters														
Doctoral	11	6	5				11						3	
Practitioners taking courses	1		1					1						
Enrolled in NSEC Programs														
Undergraduate														
Masters														
Doctoral														
K-12 (Pre-college) Education														
Teachers														
Students														
Total	89	49	40	1		3	76	9					10	

12. Outreach and Knowledge Transfer

The outreach activities at CNS-ASU are, on one hand, tightly integrated with research and education and, on the other, governed by a strategy that aims at developing broad-based capacities among both NSE researchers and various publics. As described in the strategic research plan, CNS-ASU pursues an agenda of foresight, engagement and integration in order to advance its strategic goal of building capacities for reflexivity and anticipatory governance in the NSE enterprise in particular and in society more broadly. CNS-ASU thus has a dual-tracked outreach strategy that includes, in one track, outreach to various lay-publics (**engagement**) and, in the other track, outreach to scientists and engineers (**integration**). In addition, CNS has more traditional outreach and knowledge transfer to professional colleagues via workshops and presentations, as well as a modest technology transfer program associated with InnovationSpace. In YR 8, we have deepened our collaboration with museum professionals and held several high profile events.

COLLABORATIONS WITH THE NANOSCALE INFORMAL SCIENCE EDUCATION NETWORK (NISE NET)

"Nanotechnology is relevant to everyone's lives, and has important societal and ethical implications" is one of the original learning goals established by the Nanoscale Informal Science Education Network (NISE Net). This goal was somewhat of a departure from traditional science museum content; soon after its creation, NISE Net recognized that CNS-ASU could be a valuable partner in developing programs in this area. For the past several years, CNS-ASU has developed demonstrations, presentations, posters, and film scripts for NISE Net to help introduce nano-and-society ideas to museum guests and have helped build up significant trust and good working relationship.

Over the last 12-18 months this relationship has strengthened considerably. In summer 2012, CNS-ASU officially became a "core partner" of NISE Net, a position formerly reserved for major subcontractors. Bennett, Miller, and Wetmore continue to serve on the NISE Net content committee and Miller serves on the advisory committee (and NISE Net PI Bell serves on the CNS-ASU Board of Visitors). The relationship is now truly an integrated partnership. Both groups are engaged in projects that simply would not be possible without the collaboration. What follows are descriptions of some of the key undertakings in YR 8.

Nano and Society 'Train the Trainer' Workshops

After several years of developing products and presentations for museums that emphasize the social and ethical aspects of nanotechnology, CNS and many colleagues in NISE Net realized that there was a major stumbling block to our collective effort: People working on the floor of museums were simply not comfortable with straying very far from their role of serving as experts in science facts. Some were afraid that discussions about ethics would lead to heated controversies. Others simply liked the idea of being technical experts and weren't interested in engaging the public in other topics. To address this problem, CNS-ASU and NISE Net collaborated to produce a series of two-day workshops.

Wetmore and Bennett worked closely with museum professionals from the Ithaca Sciencenter, the Science Museum of Minnesota, the Oregon Museum of Science and Industry, the Museum of Life and Science in Durham, and the Museum of Science & Industry in Chicago. In order to have the widest effect the decision was made to have these "Nano and Society" workshops built on a "train the 'trainer' model. The idea was to train participants in how to engage the public in discussions about nano and society and gave them the materials they needed to train the staff at their home institutions. The collaborative team met weekly in the spring and summer of 2012 on conference calls and every two months in person to develop an integrated, two-day program, a series of nano and society demonstrations, lesson plans, a system for evaluation, and engagement activities. In the summer of 2012 Wetmore and Bennett wrote and

narrated – and NISE Net produced – a series of seven short videos about nanotechnology and society that could be used in museum training sessions or as basic technology and society teaching tools.

As we developed the program, the team realized that it was not enough to simply package "nano and society" ideas into an easily digestible format. The team wanted to not simply add a new type of lesson to science centers, but also a new method of delivery. Rather than have museum professionals serve as experts disseminating knowledge, the team decided to train those professionals in how to facilitate conversations, thereby making science centers into a place where the public could be introduced to basic knowledge about nanotechnology and then reflect on their own values, ideas, and opinions by discussing them with museum staff and other guests.

We organized four workshops in September and October 2012, one each at: The Science Museum of Minnesota, the Houston Children's Museum, Lawrence Hall of Science, and Portland's Oregon Museum of Science & Industry. Over the course of the four workshops over 100 museum professionals were trained from over 50 different science museums and centers. These two-day workshops introduced participants to "three big ideas" in nanotechnology and society; demonstrated a handful of programs that incorporate the principles; gave participants a chance to practice the programs; encouraged them to develop their own programs; and provided them with a set of training materials (including games, videos, pocket science props, and lesson plans) so that they are equipped to train the staffs back at their own museums. NISE Net coordinated a series of subsequent engagements including online forums, conference calls, and a follow up workshop at its annual meeting in Dec 12 in Boston to ensure continued discussion and support.

Both the NISE Net administration and the participants deemed the workshops an enormous success. They broke new ground in several ways. They were the first nation-wide training program initiated by NISE Net and one of the first nation-wide museum training programs ever in the US. This success convinced NISE Net to develop additional training programs every year. The training programs helped to spark a shift in how science centers relate to their visitors. Many participants have wanted to engage the public in discussions about values and futures, but had not yet made it a normal part of their interactions. Many have remarked that the workshops gave them the courage, tools, and support to begin to make a concerted push for on the floor conversations. And finally, because many of the programs developed worked so well, nano and society ideas, materials, and activities were translated and disseminated throughout the rest of the NISE Network more quickly and broadly than ever before. For instance three of the activities developed for the Nano and Society workshops were included in the 2013 Nanodays kit that was distributed to over 200 museums.

During October and November 2012 Wetmore, Bennett, and two museum colleagues presented this work in Europe at 4S and S.NET and the Science Museum in London. Wetmore and Bennett also ran a half-day version of the workshop for 16 museum professionals from throughout Scotland at the University of Edinburgh. The first paper from this project has just been published as Ostman, Rae, Brad Herring, Ali Jackson, Ira Bennett, and Jameson Wetmore, "Making Meaning Through Conversations about Science and Society," *Exhibitionist*, Spring 2013.

Mini Nano Exhibit

Bennett and Wetmore served as consultants on the most ambitious project NISE Net embarked on last year – the Mini Nano Exhibit project. CNS scholars have provided valuable feedback and helped to evaluate the 200 square foot exhibit that NISE Net has developed to focus on nanotechnology in everyday life. The original plan to produce 50 copies of the exhibit has been increased to 70, and they will be distributed to museums across the country. Because of the collaborations NISE Net designated one of the first five exhibits produced to be sent to the Arizona Science Center to give CNS-ASU scholars easy

access to the display as we develop further activities around it, e.g., a discussion space for the Winter School.

Nanoequity Card Game: "Nano Around the World"
NISE Net has also been instrumental in developing the nanoequity card game, "Nano Around the World." Some of the NISE Net leadership were present the first time the game was introduced at the 2011 S.NET annual meeting and asked TRC 1 if we would be willing to jointly develop the game. Since Nov 11 Wetmore has collaborated with NISE Net to refine the text, develop new graphics, and review the content for consistency and accuracy.

The game has served two important interrelated purposes. First it has been very effective in getting members of the public to understand current and potential applications of nanotechnology, consider the equity issues inherent in the current system, and reflect on what their own goals for nanotechnology might be. It has been used by CNS members to teach high school students, undergraduate courses, and museum audiences. Museum professionals have used it in science summer camps as well. Wetmore alone has administered the game about 20 times. Second, the game has been very useful as a training tool. It was when NISE Net administrators played the game in January 2012 that they became convinced that workshops in nano and society would be possible. Since then we have used the game to introduce the topic at the beginning of every Nano and Society workshop, and we used it to break the ice at the 2013 Winter School and teach participants about public engagement.

While "Nano around the World" has been embraced by many museums and is being used frequently, it did not quite fit the normal museum demonstration format because it works best with players who are in their teens or older and the game takes 20-30 minutes to play. Consequently, Wetmore and a number of S.NET colleagues have developed a simpler version of the game called "You Decide" that can be played with children as young as 5 and in a timeframe as short as 3 minutes.

Hard copies of both games were distributed to the 50 institutions that took part in the Nano and Society Workshops. Digital versions are currently available for free download at nisenet.com. A hard copy of the "You Decide" game was included in the 2013 Nanodays kit that was sent to over 200 sites across the country. NISE Net is currently planning to include a hard copy of the full "Nano around the World" game in the 2014 Nanodays kit.

Three Angry Scientists
In Jan 12, playwright Melanie Wehrmacher completed the script of a ten-minute play, "Three Angry Scientists," commissioned by the Science Museum of Minnesota (SMM) and based on an idea from Guston derived from his scholarship on the role of science in regulatory decision-making. SMM hosted performances of the play in Spring 12, and Wehrmacher has now completed a new version of the play that introduces nanotechnology, in the form of a nano-enabled drug, into the decision-making of the scientists who are debating whether or not to approve the drug as safe and effective for human use.
A film of the play is now available for free download from the NISE Net website:
http://www.nisenet.org/catalog/media/three_angry_scientists

COLLABORATIONS WITH THE ARIZONA SCIENCE CENTER

Over the past year, the already strong collaborations CNS-ASU has had with the Arizona Science Center have strengthened considerably. The Informal Science Education Program that CNS coordinates with the ASU node of the NNIN sends a group of graduate students to present on the museum floor at least once a month throughout the academic year, including the annual Nanodays event. CNS's oldest flagship outreach activity – the Science Café – has been held monthly at the Science Center since 2007. Projects like these have built up a great deal of trust between CNS scholars and the Arizona Science Center

administrators. They now see CNS as one of the first organizations they go to in order to develop joint projects.

The Science Center has also opened its doors as a place for CNS scholars to develop and test new projects. For instance, ASC allowed Wetmore to try the Nano Equity game out on an adult audience not familiar with nanotechnology for the first time at an "Adult Night" event. That test run provided valuable data and led to a number of important changes in the game's protocol. In Mar 2012, the Science Center hosted the first pilot run of the joint CNS-NISE Net "Nano and Society" training workshop program. Eight staff members took a full day off from their regular duties to participate in the pilot training and provided invaluable feedback that helped to validate the proof of concept. When the Arizona Science Center was considering hosting "Deadly Medicine," a traveling exhibition developed by the United States Holocaust Memorial Museum about Nazi experiments in eugenics, its administrators were understandably anxious. Because of the wide ranging social and ethical issues they sought out the expertise of a number of CNS-ASU collaborators. We consulted with them frequently over a period of several weeks and developed strategies for training their staff. The exhibit is currently on hold, but the exercise made clear the importance of the collaboration between the two organizations.

Science Cafés

The successful CNS-ASU Science Café series continued this year. It is hosted on the third Friday of every month during the academic year by the Arizona Science Center in downtown Phoenix. The cafés typically attract around 50 people.

The YR 8, 2012-13 Science Café, held in partnership between the Arizona Science Museum, Project Humanities and ASU-CNS offered the theme of "Nano and the City" to explore issues of nanoscale science and technology in society through three complementary lenses. The central focus was on nanotechnology with a wide spectrum of applications for urban design, materials, and the built environment. The second perspective allowed participants to engage with sustainability, a normative guiding concept for the development of societies that calls for the balanced pursuit of economic development, environmental quality, and social justice. The final lens offered participants a chance to learn about the novel concept of anticipatory governance, a mode of collective action that offers diverse stakeholder groups to deliberate and take decisions on the use, benefits, costs, and unintended consequences of emerging technologies.

Throughout the series, speakers and the audience explored provocative and controversial ideas. Core issues included governance and responsible innovation with special emphasis on power, privacy, access, equality, evolution, and social learning. The program developed a trajectory of learning and engagement events that started with "Envisioning the Nano City" and will conclude in May with "Healing in the Nano City".

Speed-dating with Scientists

In Spring 2012 Wetmore (with the help of grad student Kiera Reifschneider) organized a "speed dating with scientists" program at the Science Center's Spring STEMFest event. The event drew over 100 educators including state level education administrators. The one hour activity gave museum guests a chance to sit at a table and interact with a scientist. Every seven minutes a buzzer rang, the guests stood up, found a new scientist at a table, and got another seven minutes to ask questions to get to know the scientist and his or her work. The program goal created a casual atmosphere where museum visitors and ASU scientists got to know each other, broke down some of the communication barriers that exist, and led to continued conversations over drinks afterward.

NanoDays 2013
As in previous years, CNS-ASU is participating in NanoDays by adding the societal "so what?" twist on the information and materials provided by NISE Net. In coordination with the NanoDays national program, CNS-ASU sponsored three days of demonstrations about phenomena at the nano-scale. Fourteen students from graduate classes taught by Bennett and by Wetmore, as well as students newly active in the Informal Science Communication Program participated in public displays at the Tempe Festival of the Arts, a street art fair that attracted upwards of 250,000 visitors and in the official NanoDays event hosted at the Arizona Science Center. Programs at both venues were co-sponsored by ASU's NNIN node, with its director, Trevor Thornton, presenting his own chip design demonstration.

COLLABORATIONS WITH OTHER SCIENCE MUSEUM

Partnership for Education on Climate Change, Engineered Systems, and Society (CCEP)
In YR 6, Miller (then co-PI) received a CCEP award (NSF #1043289) to establish a coordinated national network of regionally- or thematically-based partnerships devoted to increasing the adoption of effective, high quality educational programs and resources related to the science of climate change and its impacts. This award to the US National Academy of Engineering (Rachelle Hollander, PI) establishes a Phase I CCEP in collaboration with ASU, the Museum of Science-Boston, the University of Virginia, the Colorado School of Mines, and the Phoenix Union High School District. It focuses on the impacts of climate change for engineered systems, and its goal is to catalyze and transform engineering education in science museums, cities, and undergraduate programs to prepare current and future engineers, policymakers, and the public to meet these challenges. At the end of January 2013, the Partnership hosted a conference on the impact climate change will have on America's infrastructure. It brought together 75 scholars and professionals from a variety of backgrounds for two and a half days to discuss climate change science, engineering solutions, policy and governance challenges and strategies, sea level rise and storm surge, local government solutions, Native American perspectives, and engaging the public.

Frankenstein Bicentennial Project
Guston and ASU colleague Ed Finn, who directs the new Center for Science and the Imagination, have launched the Frankenstein Bicentennial Project, to recognize and celebrate the theme of creativity and responsibility in Mary Shelley's gothic novel, *Frankenstein, or The Modern Prometheus*, first published in 1818. They are in discussions with the Science Museum of Minnesota to develop a large-scale traveling exhibit on Frankenstein and the Creation of Life as part of the bicentennial activities. Guston and Finn will seek to integrate the project with the CNS-supported *Emerge* event in 2017 or 2018 and carry on through it many of the relationships with scientists and engineers as well as with the museum community and various publics that CNS has pioneered.

BROADER ENGAGEMENT PROGRAMS AND ACTIVITIES

Assessment of National Nanotechnology Initiative
In spring 2012, members of the RTTA1 team, including Porter, Shapira, Youtie, and Kay, did a special set of analyses to define and assess key indicators of research productivity, including publication and patenting rates of nanotechnology. This data was cited and used throughout the President's Council of Advisors on Science and Technology (PCAST)'s congressionally mandated biennial review: "Report to the President and Congress on the Fourth Assessment of the National Nanotechnology Initiative (NNI)."

New Tools for Science Policy
CNS-ASU is leveraging the CSPO DC office to reach out to policy audiences. In YR 8, several CNS researchers presented at CSPO's New Tools for Science Policy series, which asks: How do we know what science is "the right science" to do? How can we effectively orient the vast research enterprise to make real progress toward societal goals? Since its inception, CSPO and its network of researchers have been

developing models, tools, and methods to help address fundamental questions in science policy. CNS researchers met DC policy audiences to catalyze discussions and collaborations between science policy researchers and decision makers about new ideas and approaches for improving the social value of science and technology. YR 8 CNS researchers included: Youtie, whose presentation on "Time to reassess the promise of nanotechnology? An analysis of research, developments and commercialization" attracted about 30 attendees; and Scheufele, whose "A Brave New (online) World: Emerging Technologies at the Intersection of Science, Policy, and Rapidly Changing Media Environments" attracted 60 attendees. A forthcoming seminar by Herring of the Museum of Life and Science will be on: "Transforming and Repositioning the American Science Museum: New Tools for Engaging the Public."

Informal Science Communication Program

During YR 8, CNS-ASU and ASU's node of the National Nanotechnology Infrastructure Network (NNIN) continued a program in informal science communication in cooperation with the Arizona Science Center. Graduate students interested in working with the public to promote a broader understanding of science and technology receive training in methods and techniques to engage with diverse audiences. These "Science Liaisons" then have the opportunity to work on the floor of the Arizona Science Center once or twice a month during the semester. Students of all disciplines were invited to apply. Faculty leads Thornton, Wetmore, Bennett, Harsh, and student leader Trinidad provide ongoing support and mentorship through informal monthly group meetings and an online organizational space in the university's courseware system, Blackboard. A set of informal and formal science educational resources, training materials, and a collaboratively-edited Google calendar schedule are accessible through the community site. Thirty-five students are now members of the online group and receive regular announcements about program activities; ten students have completed the training and are active volunteers. On average, during each visit to the Science Center the students engage with 60-70 museum guests. The program has significantly strengthened the relationship between CNS-ASU and the Arizona Science Center.

ECAST

In Apr 10, the Woodrow Wilson International Center for Scholars (WWIC) released the report *Reinventing Technology Assessment: A 21st Century Model* by Richard Sclove, founder and senior member of the Loka Institute, a non-profit research and advocacy organization concerned with the social, political, and environmental repercussions of research, science and technology. The report gives an overview of participatory technology assessment, reviews its applications in Europe and some prototypes in the US, and forwards a proposal to create the ECAST network – Experts and Citizen Assessment of Science and Technology (www.ecastnetwork.org) – a consortium of NGOs, non-profits and universities that administer public engagement events on scientific and technological topics relevant to policy makers. Guston and a network of partners at WWIC, Loka, Museum of Science Boston, Pomona College, CSPO and others discuss projects, funding mechanisms and network governance in bi-weekly conference calls.

Since the report, ECAST partners have conducted several small-scale demonstration citizen engagement projects at several home institutions about emerging technologies including geoengineering, nanotechnology, and synthetic biology. ECAST has been instrumental in coordinating the participation of US sites in the Danish Board on Technology's World Wide Views (WWV) on Global Warming (which overlapped substantially with NCTF sites) and the WWV on Biodiversity held in September 2012. In the fall ECAST held two briefing events to mark the release of its report: "Technology Assessment and Public Participation: From TA to pTA." The nature of ECAST and CNS-ASU's involvement with it are directly derived from the partnership between CNS-ASU and NISE Net. ECAST manifests anticipatory governance activities and represents the building of a distributed capability among a network of organizations to extend and broaden learning about engagement techniques around nanotechnology to other emerging technologies.

Presentations to Public Audiences

CNS-ASU researchers have made numerous presentations to public audiences, including some 61 cumulatively to specifically policy audiences and 61 to lay audiences. Beyond those mentioned above, highlights in YR 7 include:

- Bennett, Ira and Jamey Wetmore, "Exploring Nanotechnology around the World," Books and Beakers, Yard Gnome Bookstore, Phoenix, AZ, December 2012.
- Guston, David H. May 11, 2012. "The Pumpkin or the Tiger?: Frederick Soddy, Michael Polanyi and the Anticipatory Governance of Emerging Technologies." Come and Tell About the Future Seminar.

Presentations to Policy and Professional Audiences

- Shapira, Philip. March 27, 2012. "The Economic Contributions of Nanotechnology to Green and Sustainable Growth"." Presentation. OECD/NNI International Symposium on assessing the Economic Impact of Nanotechnology, Washington, DC
- Scheufele, Dietram, "The Macro View: Social Dynamics in Science Communication," National Academy of Sciences Sackler Colloquium: The Science of Science Communication, Washington, DC, May 21, 2012.
- Fisher, Erik. September, 2012. "Exploring the Possibility, Utility, and Meaning of Lab-based Socio-Technical Collaborations." Presentation. Science of Science and Innovation Policy Conference 2012. The National Academy of the Sciences, Washington, DC.
- Foley, Rider W., B. Kay, Richard Rushforth and Arnim Wiek. May, 2012. "Can Nanotechnology Decontaminate Water in a Morally Contested Context?" International Symposium on Sustainable Systems and Technology, Boston, MA.

INTEGRATION PROGRAMS AND ACTIVITIES

Integration with technical colleagues in the sciences and engineering continues to be a key component of CNS-ASU's work – stretching from research to education, engagement, and outreach. It continues to be a key aspect. In fall 2012, Wetmore published an article on the benefits of collaborations between engineers and social scientists in a special issue of National Academy of Engineering's *The Bridge*. In spring 2013, some of CNS's work was cited in an article on a similar topic in the American Society for Engineering Education's *Prism*.

National Nanotechnology Infrastructure Network

In addition to the Informal Science Education Training program for graduate students mentioned previously, the CNS-ASU continues broader discussions about integrating SEI issues in the NNIN. In Nov 11, Bennett attended the annual NNIN SEI Coordinators meeting at George Washington University where he presented such CNS-ASU programs such as the DC summer session and the 1-credit course for scientists and engineers. Wetmore and Bennett have developed with Thornton, leader of the ASU NNIN node, a twenty-minute module on SEI issues that is currently presented monthly in conjunction with the health and safety training that all users of the ASU NNIN facility must successfully pass. We use this orientation as a means to introduce researchers to the practical implications and applications of CNS research and findings, while also making them aware of the support CNS can offer to young scholars in the form of PhD+ opportunities and coursework.

In fall 2012, Wetmore was asked by a group of universities led by Stanford to serve as the Societal and Ethical Implications (SEI) director for their grant proposal for the NSF's Next Generation National Nanotechnology Infrastructure Network (NG-NNIN). During spring 2013, Wetmore and Bennett developed a proposal for a nationwide SEI program. If funded, the NG-NNIN SEI initiative will build

upon the programs developed and lessons learned in CNS-ASU's development of a culture in which scientists and engineers frequently collaborate with social scientists to explore the societal impacts of their research. NG-NNIN will use workshops like the "Science Outside the Lab" program and future scenario building workshops as a way to give participants from all 18 NG-NNIN nodes experience collaborating across disciplines. The SEI program will also build on the strong relationship between CNS-ASU and NISE Net by trying to create ties between the 18 universities involved and their local science centers. Wetmore has also been asked to serve as the SEI coordinator on the current NNIN grant being run by Cornell University. Negotiations for that transition are currently in process.

Research Integration Presentations

CNS-ASU researchers have made a cumulative 64 presentations to audiences with a specifically technical orientation. Beyond those mentioned above, highlights in YR 8 include:

- Cozzens, Susan, keynote lecture, NanoAfrica Conference, Bloemfontein, South Africa, April 3, 2012.
- Youtie, Jan and Philip Shapira. September 13, 2012. "Emerging Nanotechnologies: Scaling and Scoping Environmental, Health, and Safety Applications." Presentation. Seminar, Center for the Environmental Implications of NanoTechnology, Duke University. (This presentation was made to Environmental, Health, and Safety scientists at the Duke CEIN and webcast for the UCLA CEIN)
- Bennett, Ira, November 2012. "Teaching Ethics, Policy and Societal Implications of Research to Scientists and Engineers: Delivering Content," Annual Fall Meeting of the Materials Research Society, Boston.
- Arora, Sanjay, Alan L. Porter, Jan Youtie and Philip Shapira. September 2012. "Capturing New Developments in an Emerging Technology: An Updated Search Strategy for Identifying Nanotechnology Research Output." Presentation. Global Tech Mining Conference, Montreal.

COLLABORATIONS WITH ACADEMIC COLLEAGUES

Society for the Study of Nanoscience and Emerging Technologies (S.NET)

After serving as co-organizer and host of its the third annual meeting in Nov 11, CNS-ASU continues to support S.NET. This past year RTTA1, TRC1, TRC2, education and outreach programs were all well represented by faculty and graduate students. One of the five plenary lectures, which was given by occasional collaborator Michael Gorman and former visiting scholar Daan Schuubiers, analyzed many of the programs developed at CNS-ASU with special emphasis on RTTA 3 activities.

Emerge

CNS-ASU once again co-sponsored ASU's multidisciplinary *Emerge* workshop. During this second iteration *Emerge* brought together artists, scientists, dancers, engineers, and humanists to analyze, create, ponder, reflect on, and discuss the future of truth. The invited speaker list included individuals as diverse as science fiction writer Bruce Sterling, cyborg activist Neil Harbisson, and Syd Mead, futurist designer whose credits include the film "Blade Runner." Slate's Future Tense covered the event. Links to the program as well as the reports produced throughout the workshop can be found at: http://emerge2013.asu.edu/. In particular, CNS-ASU supported the workshop "The Future of Making," run by senior investigator Boradkar of InnovationSpace.

Presentations to academic and professional audiences

CNS-ASU researchers have made 355 cumulative presentations to collegial academic and professional audiences. Beyond those mentioned above, highlights in YR 8 include:

- Arora, Sanjay. May, 2012. "Website Indicators for the Strategic Management of Emerging Technologies." Poster Session. International Conference on Innovative Methods for Innovation Management and Policy, Beijing, China.
- Soumonni, Ogundiran. "Nanotechnology and Renewable Energy Development in China and South Africa: Bridging the Gap between Research and Innovation," Globelics Doctoral Academy, Rio de Janeiro, Brazil, August 2012.
- Cacciatore, Michael A., Dietram A. Scheufele, Elizabeth A. Corley, Philip Shapira, and Jan Youtie. April, 2012. "Practicing what they preach? Comparing the Self-Reported Attitudes of Nanoscientists with their EHS Publication Records." Paper Presentation. 12th International Public Communication of Science and Technology Conference, Florence, Italy.
- Wetmore, Jameson M., "The Need for Local Sensitivities in International Standards," International Workshop: Engineering Ethics for a Globalized World (EGW12), University of Illinois, Champaign, IL, October 8, 2012.

COLLABORATIONS/INTERACTIONS WITH INDUSTRY AND OTHER SECTORS

Governance Scenarios for Cities (Phoenix)
In Dec 2012, TRC 2 conducted an expert and stakeholder workshop on "Nano and the City: Future Scenarios of Nanotechnology Innovation". The goal of this workshop was to synthesize literature about future projections of nanotechnology innovations and present them to policy and industry representatives to ground the projects in practical reality. Representatives from the Arizona Corporation Commission (ACC), Arizona Nanotechnology Cluster (ANC), Arizona Biotechnology Association (ABA), Arizona Technology Council (AzTC), Arizona Technology Investors Forum (ATIF), Maricopa Association of Governments (MAG), various city officials, Greater Phoenix Economic Council (GPEC), Arizona State University (ASU), Intel, SDC Materials, Phoenix Revitalization Corp. (PRC), Bioscience High School (BHS) participated in the workshop. Additionally, small business entrepreneurs, business consultants, and patent attorneys were in attendance. The workshop helped TRC2 refine the visions it had created as well as inform the local nano AZ community about some of the technologies and systems that are being envisioned by scientists, engineers, and designers. The resulting scenarios are now being used throughout TRC2's activities in both research and the classroom.

CNS Private Sector Engagement
CNS-ASU postdoc Sarah Davies led the CNS private sector engagement initiative from October 2010 to September 2012 thanks to a supplemental NSF grant. While here in Arizona she developed an internal database and convened a workshop on "Nanotechnology, Business and Anticipatory Governance" in YR 7. In October 2012 she assumed a new position in the Department of Media, Cognition and Communication at the University of Copenhagen. The most recent product of her work is a special issue of *Nanotechnology Law & Business* that she co-edited with Noela Invernizzi. The issue examines private sector nanotechnology in developing countries, the influence of regulation on markets, and the ways in which corporations inform the public about their work.

InnovationSpace
CNS-ASU has a modest technology transfer program through its support of InnovationSpace (ISpace). One important output of ISpace is an invention disclosure by each of the cross-functional undergraduate teams. ISpace teams working with CNS have disclosed 12 inventions to ASU's technology transfer arm, Arizona Technology Enterprises (AZTE) and at the end of the year will submit 3 additional invention disclosures. These disclosures have generally been the endpoint of technology development from ISpace, as neither it nor CNS-ASU has had the resources to perform follow-up research and development – although ISpace faculty leader Boradkar and Guston are attempting to cultivate potential sources of support.

Presentations to private sector/industrial audiences

CNS-ASU researchers have made a cumulative 40 presentations to audiences with a specifically private sector/industrial orientation. Beyond those mentioned above, highlights in YR 8 include:

- Scheuefele, Dietram, "The Brave New World of Communicating Science & Technology: Opportunities and challenges at the Intersection of Science, Markets, and (new) Media." Bioscience Vision Summit: Growth by Association, Madison WI, September 12, 2012.
- Davies conducted a "NanoEthics: Responsibility, Risk, and Responsible Innovation" Training Session for the SESHA (ESH for High Technology) Annual Symposium (May 12), Scottsdale AZ.
- Scheufele, Dietram, "Advanced Metering Roundtable," Wisconsin Public Utility Institute, Madison, WI, September 14, 2012.

DOCUMENTARY AND VIDEO/MEDIA PROJECTS

CNS-ASU has revamped its website (cns.asu.edu) which we have soft-launched and will officially announce shortly before the site visit. The new website is meant to demonstrate CNS-ASU's recognition that interdisciplinary and integrated communications about the societal dimensions of nanotechnology require a diverse outreach strategy. CNS-ASU thus continues to develop its new media project to infrastructure, workflows, and capacities. The goal of the project is to expand the reach of the Center's regular research and engagements through a variety of media.

Our goal has been to video as much as possible and make it accessible to a broader audience through the website. To this end we have been producing videos of CNS's Occasional Speaker series; they are available at: http://vimeo.com/album/1542414. We have been recording the CNS Science Café Series for a couple years as well, posting those videos at: http://vimeo.com/album/1662457. We have also tried to highlight specific faculty and projects by compiling short videos of them discussing their work. We have also disseminated the short films that Wetmore and Bennett developed for the Nano and Society workshop program.

13. Shared and other Experimental Facilities

While CNS-ASU has no physical science or engineering experimental facilities as such, it has created a nexus of exciting, cutting-edge inquiry that has drawn large numbers of scholars, many of them international, to visit and collaborate with us in a variety of capacities. The Center has a physically coherent space – integral with its parent center, the Consortium for Science, Policy and Outcomes (CSPO) – and sufficient capacity and flexibility to host visitors. Since beginning operation in Oct 05, and according to rigorous selection criteria, CNS-ASU has hosted numerous visitors including some ninety (90) international scholars, students, and policy practitioners from over twenty (20) countries. These numbers do not include several dozen international visitors to the Georgia Tech and University of Wisconsin-Madison sites, nor do they include some fifty-four (54) visitors who attended the 2011 S.NET conference. This section reports on the interactions that CNS-ASU has generated, which in turn point to the Center's value as a destination for visiting international scholars and its role as the central node in a widening international network.

To provide meaningful structure for our reporting on these visits, we limit our account here to include only a subset of these interactions based on three rigorous selection criteria. First, we only report on visitors who come from outside the US to the CNS-ASU. Thus, in past years, we have not counted Bowman (Northern Ireland) or twelve other international visitors who attended the fourth STIR project workshop or, this year, three UK visitors who attended the US-UK dialogue on responsible innovation, since these meetings were both held in Washington DC. Second, we only report on visitors who have no formal positions within US institutions, whether at ASU or elsewhere. Thus, in past years, we have not

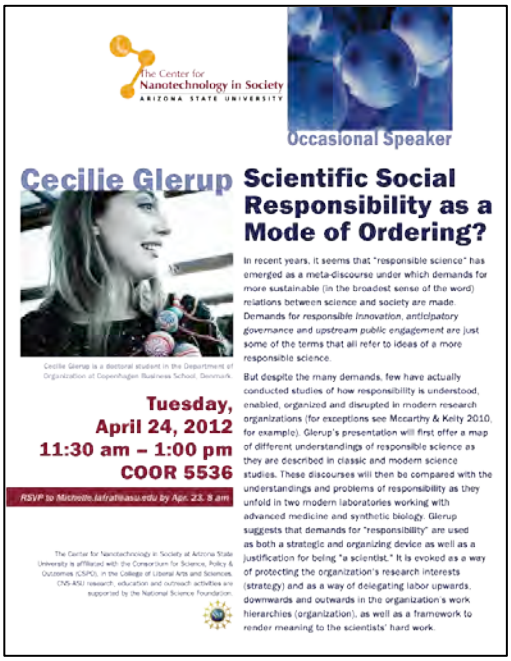
counted international students such as Calleja-Lopez (Spain), who had a Fulbright scholarship to attend ASU; Bal, Gatchair and Kay (who received some form of support from Georgia Tech); Hu (Taiwan), Kim (Korea), Luk (Hong Kong), Stavrianakis (UK) and Zhu (China), who currently have or have had appointments either at ASU or another US institution; or international post-doctoral scholars such as Davies (UK) or Rodriguez (Basque Country) who have appointments at ASU. Third, we only count one member of each group of between two and four visitors from the same institution or country (except in cases where members engaged in separate Center interactions that did not involve the group as such). We thus have counted Naranjo (Ecuador) and Hosono (Japan), but not the other five scholar-practitioners who comprised the same South American and Japanese delegations, respectively.

In YRs 1-7, CNS-ASU was visited by eighty-three (83) international visitors who fit these criteria. Visits from these people varied in length of stay, ranging from a few days to several months, but in nearly every case the visitor provided a lecture or seminar on his or her work related to nanotechnology in society and met intensively with CNS-ASU researchers. These visitors included faculty, students, and policy

practitioners.

In YR 8, the following seven CNS-ASU visitors fit the three criteria specified above:

1. Indrani Mahapatra – University of Birmingham, UK
2. Kumi Okuwada – Research Institute of Science and Technology for Society (RISTEX), Japan
3. Laxmi Pant – University of Guelph, Canada
4. Simon Pfersdorf – Karlsruhe Institute of Technology, Germany
5. Stefanie Seitz – Karlsruhe Institute of Technology, Germany
6. Oliver Shackleton – University of Manchester, UK
7. Alec Waterworth – Manchester Business School, UK



YR 8 CNS-ASU visitors consist of six students/researchers and one policy practitioner who come from four countries. Several YR 8 visitors are developing research plans that grow out of their interactions with the Center. Two are returning visitors. Six were participants in the Winter School. In general, all visiting graduate students receive mentorship from CNS-ASU researchers and most have opportunities to present and to publish. One YR 8 international visitor to the Center was a policy practitioner working for a publicly funded science policy institution.

This year we also separately report on YR 8 international visitors to Georgia Tech in connection to RTTA 1. These six visitors (which are not tallied in the above numbers) include:

1. Alfred Li-Ping Cheng - Chung-Hua Institution for Economic Research
2. Angela Rocha – Universidade Federal da Bahia
3. Arho Suominen – University of Turku, Finland
4. Yi Zhang – Beijing Institute of Technology, China
5. Xiao Zhou – Beijing Institute of Technology, China
6. Donghua Zhu – Beijing Institute of Technology, China

Georgia Tech visitors include three students, two university faculty members and one research fellow from four countries.

Sample publications or publishing activity in YR 8 by previous international visitors to the Center that stemmed from or were shaped by their interactions with CNS-ASU include the following articles:

1. Hannot Rodríguez, Erik Fisher and Daan Schuurbiers (2013, in press). "Integrating Science and Society in European Framework Programmes: Trends in Project-Level Solicitations." *Research Policy*.

2. Erik Fisher, Marianne Boenink, Simone van der Burg, and Neal Woodbury (2012). "Responsible Healthcare Innovation: Anticipatory Governance of Nanodiagnostics for Theranostics Medicine." *Expert Review of Molecular Diagnostics* 12(8): 857–870.

During YR 8, several instances of knowledge transfer, dissemination, and application occurred, including

those mentioned in conjunction with the Winter School (see, e.g., RTTA 4) and the ongoing incorporation of Center ideas into EU and UK efforts aimed at Responsible Innovation. After several visits to the US, Frank Theys and Fisher began training and filming four "embedded humanists" who started working in laboratories for his documentary entitled, 'Lab-Life'. This is a documentary directed by Theys and produced by Savage Films (Belgium) and Cobos Films (The Netherlands) in a coproduction with the public broadcaster ZDF/ARTE (Germany/France), supported by the Flemish and the Dutch Film Funds, the European MEDIA program and the CERA Art Foundation. The film will have a cinema release (90 min.) and a 60 min. or series version for television and will be distributed by Autlook Films (Austria).

These activities and capacities have enabled CNS-ASU to become increasingly involved in arranging and participating in international events that take place outside of our physical space proper and that extend the reach and vibrancy of our network of partners and collaborators. They have also provided the template for activities anticipated under the proposal to NSF's "Science Across Virtual Institutes" program for a "Virtual Institute for Responsible Innovation."

14. Personnel

The Center is managed by a Director (Guston), three Associate Directors (Fisher, integration; Selin, anticipation; and Wetmore, engagement), and an Assistant Director (Bennett, education). An Executive Committee composed of the Center's team leaders and institutional PIs meets monthly by phone. In addition to Guston (ASU) and Miller (ASU), Center co-PIs are Elizabeth Corley (ASU), to recognize her work across RTTAs, Dietram Scheufele (Wisconsin) and Jan Youtie (GA Tech) – to recognize the deep partnership with those subcontracting institutions – Deirdre Meldrum (ASU), recently Dean of the Ira A. Fulton Schools of Engineering and now advisor to President Crow on special projects, to acknowledge our shifting agenda to include greater collaboration with engineering faculty.

CNS-ASU has three full-time staff: Regina Sanborn, promoted in the previous year from Program Manager to Assistant Director, who reports to the Director; Michelle Iafrat, promoted in the previous year from Administrative Associate to Program Coordinator, who reports to the Assistant Director; and Daniel Hooker, Program Coordinator for communication who reports to the Assistant Director.

CNS-ASU has a set of team leaders for each of its major RTTA and TRC research programs. These leaders are spread across the Center's participating institutions and in some instances overlap with institutional leaders (see below). The team leaders currently are:

RTTA 1: Jan Youtie, GA Tech; Jose Lobo, ASU
RTTA 2: Elizabeth Corley, ASU; Dietram Scheufele, Wisconsin
RTTA 3: Cynthia Selin, ASU; Kelly Rawlings, ASU
RTTA 4: Erik Fisher, ASU; Elizabeth Corley, ASU

TRC 1: Jameson Wetmore, ASU; Susan Cozzens, GA Tech
TRC 2: Arnim Wiek, ASU; Sander van der Leeuw, ASU

This group convenes monthly in a telephone call as the Executive Committee. CNS-ASU also communicates internally through a regular lab meeting, held every other week, for personnel at ASU, and regular lab meetings held at similar intervals among the Wisconsin and GA Tech groups, as well as between GA Tech and ASU for TRC 1. A listserv dedicated to CNS-ASU affiliated personnel at all its institutions also facilitates communication.

Much of the interaction among CNS personnel is driven by both the preparation for and the consequences of the All-Hands meeting. The first All-Hands meeting, held 19-21 April 2007, involved more than fifty faculty and student researchers from the several universities involved in CNS-ASU, plus about one dozen specially selected nano-in-society scholars from outside of CNS. CNS-ASU held its second All-Hands meeting 23-25 Apr 08.

CNS-ASU held a Visioning Workshop in Oct 08 to engage in reflexive scrutiny of our future visions of anticipatory governance and RTTA. It included CNS-ASU research, education, and outreach leadership, as well as a few select outsiders and several of our NSE research collaborators. The meeting helped feed into the Center's strategic planning process and prepared for the All Hands meeting.

CNS held its third All-Hands meeting on 14-16 Jan 09, the major focus of which was preparing for the renewal effort. Seventy individuals were in attendance representing ASU (researchers, students and staff), CNS-affiliated universities (researchers and students), and others in the nano-in-society field. Our fourth All-Hands meeting was held 11-13 Jan 10, with sixty-four in attendance representing ASU (researchers, students and staff), CNS-affiliated universities (researchers and students), and several representatives from NISE Net. Our fifth All-Hands Meeting was held on 10-12 Jan 11, with fifty-seven in attendance

representing ASU, CNS-affiliated researchers at other universities, several representatives from NISE Net, and a newly constituted Board of Visitors.

In the previous year, CNS-ASU held its All-Hands meeting – with 51 in attendance including its Board of Visitors – in conjunction with the 3rd Annual Meeting of the Society for the Study of Nanoscience and Emerging Technologies (S.NET), co-hosted by CNS-ASU and CNS-UCSB in Tempe, AZ on 7-10 Nov 11.

In the current reporting year, CNS-ASU held its first Winter School on the Anticipatory Governance of Emerging Technologies. Because all team leaders were present for the Winter School, the Center did not hold an official All-Hands meeting, but instead invited all graduate students in the Center to meet with both the Winter School participants and the Board of Visitors, with whom they engaged in a "speed dating poster session."

Next year's All-Hands meeting will occur during the Winter School and will focus on issues of extending CNS-ASU research and other collaborative activities beyond the tenth year.

CNS-ASU Organizational Structure
September 2012 – Present

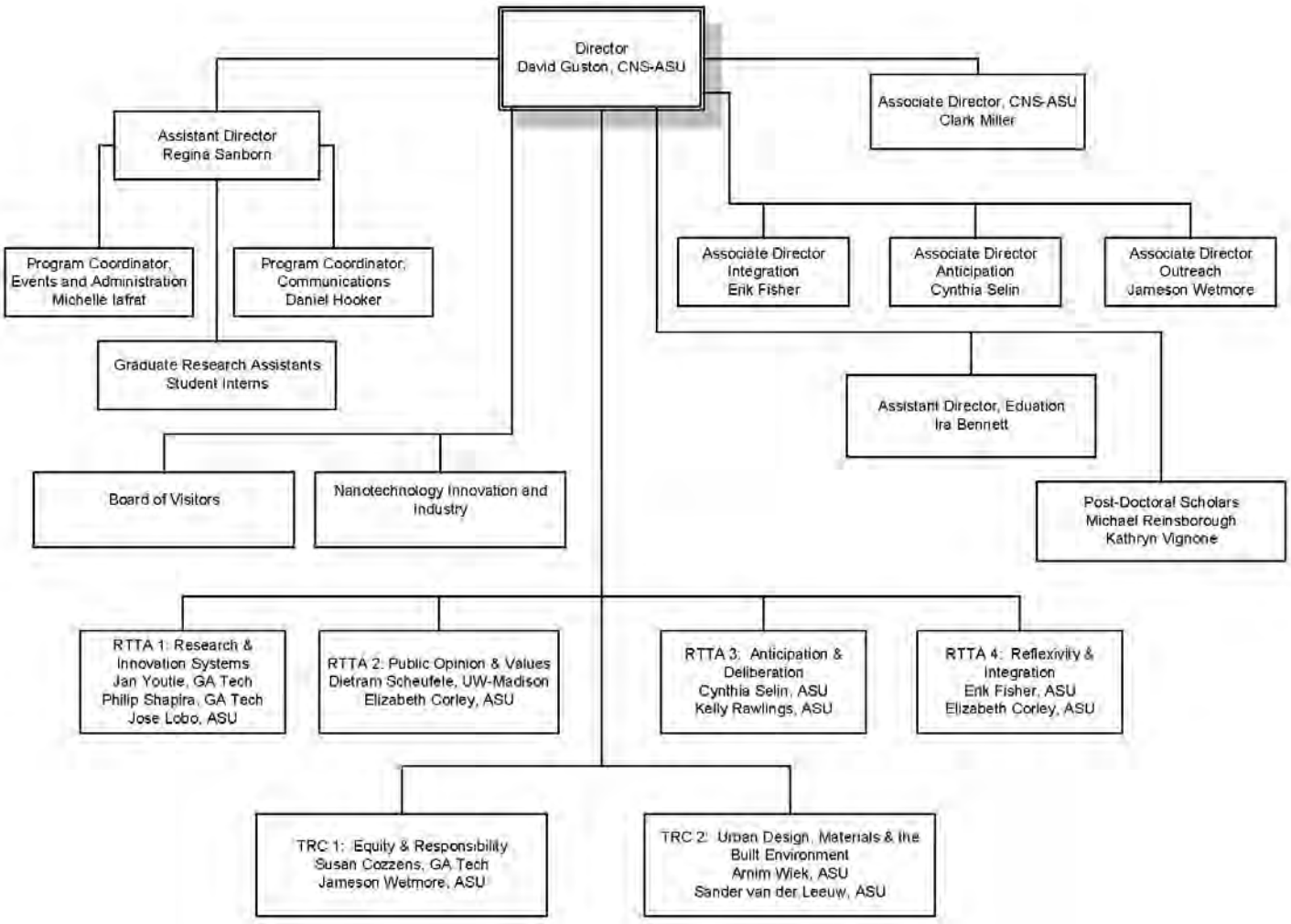


Table 4A: NSEC Personnel, Irrespective of Citizenship

							Citizenship Status											
							U.S. Citizen or Permanent Resident											
					Gender		Race					Mixed-incl.	Mixed					
Personnel Type				Total	Male	Female	NA	PI	AA	C	A	NA,PI,AA	C,A	Not Provided	Other Non-US	*Ethnicity Hispanic	Disabled	% NSEC Dollars
Director				1	1					1								0%
Asc. Dir.				1	1					1								0%
Team Leaders				12	7	5	0	0	0	11						1		50%
Staff				3	1	2				3								75%
Collaborators				204	133	71	1	0	1	185	18					7	0	0%
Research																		
	Post Docs			13	7	6	0	0	0	10	3					2	0	50%
	Doc/Mas. Students			83	49	34	0	0	1	62	20					5	0	50%
	Undergraduate Students			19	14	5	0	1	1	16	2					3	0	100%
Curriculum Development and Outreach																		
	Senior Faculty																	
	Junior Faculty																	
	Research Staff																	
	Visiting Faculty																	
	Industry Researchers																	
	Post Docs																	
	Doctoral Students																	
	Masters Students																	
	Undergraduate Students																	
REU Student, if applicable																		
	NSF REU Program																	
	NSF/NSEC Program REU																	
	NSEC's Own REU																	
Other Visiting College Students																		
Pre-college (K-12)																		
	Students																	
	Teachers - RET																	
	Teachers - non-RET																	
TOTALS				**336**	**213**	**123**	**1**	**1**	**3**	**289**	**43**				**0**	**18**	**0**	

Table 4B: NSEC Personnel, U.S. Citizen or Permanent Resident

					Gender		Race						Mixed-incl.	Mixed					
Personnel Type				Total	Male	Female	NA	PI	AA	C	A		NA,PI,AA	C,A	Not Provided	Other Non-US	*Ethnicity Hispanic	Disabled	% NSEC Dollars
Director				1	1					1									0%
Asc. Dir.				1	1					1									0%
Team Leaders				7	3	4				7									50%
Staff				3	1	2				3									75%
Collaborators				166	105	61	1		1	161	4						5		0%
Research																			
	Post Docs			7	5	2				7							2		50%
	Doc/Mas. Students			50	27	23			1	47	2						2		50%
	Undergraduate Students			17	14	3		1	1	16							3		100%
Curriculum Development and Outreach																			
	Senior Faculty																		
	Junior Faculty																		
	Research Staff																		
	Visiting Faculty																		
	Industry Researchers																		
	Post Docs																		
	Doctoral Students																		
	Masters Students																		
	Undergraduate Students																		
REU Student, if applicable																			
	NSF REU Program																		
	NSF/NSEC Program REU																		
	NSEC's Own REU																		
Other Visiting College Students																			
Pre-college (K-12)																			
	Students																		
	Teachers - RET																		
	Teachers - non-RET																		
Totals				**252**	**157**	**95**	**1**	**1**	**3**	**243**	**6**		**0**			**0**	**12**	**0**	

14. Publications, Patents and Press

Primary NSEC support indicated by (‡) *symbol. Partial NSEC support for all others.*

Faculty level participants indicated in boldface.

Books

1. **Allenby, Braden** and **Daniel Sarewitz**. 2011. *The Techno-Human Condition*. Cambridge, MA: MIT Press.

2. **Campbell, Heather E.** and **Elizabeth A. Corley**. 2012. *Urban Environmental Policy Analysis: Toward Sustainability*. Armonk, NY: M. E. Sharpe, Inc.

3. ‡**Cozzens, Susan** and **Jameson Wetmore** (eds.). 2011. *Yearbook of Nanotechnology in Society, Volume II: Nanotechnology and the Challenges of Equity, Equality, and Development*. New York, NY: Springer.

4. ‡**Fisher, Erik, Cynthia Selin** and **Jameson Wetmore** (eds.). 2008. *Yearbook of Nanotechnology in Society, Volume I: Presenting Futures*. New York, NY: Springer.

5. **Gorman, Michael E.** (ed.). 2010. *Trading Zones and Interactional Expertise: Creating New Kinds of Collaboration*. Cambridge, MA: MIT Press.

6. ‡**Guston, David H.** (ed.). 2010. *Encyclopedia of Nanoscience and Society (two volumes)*. Thousand Oaks, CA: SAGE Publications.

7. ‡**Hays, Sean A.**, **Jason S. Robert**, **Clark A. Miller** and **Ira Bennett** (ed.). 2012. *Yearbook of Nanotechnology in Society, Volume III: Nanotechnology, the Brain, and the Future*. New York, NY: Springer.

8. ‡De Ridder-Vignone, Kathryn, **Clark A. Miller,** and **Daniel Barben** (eds.). In preparation, 2014. *Yearbook of Nanotechnology in Society, Volume IV: Nanotechnology and Democracy*. New York, NY: Springer.

9. **Smits, Ruud**, **Stefan Kuhlmann** and **Philip Shapira** (eds.). 2010. *The Theory and Practice of Innovation Policy. An International Research Handbook*. Edward Elgar Publishing.

10. **Wetmore, Jameson** and **Deborah G. Johnson** (eds.). 2009. *Technology and Society: Building our Sociotechnical Future*. Cambridge, MA: MIT Press.

Book Chapters

1. ‡Anderson, Ashley A., **Dominique E. Brossard, Dietram A. Scheufele** and **Michael A. Xenos**. 2012. "Online Talk: How Exposure to Disagreement in Online Comments Affects Beliefs in the Promise of Controversial Science." *Citizen Voices: Performing Pubic Participation in Science and Environments Communication*, eds. L. Phillips, A. Carvalho and J. Doyle, 119-135. Chicago, IL: Intellect/University of Chicago Press.

2. ‡Anderson, Derrick. 2012. "The Cochlear Implant Controversy: Lessons Learned for Using Anticipatory Governance to Address Societal Concerns of Nano-scale Neural interface Technologies." *Yearbook of Nanotechnology in Society, Volume III: Nanotechnology, the Brain, and the Future*, eds. Sean A. Hays, Jason S. Robert, Clark A. Miller and Ira Bennett, 147-158. New York, NY: Springer.

3. ‡Bal, Ravtosh. 2011. "Public Perceptions of Fairness in NBIC Technologies." *Yearbook of Nanotechnology in Society, Volume II: The Challenges of Equity, Equality, and Development*, eds. Jameson Wetmore and Susan Cozzens. New York, NY: Springer.

4. ‡**Barben, Daniel**, **Erik Fisher**, **Cynthia Selin** and **David H. Guston**. 2008. "Anticipatory Governance of Nanotechnology: Foresight, Engagement, and Integration." *The Handbook of Science and Technology Studies, Third Edition*, eds. Edward J. Hackett, Olga Amsterdamska, Michael Lynch and Judy Wajcman, 979-1000. Cambridge, MA: MIT Press.

5. ‡Bennett, Ira**.** 2008. "Developing Plausible Nano-Enabled Products." *Yearbook of Nanotechnology in Society, Volume 1*, eds. Erik Fisher, Cynthia Selin and Jameson Wetmore, 149-156. New York, NY: Springer.

6. **Boardman, Craig**, **Catherine Slade** and **Barry Bozeman**. 2012. "A Retrospective of the U.S. National Nanotechnology Initiative (NNI): Lessons Learned for Coordination of Federal Scientific and Technical Work at the Nanoscale." *Making it to the Forefront: Nanotechnology-A Developing Country Perspective*, ed. N. A. Duda. Springer.

7. ‡Choi, Doo-Hun, Anthony D. Dudo and **Dietram A. Scheufele**. 2012. "U.S. News Coverage of Neuroscience Nanotechnology: How U.S. Newspapers Have Covered Neuroscience Nanotechnology During the Last Decade." *Yearbook of Nanotechnology in Society, Volume III: Nanotechnology, the Brain, and the Future*, eds. Sean A. Hays, Jason S. Robert, Clark A. Miller and Ira Bennett, 67-78. New York, NY: Springer.

8. ‡**Cobb, Michael D**. 2012. "Deliberative Fears: Citizen Deliberation about Science in a National Technology Forum." *Public Engagement and Emerging Technologies*, eds. Kieran O'Doherty and Edna Einsiedel. Vancouver, Canada: University of British Columbia Press.

9. ‡**Cobb, Michael D.** 2012. "Lessons Learned from the First National Citizens' Technology Conference." *Nanotechnology and the Public: Risk Perception and Risk Communication*, ed. Susanna Hornig Priest, 93-103. Boca Raton, FL: CRC Press (Taylor and Francis).

10. Cortes Lobos, Rodrigo. 2012. "Nanotecnologa en Chile, Qu tan preparado se encuentra el pas para desarrollar esta disciplina." *Perspectivas sobre el desarrollo de las nanotecnologas en Amrica Latina*, eds. Guillermo Foladori, Edgar Zayago Lau and Noela Invernizzi, 85-101. Miguel Angel Porrua, Mexico.

11. ‡**Cozzens, Susan**. Forthcoming. "The Distinctive Dynamics of Nanotechnology in Developing Nations." *Making it to the Forefront: Nanotechnology-A Developing Country Perspective*, ed. N. A. Duda. Springer.

12. ‡**Cozzens, Susan**. 2011. "Building Equity and Equality into Nanotechnology." *Yearbook of Nanotechnology in Society, Volume II: The Challenges of Equity, Equality, and Development*, eds. Susan Cozzens and Jameson Wetmore, 433-457. New York, NY: Springer.

13. ‡**Cozzens, Susan** and **Jameson Wetmore**. 2011. "Introduction." *The Yearbook of Nanotechnology in Society, Volume II: Nanotechnology and the Challenges of Equity, Equality, and Development*, eds. Susan Cozzens and Jameson Wetmore, vii-ix. New York, NY: Springer.

14. ‡Davies, Sarah R. 2011. "Of insects and armies." *Lemistry: A Celebration of the Work of Stanislaw Lem*, eds. Ra Page and Magda Raczynska. Manchester, United Kingdom: Comma Press, Co-commissioned by the Polish Cultural Institute in London with support from the Polish Book Institute.

15. ‡Davies, Sarah R. 2010. "The Exhibition and Beyond: New and Controversial Science in the Museum." *The Science Exhibition: Curation and Design*, eds. A. Filippoupoliti and G. Farnell. MuseumsEtc.

16. ‡Davies, Sarah R. and **Phil Macnaghten**. 2010. "Narrative and Public Engagement: Some Findings from the DEEPEN Project." *Understanding Public Debate on Nanotechnologies: Options for Framing Public Policies*, eds. Rene von Schomberg and Sarah R. Davies, 13-30. Brussels: European Commission.

17. Ellwood, Paul, **Erik Fisher** and **Kristo Pandza**. 2012. "Organizational Capability Life Cycles for Responsible Innovation." *Emerging Technologies: Socio-Behavioral Life Cycle Approaches*, eds. Michael E. Gorman, N. Savage and A. Street. Singapore: Pan Stanford.

18. ‡**Fisher, Erik.** 2009. "Legislative and Regulatory Framework." *Nanotechnology and FDA-Regulated Products: The Essential Guide*. Washington, DC: Food and Drug Law Library.

19. ‡**Fisher, Erik.** 2007. "The Convergence of Nanotechnology, Policy, and Ethics." *Advances in Computers 71: Nanotechnology*, ed. M. Zelkowitz, 274-296. London, England: Academic Press (Elsevier).

20. ‡**Fisher, Erik** and **Arie Rip**. In preparation, "Responsible Innovation: Multi-Level Dynamics and Soft Interventions." *Resonsible Innovation*, eds. R. Owen, M. Heintz and J. Bessant. Wiley.

21. ‡**Fisher, Erik** and **Clark A. Miller**. 2009. "Contextualizing the Engineering Laboratory." *Engineering in Context*, eds. S.H. Christensen, M. Meganck and B. Delahousse, 369-381. Palo Alto, CA: Academica Press.

22. ‡Fisher, Erik and Daan Schuurbiers. Forthcoming, "Midstream Modulation." *Opening up the Laboratory: Approaches for Early Engagement with New Technology*, eds. I. van de Poel, M.E. Gorman, N. Doorn and D. Schuurbiers. Wiley-Blackwell.

23. ‡**Fisher, Erik** and **Roop L. Mahajan**. 2010. "Embedding the Humanities in Engineering: Art, Dialogue, and a Laboratory." *Creating New Kinds of Collaboration: Trading Zones and Interactional Expertise*, eds. M.E. Gorman and R. Evans. Cambridge, MA: MIT Press.

24. ‡**Fujimura, Joan H.** 2010. "Technobiological Imaginaries: How Do We Know Nature?" *The Politics of Divergent (Interdisciplinary) Framings of Nature and Evolving Ecologies*, eds. Mara Goldman, Matthew Turner and Paul Nadasdy. Durham, NC: Duke University Press.

25. ‡Gallo, Jason. 2009. "Doing Archival Research: How to Find a Needle in a Haystack." *Research Confidential: Solutions to Problems Most Social Scientists Pretend They Never Have*, ed. E. Hargittai, 262-286. Ann Arbor, MI: University of Michigan Press.

26. ‡Gatchair, Sonia. 2011. "Potential Implications for Equity in the Nanotechnology Workforce in the U.S." *Yearbook of Nanotechnology in Society, Volume II: The Challenges of Equity, Equality, and Development*, eds. Susan Cozzens and Jameson Wetmore. New York, NY: Springer.

27. Guo, Ying, Tingting Ma and **Alan L. Porter**. 2012. "Innovation Risk Path Assessing for a Newly Emerging Science and Technology: Illustrated for Dye-Sensitized Solar Cells." *Disruptive Technologies, Innovation and Global Redesign: Emerging Implications*, eds. Ndubuisi Ekekwe and Nazrul Islam, 12-26. Hershey, PA: IGI Global.

28. ‡**Guston, David H.** 2013. "Daddy, Can I Have a Puddle Gator?: Creativity, Anticipation, and Responsible Innovation." *Responsible Innovation: Concepts and Practice*, eds. R. Owen, J. Bessant and M. Heintz, 109-118. London: Wiley.

29. ‡**Guston, David H.** 2007. "The Center for Nanotechnology in Society at Arizona State University and the Prospects for Anticipatory Governance." *Nanoscale: Issues and Perspectives for the Nano Century*, eds. N. Cameron and M.E. Mitchell, 377-92. New York, NY: John Wiley and Sons.

30. **Guston, David H.** 2007. "Toward Centres for Responsible Innovation in the Commercialized University." *Public Science in Liberal Democracy: The Challenge to Science and Democracy*, eds. P.W.B. Phillips and J. Porter, 295-312. Toronto, Canada: University of Toronto Press.

31. ‡**Guston, David H.**, John Parsi and Justin Tosi. 2007. "Anticipating the Political and Ethical Challenges of Human Nanotechnologies." *Nanoethics: The Ethical and Social Implications of Nanotechnology*, eds. Fritz Allhoff, Patrick Lin, James Moor and John Weckert, 185-97. New York, NY: John Wiley and Sons.

32. ‡**Hamlett, Patrick**, **Michael D. Cobb** and **David H. Guston**. 2012. "National Citizen's Technology Forum: Nanotechnologies and Human Enhancement." *Yearbook of Nanotechnology in Society, Volume III: Nanotechnology, the Brain, and the Future*, eds. Sean A. Hays, Jason S. Robert, Clark A. Miller and Ira Bennett, 265-283. New York, NY: Springer.

33. ‡**Harsh, Matthew**. 2012. "Informal Governance of Emerging Technologies: Non-Governmental Organizations and Nanotechnology in Africa." *International Handbook on Informal Governance*, eds. Thomas Christiansen and Christine Neuhold, 481-500. Cheltenham, United Kingdom: Edward Elgar Publishing.

34. ‡Harsh, Matthew. 2011. "Equity and Participation in Decisions: What can Nanotechnology Learn from Biotechnology in Kenya." *Yearbook of Nanotechnology in Society, Volume II: Nanotechnology and the Challenges of Equity, Equality, and Development*, eds. Susan Cozzens and Jameson Wetmore, 251-269. New York, NY: Springer.

35. ‡**Hays, Sean A.** 2012. "Narratives of Intelligence: The Sociotechnical Context of Cognitive Enhancement in American Political Culture." *Yearbook of Nanotechnology in Society, Volume III: Nanotechnology, the Brain, and the Future*, eds. Sean A. Hays, Jason S. Robert, Clark A. Miller and Ira Bennett, 219-234. New York, NY: Springer.

36. ‡**Hays, Sean A.**, **Clark A. Miller** and **Michael D. Cobb**. 2012. "Public Attitudes Towards Nanotechnology-Enabled Cognitive Enhancement in the United States." *Yearbook of Nanotechnology in Society, Volume III: Nanotechnology, the Brain, and the Future*, eds. Sean A. Hays, Jason S. Robert, Clark A. Miller and Ira Bennett, 43-65. New York, NY: Springer.

37. **Hogle, Linda F.** 2008. "Emerging Medical Technologies." *The Handbook of Science and Technology Studies, Third Edition*, eds. Edward J. Hackett, Olga Amsterdamska, Michael Lynch and Judy Wajcman, 841-74. Cambridge, MA: MIT Press.

38. **Johnson, Deborah G.** and **Jameson Wetmore**. 2008. "STS and Ethics: Implications for Engineering Ethics." *The Handbook of Science and Technology Studies, Third Edition*, eds. Edward J. Hackett, Olga Amsterdamska, Michael Lynch and Judy Wajcman, 567-82. Cambridge, MA: MIT Press.

39. ‡Karinen, Risto and **David H. Guston**. 2010. "Toward Anticipatory Governance: The Experience with Nanotechnology." *Governing Future Technologies: Nanotechnology and the Rise of an Assessment Regime*, eds. M. Kaiser, M. Kurath, S. Maasen and C. Rehmann-Sutter, 217-232. Dordrecht, The Netherlands: Springer.

40. ‡Kay, Luciano and **Philip Shapira**. 2011. "The Potential of Nanotechnology for Equitable Economic Development: The Case of Brazil." *Yearbook of Nanotechnology in Society, Volume II: Challenges of Equity, Equality, and Development*, eds. Susan Cozzens and Jameson Wetmore. New York, NY: Springer.

41. ‡Keiper, Adam. 2012. "The Age of Neuroelectronics." *Yearbook of Nanotechnology in Society, Volume III: Nanotechnology, the Brain, and the Future*, eds. Sean A. Hays, Jason S. Robert, Clark A. Miller and Ira Bennett, 115-146. New York, NY: Springer.

42. ‡**Loosemore, Richard P.W.** 2012. "The Complex Cognitive Systems Manifesto." *Yearbook of Nanotechnology in Society, Volume III: Nanotechnology, the Brain, and the Future*, eds. Sean A. Hays, Jason S. Robert, Clark A. Miller and Ira Bennett, 195-217. New York, NY: Springer.

43. **Marchant, Gary E.** and **Douglas J. Sylvester**. 2007. "Nanotechnology Regulation: The United States Approach." *New Global Frontiers in Regulation: The Age of Nanotechnology*, eds. Graeme A. Hodge, Diana M. Bowman and Karinne Ludlow, 189-211. Cheltenham, UK: Edward Elgar.

44. ‡Meng, Yu and **Philip Shapira**. 2011. "Female Involvement in Nanotechnology Patenting: Does It make a Difference." *Yearbook of Nanotechnology in Society, Volume II: The Challenges of Equity, Equality, and Development*, eds. Susan Cozzens and Jameson Wetmore. New York, NY: Springer.

45. ‡Milford, Richard and **Jameson Wetmore**. 2012. "A New Model for Public Engagement: The Dialogue on Nanotechnology and Religion." *Yearbook of Nanotechnology in Society, Volume III: Nanotechnology, the Brain, and the Future*, eds. Sean A. Hays, Jason S. Robert, Clark A. Miller and Ira Bennett, 97-111. New York, NY: Springer.

46. ‡**Miller, Clark A.** 2009. "Science, Technology, and Society." *The Big Ideas of Nanoscale Science and Engineering: A Guidebook for Secondary Teachers*, eds. Shawn Y. Stevens, LeeAnn Sutherland and Joseph S. Krajcik, 160-170. National Science Teachers Association Press.

47. ‡**Miller, Clark A.** 2009. "NSE and Society." *The Big Ideas of Nanoscale Science and Engineering: A Guidebook for Secondary Teachers*, eds. Shawn Y. Stevens, LeeAnn Sutherland and Joseph S. Krajcik, 65-72. Arlington, VA: National Science Teachers Association Press.

48. ‡**Miller, Clark A.** and **Sarah K. Pfatteicher**. 2007. "Nanotechnology in Society Education: Cultivating the Mental Habits of Social Engineers and Critical Citizens." *Nanoscale Science and Engineering Education*, eds. Aldrin E. Sweeney and Sudipta Seal, 567-76. Stevenson Ranch, CA: American Scientific Publishers.

49. ‡Milleson, Valerye. 2012. "Nanotechnology, the Brain, and the Futures: Ethical Considerations." *Yearbook of Nanotechnology in Society, Volume III: Nanotechnology, the Brain, and the Future*, eds. Sean A. Hays, Jason S. Robert, Clark A. Miller and Ira Bennett, 79-96. New York, NY: Springer.

50. ‡Naufel, Stephanie. 2012. "Nanotechnology, the Brain, and Personal Identity." *Yearbook of Nanotechnology in Society, Volume III: Nanotechnology, the Brain, and the Future*, eds. Sean A. Hays, Jason S. Robert, Clark A. Miller and Ira Bennett, 167-178. New York, NY: Springer.

51. ‡Nulle, Christina, **Clark A. Miller**, **Alan L. Porter** and Harmeet Singh Gandhi. 2012. "Applications of Nanotechnology to the Brain and Central Nervous System." *Yearbook of Nanotechnology in Society, Volume III: Nanotechnology, the Brain, and the Future*, eds. Sean A. Hays, Jason S. Robert, Clark A. Miller and Ira Bennett. New York, NY, 21-41: Springer.

52. **Nydal, Rune**, **Stacey Efstathiou** and **Astrid Laegreid**. 2012. "Crossover Research: Exploring a Collaborative Mode of Integration." *Little by Little. Expansions of Nanoscience and Emerging Technologies*, ed. H. van Lente, et al, 181-194, part 14. Amsterdam: IOS press.

53. **Owen, Richard**, **Phil Macnaghten**, **Jack Stilgoe**, **Michael Gorman**, **Erik Fisher** and **David H. Guston**. 2013. "A Framework for Responsible Innovation." *Responsible Innovation: Concepts and Practice*, eds. R. Owen, J. Bessant and M. Heintz, 27-50. London: Wiley.

54. ‡Phelps, Robin and **Erik Fisher**. 2011. "Legislating the Laboratory? Promotion and Precaution in a Nanomaterials Company." *Biomedical Nanotechnology, Methods in Molecular Biology Series*, ed. Sarah J. J. Hurst, Volume 726, Part 2, 339-358. Zurich, Switzerland: Humana Press.

55. **Randles, Sally**, **Jan Youtie**, **David H. Guston**, **Barbara Harthorn**, **Chris Newfield**, **Philip Shapira**, et al. 2012. "A Trans-Atlantic Conversation on Responsible Innovation and Responsible Governance." *Little by Little: Expansions of Nanoscience and Emerging Technologies*, eds. H. Van Lente, C. Coenen, T. Fleischer and K. Konrad, et a, 169-180. Heidelberg: Akademische Verlagsgesellschaft.

56. ‡**Robert, Jason S.** 2009. "Nanoscience, Nanoscientists, and Controversy." *Nanotechnology and Society: Current and Emerging Ethical Issues*, eds. F. Allhoff and P. Lin, 225-239. New York, NY: Springer.

57. ‡**Robert, Jason S.**, **Clark A. Miller** and Valerye Milleson. 2012. "Introduction: Ethics and Anticipatory Governance of Nano-Neurotechnological Convergence." *Yearbook of Nanotechnology in Society, Volume III: Nanotechnology, the Brain, and the Future*, eds. Sean A. Hays, Jason S. Robert, Clark A. Miller and Ira Bennett, 1-17. New York, NY: Springer.

58. ‡**Roco, Mihail**, **Barbara Harthorn**, **David H. Guston** and **Philip Shapira**. 2011. "Innovative and Responsible Governance of Nanotechnology for Societal Development." *WTEC Panel Report on Nanotechnology Research Directions to 2020: Retrospective and Outlook*, eds. Mihail C. Roco, Chad A. Mirkin and Mark C. Hersam, 441-488. New York, NY: Springer.

59. ‡Rodriguez, Hannot, Hu Mingyan and **Erik Fisher**. 2012. "Socio-Technical Integration in International Research Policy: The situation in the European Union, the United States and China." *Engineering and Development in American, Chinese and European Contexts*, eds. S. Christensen, C. Mitcham, B. Li and Y. An, 291-304. Dordrecht: Springer.

60. ‡**Sarewitz, Daniel**. 2011. "Anticipatory Governance of Emerging Technologies." *The Growing Gap Between Emerging Technologies and Legal-Ethical Oversight: The Pacing Problem*, eds. Gary Marchant, Braden Allenby and Joseph Herkert, 95-106. Dortrecht, Germany: Springer.

61. ‡**Sarewitz, Daniel** and **David H. Guston**. 2008. "Commentary: Public Engagement as Scientific Responsibility." *Nanotechnology: Ethics and Society*, ed. Deb Bennett-Woods, 32-35. New York, NY: CRC Press.

62. ‡**Scheufele, Dietram A.** 2011. "Perspective: Public Attitudes toward Nanotechnology." *Nanotechnology: Public Perception and Risk Communication*, ed. Susanna Hornig Priest, 71-78. NY: Taylor and Francis.

63. ‡**Scheufele, Dietram A.** 2006. "Messages and Heuristics: How Audiences Form Attitudes About Emerging Technologies." *Engaging Science: Thoughts, Deeds, Analysis and Action*, ed. J. Turney, 20-25. London, UK: The Wellcome Trust.

64. ‡**Scheufele, Dietram A.**, Anthony D. Dudo and C. Salmon. 2010. "Emerging Agendas at the Intersection of Political and Science Communication: The Case of Nanotechnology." *Communication Yearbook*, ed. C. Salmon, 143-166. Newbury Park, CA: Sage.

65. ‡**Selin, Cynthia**. 2011. "Travails, Travels, and Trials: Report from the SNET Roundtable on Plausibility." *Quantum Engagements: Social Reflections of Nanoscience and Emerging Technologies*, eds. Torben B. Zulsdorf, Christopher Coenen and Ulrich Fiedeler, et al, 235-240. Heidelberg, Germany: AKA GmbH.

66. ‡**Selin, Cynthia**. 2007. "Professional Dreamers: The Past in the Future of Scenario Planning." *Scenarios for Success: Turning Insight into Action*, eds. Bill Sharpe and Kees van der Heijden, 27-52. London, UK: John Wiley and Sons.

67. ‡**Sharan, Raghubir**, **Yashowanta N. Mohapatra** and **Jameson Wetmore.** 2011. "Technical Education and Indian Society: The Role of Values." *Yearbook of Nanotechnology in Society, Volume II: The Challenges of Equity, Equality, and Development*, eds. Susan Cozzens and Jameson Wetmore, 393-406. New York, NY: Springer.

68. ‡Silverman, Arielle. 2012. "Healing the blind: Perspectives of Blind Persons on Methods to Restore Sight." *Yearbook of Nanotechnology in Society, Volume III: Nanotechnology, the Brain, and the Future*, eds. Sean A. Hays, Jason S. Robert, Clark A. Miller and Ira Bennett, 159-166. New York, NY: Springer.

69. ‡**Slade, Catherine**. 2011. "Exploring Societal Impact of Nanomedicine using Pulic Value Mapping." *Yearbook of Nanotechnology in Society, Volume II: The Challenges of Equity, Equality, and Development*, eds. Susan Cozzens and Jameson Wetmore, 69-88. New York, NY: Springer.

70. ‡**Smits, Ruud**, Rutger van Merkerk, **David H. Guston** and **Daniel Sarewitz**. 2010. "The Role of Technology Assessment in Systemic Innovation Policy." *The Theory And Practice Of Innovation Policy*, eds. Ruud E. Smits, Stefan Kuhlmann and Philip Shapira, 387-416. Cheltenham, UK: Edward Elgar Publishing Ltd.

71. ‡Valdivia, Walter. 2011. "Innovation, Growth, and Inequality: Plausible Scenarios of Wage Disparities in a World with Nanotechnologies." *Yearbook of Nanotechnology in Society, Volume II: The Challenges of Equity, Equality, and Development*, eds. Susan Cozzens and Jameson Wetmore, 145-164. New York, NY: Springer.

72. **van der Leeuw, Sander**. 2010. "The Archaeology of Innovation: Lessons for our Times." *Innovation: Perspectives for the 21st Century*, eds. Frank Moss and Todd and et al Machover, 33-56. Madrid, Spain: BBVA.

73. ‡**Wetmore, Jameson**. 2012. "Aider les Scientifiques et le Public a Reflechir aux Implications d'Ensemble des Nanotechnologies (Etats-Unis)." *La Science et le Debat Public*, ed. Institute des Hautes Etudes pour la Science et la Technologie, 279-293. Paris, France: Actes Sud.

74. ‡**Wicksen, Fern**, **Michael D. Cobb** and **Patrick Hamlett**. Forthcoming, "Review of deliberative processes: National Citizens Technology Forum - USA." *Democratisation of Science and Technology Development: Deliberative Processes in the Development of Nanotechnologies*, eds. S. Pal, G. Scholl and S. Eivind. Singapore: Pan Stanford Publishing.

75. ‡**Wolbring, Gregor**. 2011."Ableism and Favoritism for Abilities Governance, Ethics and Studies: New Tools for Nanoscale and Nanoscale Enabled Science and Technology Governance." *Yearbook for Nanotechnology in Society, Volume II: The Challenges of Equity, Equality, and Development*, eds. Susan Cozzens and Jameson Wetmore, 89-104. New York, NY: Springer.

76. **Wolbring, Gregor.** 2008. "The Unenhanced Underclass." *Building Everyday Democracy*, eds. P. Miller and J. Wilsdon, 122-28. London, UK: Demos.

77. ‡Woodson, Thomas, Vrishali Subramanian and **Susan Cozzens**. 2012. "Nanotechnology in India: Inferring Links between Emerging Technologies and Development." *Making it to the Forefront: Nanotechnology-A Developing Country Perspective*, ed. N. A. Duda. Springer.

78. ‡**Youtie, Jan**, **Alan L. Porter**, **Kevin Boyack**, **Jose Lobo**, **Richard Klavans**, **Ismael Rafols**, et al. 2012. "Using Large-scale Databases to Understand the Trajectories of Emerging Technologies." *Little by Little: Expansions of Nanoscience and Emerging Technologies*, eds. H. Van Lente, C. Coenen, T. Fleischer and K. Konrad, et a, 55-58. Heidelberg: Akademische Verlagsgesellschaft.

79. ‡**Youtie, Jan** and **Philip Shapira**. 2011. "Metropolitan Development of Nanotechnology: Concentration or Dispersion." *Yearbook of Nanotechnology in Society, Volume II: The Challenges of Equity, Equality, and Development*, eds. Susan Cozzens and Jameson Wetmore, 165-180. New York, NY: Springer.

Peer Review Journal Article

1. **Abbott, Kenneth W.**, **Elizabeth A. Corley** and **Gary E. Marchant**. 2012. "Soft Law Oversight Mechanisms for Nanotechnology." *Jurimetrics: The Journal of Law, Science and Technology*, 52(3): 279-312.

2. **Abbott, Kenneth W.**, **Gary E. Marchant** and **Douglas J. Sylvester**. 2006. "A Framework Convention for Nanotechnology." *Environmental Law Reporter*, 36: 10931-10942.

3. Alencar, Maria Simone de M., **Alan L. Porter** and Adelaide Maria de Souza Antunes. 2007. "Nanopatenting Patterns in Relation to Product Life Cycle." *Technological Forecasting & Social Change*, 74(9): 1661-1680.

4. Alencar, Maria Simone de M., Adelaide Maria de Souza Antunes and **Alan L. Porter**. 2007. "Patents on Nano and the Life Cycle & Value Chain Analysis of Related Products." *China Intellectual Property*, 865-866.

5. ‡Anderson, Ashley A., Amy B. Becker, **Michael A. Xenos**, **Dominique E. Brossard** and Dietram **A. Scheufele**. Under review, "The Role of Cognition and Anticipated Opinion Climate in Discussion of Nanotechnology." *Science Communication*.

6. ‡Anderson, Ashley A., **Dietram A. Scheufele**, **Dominique E. Brossard** and **Elizabeth A. Corley**. 2013. "The Role of Media and Deference to Scientific Authority in Cultivating Trust in Sources of Information about Nanotechnology." *International Journal of Public Opinion Research*, 24(2): 225-237.

7. ‡Anderson, Ashley A., **Dominique E. Brossard and Dietram A. Scheufele**. 2013. "Nanoparticle-related Deaths: Science News and the Issue Intention Cycle in Print and Online Media." *Politics and the Life Sciences*, 31(1-2): 87-96.

8. ‡Anderson, Ashley A., **Dominique E. Brossard** and **Dietram A. Scheufele**. 2010. "The Changing Information Environment for Nanotechnology: Online Audiences and Content." *Journal of Nanoparticle Research*, 12(4): 1083-1094.

9. ‡Anderson, Ashley A., **Dominique E. Brossard**, **Dietram A. Scheufele**, **Michael A. Xenos** and Peter Ladwig. Forthcoming, "'The Nasty Effect' Online Incivility's Effect on Risk Perceptions of Emerging Technologies." *Journal of Computer-Mediated Communication. DOI: 10.1111/jcc4.12009*.

10. ‡Anderson, Ashley A., **Dominique E. Brossard**, **Dietram A. Scheufele**, **Michael A. Xenos** and Sara K. Yeo. Under review, "Toxic Talk? How Online Incivility can Undermine Perceptions of Media." *Mass Communication and Society*.

11. ‡Anderson, Ashley A., **Jason Delborne** and Daniel L. Kleinman. 2012. "Information Beyond the Forum: Motivations, Strategies, and Impacts of Citizen Participants Seeking Information during a Consensus Conference." *Public Understanding of Science. DOI: 10.1177/0963662512447173*.

12. ‡Anderson, Ashley A., Jiyoun Kim, **Dietram A. Scheufele**, **Dominique E. Brossard** and **Michael A. Xenos**. 2013. "What's in a Name?: How We Define Nanotech Shapes Public Reactions." *Journal of Nanoparticle Research*, 15(2): 1-5.

13. Arora, Sanjay, **Alan L. Porter**, **Jan Youtie** and **Philip Shapira**. 2012. "Capturing Developments in an Emerging Technology: an Updated Search Strategy for Identifying Nanotechnology Research Outputs." *Scientometrics*.

14. ‡Arora, Sanjay, **Jan Youtie**, **Philip Shapira**, L. Gao and Tingting Ma. 2013. "Entry Strategies in an Emerging Technology: A Cross-Country Study of Early Commercialization by Graphene Firms." *Scientometrics*.

15. ‡Arora, Sanjay, **Jan Youtie**, **Philip Shapira**, Lidan Gao and Tingting Ma. 2013. "Entry Strategies in an Emerging Technology: a Pilot Web-based Study of Graphene Firms." *Scientometrics*.

16. ‡**Barben, Daniel**. 2010. "Analyzing Acceptance Politics: Towards an Epistemological Shift in the Public Understanding of Science and Technology." *Public Understanding of Science*, 19(3): 274-292.

17. **Barben, Daniel**. 2007. "Changing Regimes of Science and Politics: Comparative and Transnational Perspectives for a World in Transition." *Science and Public Policy*, 33(11): 55-69.

18. ‡Bennett, Ira and **Daniel Sarewitz**. 2006. "Too Little, Too Late? Research Policies on the Societal Implications of Nanotechnology in the United States." *Science as Culture*, 15(4): 309-325.

19. ‡Berube, D. M., C. C. Cummings, Michael A. Cacciatore, **Dietram A. Scheufele** and J. Kalin. 2011. "Characteristics and Classification of Nanoparticles: Expert Delphi Survey." *Nanotoxicology*, 5(2): 236-243.

20. ‡Binder, Andrew R., Michael A. Cacciatore, **Dietram A. Scheufele**, Bret R. Shaw and **Elizabeth A. Corley**. 2013. "Measuring Risk/Benefit Perceptions of Emerging Technologies and their Potential Impact on Communication of Public Opinion toward Science." *Public Understanding of Science*, 21(7): 830-847.

21. **Bozeman, Barry** and **Daniel Sarewitz**. 2011. "Public Value Mapping and Science Policy Evaluation." *Minerva*, 49(1): 1-23.

22. ‡**Brossard, Dominique E.**, **Dietram A. Scheufele**, Eunkyung Kim and **Bruce V. Lewenstein**. 2008. "Religiosity as a Perceptual Filter: Examining Processes of Opinion Formation about Nanotechnology." *Public Understanding of Science*, 18(5): 546-558.

23. **Brown, Mark**. and **David H. Guston**. 2009. "Science, Democracy, and the Right to Research." *Science and Engineering Ethics*, 15(3): 351-366.

24. ‡Cacciatore, Michael A., Ashley A. Anderson, Doo-Hun Choi, **Dominique E. Brossard**, **Dietram A. Scheufele**, Xuan Liang, et al. 2012. "Coverage of Emerging Technologies: A Comparison between Print and Online Media." *New Media and Society*, 14(6): 1039-1059.

25. ‡Cacciatore, Michael A., **Dietram A. Scheufele** and **Elizabeth A. Corley**. 2011. "From Enabling Technology to Applications: The Evolution of Risk Perceptions about Nanotechnology." *Public Understanding of Science*, 20(3): 385-404.

26. ‡Cacciatore, Michael A., **Dietram A. Scheufele** and **Elizabeth A. Corley**. 2013. "Another (Methodological) Look at Knowledge Gaps and the Internets Potential for closing them." *Public Understanding of Science. DOI: 10.1177/0963662512447606*.

27. ‡Cacciatore, Michael A., Sarah K. Yeo, Dietram A. Scheufele, Michael A. Xenos, Doo-Hun Choi, Amy B. Becker, et al. Under review, "Misperceptions in Polarized Politics: The Role of Knowledge, Religiosity, and Media." *PS: Political Science and Politics*.

28. ‡**Calvert, Jane** and **Joan H. Fujimura**. 2009. "Calculating Life? A Sociological Perspective on Systems Biology." *European Molecular Biology Organization EMBO Reports*, 10(Special Issue, August 2009): S46-S49.

29. ‡Carley, Stephen and **Alan L. Porter**. 2012. "A Forward Diversity Index." *Scientometrics*, 90(2): 407-427.

30. ‡Carley, Stephen and **Alan L. Porter**. 2011. "Measuring the Influence of Nanotechnology Environmental Health & Safety Research." *Research Evaluation*, 20(5): 389-395.

31. ‡**Cobb, Michael.** 2011. "Creating Informed Public Opinion: Citizen Deliberation about Nanotechnologies for Human Enhancements." *Journal of Nanoparticle Research*, 13(4): 1533-1548.

32. ‡**Cobb, Michael D.** and Gretchen Gano. 2012. "Evaluating Structured Deliberations about Emerging Technologies: What About Participant Evaluation." *International Journal of Emerging Technologies and Society*, 10: 96-110.

33. ‡**Cobb, Michael D.** and Gretchen Gano. In preparation, "Empowerment and Social Learning: Long Term Benefits of Citizen Deliberation about Nanotechnologies for Human Enhancement." *Public Understanding of Science*.

34. ‡**Corley, Elizabeth A.**, **Dietram A. Scheufele** and Qian Hu. 2009. "Of Risks and Regulations: How Leading U.S. Nano-Scientists Form Policy Stances about Nanotechnology." *Journal of Nanoparticle Research*, 11(7): 1573-1585.

35. ‡**Corley, Elizabeth A.**, Youngjae Kim and **Dietram A. Scheufele**. 2012. "Public Challenges of Nanotechnology Regulation." *Jurimetrics: The Journal of Law, Science and Technology*, 52(3): 371-381.

36. ‡**Corley, Elizabeth A.**, Youngjae Kim and **Dietram A. Scheufele**. 2011. "Leading U.S. Nano-Scientists' Perceptions about Nano Media Coverage and the Public Communication of Scientific Research Findings." *Journal of Nanoparticle Research*, 13(12): 7041-7055.

37. ‡**Corley, Elizabeth A.**, Younjae Kim and **Dietram A. Scheufele**. Under review, "The Current Status and Future Direction of Nanotechnology Regulations: A View from Nano-Scientists." *Review of Policy Research*.

38. ‡Cortes Lobos, Rodrigo. 2012. "Georia Manufacturing Industry: Key Factors of Exchange of Knowledge with External Sources." *International Journal of Learning and Intellectual Capital*, 9(4): 380-391.

39. ‡**Cozzens, Susan**, Rodrigo Cortes Lobos, Diran Soumonni and Thomas Woodson. Forthcoming, "Nanotechnology and the Millennium Development Goals: Water, Energy, and Agri-food." *Nature Nanotechnology*.

40. **Dandara, Collet**, **Clement Adebamowo**, Jantina de Vries, Edward S. Dove, **Erik Fisher**, **Richard A. Gibbs**, et al. 2012. "An Idea whose Time Has Come? An African Foresight Observatory on Genomics Medicine and Data-Intensive Global Science." *Current Pharmacogenomics and Personalized Medicine*, 10(1): 7-15.

41. ‡Davies, Sarah R**.** 2010. "How We Talk when We Talk about Nano: The Future in Laypeoples Talk." *Futures*, 43(3): 317-326.

42. ‡Davies, Sarah R. and **Cynthia Selin**. 2012. "Energy Futures: Five Dilemmas of the Practice of Anticipatory Governance." *Environmental Communication*, 6(1): 119-136.

43. ‡Davies, Sarah R., **Cynthia Selin**, Gretchen Gano and **Angela Pereira**. 2012. "Citizen Engagement and Urban Change: Three Case Studies of Material Deliberation." *Cities. doi: 10.1016/j.cities.2011.11.012*.

44. ‡Davies, Sarah R. and **Phil Magnaghten**. 2010. "Narratives of Mastery and Resistance: Lay Ethics of Nanotechnology." *NanoEthics 4*, 2(8): 141-151

45. **Davis, Robert W.** 2012. "A Computer-aided Affective Content Analysis of Nanotechnology Newspaper Articles." *NanoEthics*, 5: 319-334.

46. ‡**Delborne, Jason A.**, Ashley A. Anderson, **Daniel L. Kleinman**, **Mathilde Colin** and **Maria Powell**. 2011. "Virtual Deliberation? Prospects and Challenges for Integrating the Internet in Concensus Conferences." *Public Understanding of Science*, 20(3): 367-384.

47. ‡Dudo, Anthony D., Doo-Hun Choi and **Dietram A. Scheufele.** 2011. "Food Nanotechnology in the News. Coverage Patterns and Thematic Emphases during the Last Decade." *Appetite*, 56(1): 78-89.

48. ‡Dudo, Anthony D., **Sharon Dunwoody** and **Dietram A. Scheufele.** 2011. "The Emergence of Nano News: Tracking Thematic Trends and Changes in U.S. Newspaper Coverage of Nanotechnology." *Journalism & Mass Communication Quarterly*, 88(1): 55-75.

49. **Feldman, Martha S.**, **Anne M. Khademian**, **Helen Ingram** and **Anne S. Schneider**. 2006. "Ways of Knowing and Inclusive Management Practices." *Public Administration Review*, 66(Supplement s 1): 89-99.

50. ‡**Fernandez-Ribas, Andrea**. 2010. "International Patent Strategies of Small and Large Firms: An Empirical Study of Nanotechnology." *Review of Policy Research*, 27(4): 457-473.

51. ‡**Fernandez-Ribas, Andrea** and **Philip Shapira**. 2009. "Technological Diversity, Scientific Excellence and the Location of Inventive Activities Abroad: The Case of Nanotechnology." *Journal of Technology Transfer*, 34(3): 286-303.

52. ‡**Fisher, Erik**. 2007. "Ethnographic Invention: Probing the Capacity of Laboratory Decisions." *NanoEthics*, 1(2): 155-165.

53. ‡**Fisher, Erik**, **Catherine Slade**, Derrick Anderson and **Barry Bozeman**. 2011. "The Public Value of Nanotechnology." *Scientometrics*, 85(1): 29-39.

54. ‡**Fisher, Erik**, **Marianne Boenink**, **Simone van der Burg** and **Neal Woodbury**. 2012. "Responsible Healthcare Innovation: Anticipatory Governance of Nanodiagnostics for Theranostics Medicine." *Expert Review of Molecular Diagnostics*, 12(8): 857-870.

55. ‡**Fisher, Erik** and **Michael Lightner**. 2009. "Entering the Social Experiment: A Case for the Informed Consent of Graduate Engineering Students." *Social Epistemology*, 23(3-4): 283-300.

56. ‡Fisher, Erik and **Roop L. Mahajan**. 2006. "Nanotechnology Legislation: Contradictory Intent? U.S. Federal Legislation on Integrating Societal Concerns into Nanotechnology Research and Development." *Science and Public Policy*, 33(1): 5-16.

57. ‡Fisher, Erik, **Roop L. Mahajan** and **Carl Mitcham**. 2006. "Midstream Modulation of Technology: Governance from Within." *Bulletin of Science, Technology and Society*, 26(6): 486-496.

58. **Flipse, Steven**, **Maarten C.A. van der Sanden** and **Patricia Osseweijer**. 2012. "Midstream Modulation in Biotechnology Industry: Redefining What is Part of the Job of Researchers in Industry." *Science Engineering Ethics*, DOI: 10.1007/s11948-012-9411-6

59. ‡Foley, Rider W. and **Arnim Wiek**. Under review, "Nanotechnology Innovation: Govenanceby Urban Actors." *Review of Policy Research*.

60. ‡Foley, Rider W., **Ira Bennett** and **Jameson Wetmore**. 2012. "Practitioners Views on Responsibility: Applying Nanoethics." *Nanoethics*, 6(3): 231-241.

61. ‡**Fujimura, Joan H.** and Ramya Rajagopalan. 2011. "Different Differences: The Use of 'Genetic Ancestry' Versus Race in Biomedical Human Genetic Research." *Social Studies of Science*, 41(1): 5-30.

62. ‡Gallo, Jason. 2009. **"**The Discursive and Operational Foundations of the National Nanotechnology Initiative in the History of the National Science Foundation." *Perspectives on Science*, 17(2): 174-211.

63. Gao, L., **Alan L. Porter**, Jue Wang, S. Fang, X. Zhang, Tingting Ma, et al. 2013. "Technology Life Cycle Analysis Modeling Based on Patent Documents." *Technological Forecasting and Social Change*, 80(3): 398-407.

64. **Gaughan, Monica** and **Elizabeth A. Corley**. 2010. "Science Faculty at U.S. Research Universities: The Impacts of University Research Center Affiliation and Gender on Industrial Activities." *Technovation*, 30(3): 215-222.

65. ‡**Graham, Stuart** and **Maurizio Iacopetta**. 2009. "Nanotechnology and the Emergence of a General Purpose Technology." *Les Annales d'Economie et de Statistique*.

66. Guo, Ying, Chen Xu, Lu Huang and **Alan L. Porter**. 2012. "Empirically Informing a Technology Delivery System Model for an Emerging Technology: Illustrated for Dye-Sensitized Solar Cells." *R & D Management*, 42(2): 133-149.

67. ‡Guo, Ying, Lu Huang and **Alan L. Porter**. 2010. "Research Profiling: Nano-enhanced, Thin-film Solar Cells." *R &D Management*, 40(2): 195-208.

68. ‡**Guston, David H.** 2012. "The Pumpkin or the Tiger? Michael Polanyi, Frederick Soddy, and Anticipating Emerging Technologies." *Special 50th Anniversary Issue, Minerva*, 50(3): 363-379.

69. ‡**Guston, David H.** 2010. "The Anticipatory Governance of Emerging Technologies." *Journal of the Korean Vacuum Society*, 19(6): 432-441.

70. ‡**Guston, David H.** In Press. Building the Capacity for Public Engagement with Science in the United States." *Public Understanding of Science. DOI: 10.1177/0963662J13476403.*

71. ‡**Harsh, Matthew** and Thomas Woodson. 2012. "Pro-Poor Nanotechnology Applications for Water: Characterizing and Contextualizing Private Sector Research and Development." *Nanotechnology, Law & Business*, 9(3): 232-252.

72. Heinze, Thomas, **Philip Shapira**, **Juan D. Rogers** and **Jacqueline M. Senker**. 2009. "Organizational and Institutional Influences on Creativity in Scientific Research." *Research Policy*, 38(4): 610-623.

73. ‡**Ho, Shirley S.**, **Dietram A. Scheufele** and **Elizabeth A. Corley**. Forthcoming, "Factors Influencing Public Risk-Benefit Perceptions of Nanotechnology: Assessing the Effects of Mass Media, Interpersonal Communication, and Elaborative Processing." *Public Understanding of Science. DOI: 10.1177/0963662511417936*.

74. ‡**Ho, Shirley S.,** Dietram **A. Scheufele** and **Elizabeth A. Corley**. 2011. "Value Predispositions, Mass Media, and Attitudes toward Nanotechnology: The Interplay of Public and Experts." *Science Communication*, 33(2): 167-200.

75. ‡**Ho, Shirley S.**, **Dietram A. Scheufele** and **Elizabeth A. Corley**. 2010. "Making Sense of Policy Choices: Understanding the Roles of Value Predispositions, Mass Media, and Cognitive Processing in Public Attitudes Toward Nanotechnology." *Journal of Nanoparticle Research*, 12(8): 2703-2715.

76. ‡**Hogle, Linda F.** 2006. "Enhancement Technologies and the Body." *Annual Reviews of Anthropology and Neuroscience*, 34: 695-716.

77. **Horst, Maja**. 2011. "Taking Our Own Medicine: On an Experiment in Science Communication." *Science and Engineering Ethics*, 17(4): 801-815.

78. Hu, Guangyuan, Stephen Carley and Li Tang. 2011. "Visualizing Nanotechnology Research in Canada: Evidence from Publication Activities, 1990-2009." *Journal of Technology Transfer*, 1-13. Published online first at doi: 10.1007/s10961-011-9238-3.

79. ‡Huang, Lu, Zhengchun Peng, Ying Guo and Alan L. Porter. 2010. "Identifying the Emerging Roles of Nanoparticles in Biosensors." *Journal of Business Chemistry*, 7(1): 15-30.

80. ‡Huang, Lu, Zhengchun Peng, Ying Guo and **Alan L. Porter**. 2011. "Characterizing a Technology Development at the Stage of Early Emerging Applications: Nanomaterial-enhanced Biosensors." *Technology Analysis and Strategic Management*, 23(5): 527-544.

81. **Jenkins, Lekelia D.**, **Sara M. Maxwell** and **Erik Fisher**. 2012. "Increasing Conservation Impact and Policy Relevance of Research through Embedded Experiences." *Conservation Biology*, 26(4): 740-742.

82. Kay, Luciano, **Nils Newman**, **Jan Youtie**, **Alan L. Porter** and **Ismael Rafols**. 2012. "Patent Overlay Mapping: Visualizing Technological Distance." *Journal of the American Society for Information Science and Technology*.

83. ‡Kay, Luciano and **Philip Shapira**. 2009. "Developing Nanotechnology in Latin America." *Journal of Nanoparticle Research,* 11(2): 259-278.

84. ‡Kim, Eun-Sung. 2008. "Directed Evolution: A Historical Exploration into an Evolutionary Experimental System of Nanobiotechnology, 1965-2006." *Minerva*, 46(4): 463-484.

85. ‡Kim, Jiyoun, Sara K. Yeo, **Dominique E. Brossard**, **Dietram A. Scheufele** and **Michael A. Xenos**. Under review, "Disentangling the Influence of Value Predispositions and Risk/Benefit Perceptions on Support for Nanotechnology among the American Public." *Risk Analysis*.

86. ‡Kim, Youngjae, **Elizabeth A. Corley** and **Dietram A. Scheufele**. 2012. "Classifying U.S. Nano Scientists Of Cautious Innovators, Regulators, and Technology Optimists." *Science and Public Policy*, 39(1): 30-38.

87. **Klaine, Stephen J**., **Albert A. Koelsmans**, Nina Horne, Stephen Carley, **Richard D. Handy**, Larry Kapustka, et al. 2012. "Paradigms to Assess the Environmental Impact of Manufactured Nanomaterials." *Environmental Toxicology and Chemistry*, 31(1): 3-14.

88. ‡**Kleinman, Daniel L.**, **Jason A. Delborn**e and Ashley A. Anderson. 2009. "Engaging Citizens: The High Cost of Citizen Participation in High Technology." *Public Understanding of Science*, 1: 1-20.

89. **Klochikhin, Evgeny A.** and **Philip Shapira**. 2012. "Engineering Small Worlds in a Big Society: Assessing the Early Impacts of Nanotechnology in China." *Review of Policy Research*, 29(6): 752-775.

90. Ladwig, Peter, **Kajsa E. Dalrymple**, **Dominique E. Brossard**, **Dietram A. Scheufele** and **Elizabeth A. Corley**. 2012. "Perceived Familiarity or Factual Knowledge? Comparing Operationalizations of Scientific Understanding." *Science and Public Policy*, 39(6): 761-774.

91. Laurent, Brice. 2011. "Technologies of Democracy: Experiments and Demonstrations." *Science and Engineering Ethics*, 17(4): 649-666.

92. ‡Laurent, Brice. 2007. "Diverging Convergences." *Innovation: The European Journal of Social Science Research*, 20(4): 343-357.

93. Lee, Chul-joo and **Dietram A. Scheufele**. 2006. "The Influence of Knowledge and Deference toward Scientific Authority: A Media Effects Model for Public Attitudes toward Nanotechnology." *Journalism & Mass Communication Quarterly*, 83(4): 819-834.

94. **Leech, Beth**. 2011. "Nano-solutions or Macro-problems? A Public Values Analysis of the Application of Nanotechnology to Water Purification." *American Society of Mechanical Engineering (ASME) 2011 Congress Proceedings.*

95. ‡**Leung, Ricky C.** 2013. "Networks as sponges: International collaboration for developing nanomedicine in China." *Research Policy*, 42(1): 211-219.

96. ‡Leung, Ricky. 2007. "Network Position, Research Funding and Interdisciplinary Collaboration among Nanotechnology Scientists: An Application of Social Network Analysis." *Solid State Phenomena*, 121-123: 1347-1350.

97. Leydesdorff, Loet, Stephen Carley and Ismael Rafols. 2013. "Global Maps of Science based on the new Web-of-Science Categories." *Scientometrics*, 94(2): 589-593.

98. ‡Li, Nan, **Ashley A. Anderson**, **Dominique E. Brossard** and **Dietram A. Scheufele**. Forthcoming, "Channeling Science Information Seekers' attention? A Content Analysis of Top-Ranked vs. Lower-‡Ranked Sites in Google." *Journal of Computer-Mediated Communication*.

99. ‡Liang, Xuan, Shirley S. Ho, **Dominique E. Brossard**, **Dietram A. Scheufele** and **Michael A. Xenos**, X. Hao, et al. Under review, "Value Predispotisions as Perceptual Filters: A Cross-Cultural Comparison of Public Attitudes toward Nanotechnology in the United States and Singapore." *Public Understanding of Science*.

100. ‡Lopez, Antonio Calleja. 2009. "Ciencia, tecnologia e integracion social: el proyecto STIR (Socio-Technical Integration Research)." *Argumentos de Razon Tecnica*, 12: 157-165.

101. **Marchant, Gary E.** and **Douglas J. Sylvester**. 2006. "Transnational Models for Regulation of Nanotechnology." *Journal of Law, Medicine, and Ethics*, 34(4): 714-725.

102. ‡**McGregor, Joan** and **Jameson Wetmore**. 2009. "Researching and Teaching the Ethics of Social Implications of Emerging Technologies in the Laboratory." *Nanoethics*, 3(1): 17-30.

103. Meng, Yu, **Philip Shapira** and Li Tang. Forthcoming, 2013. "The Emergence of Science-Driven Entrepreneurship in China: A Case Study of Technological Innovation in Nano-Pigment Inks." *International Journal of Entrepreneurship and Innovation Management*.

104. ‡**Miller, Clark A.** and Ira Bennett. 2008. "Thinking Longer Term about Technology: Is there Value in Science Fiction-inspired Approaches to Constructing Future." *Science and Public Policy*, 35(8): 597-606.

105. **Mohr, Alison.** 2011. "Publics in the Making: Mediating Different Methods of Engagement and the Publics These Construct Commentary on: Technologies of Democracy: Experiments and Demonstrations." *Science and Engineering Ethics*, 17(4): 667-672.

106. Molin, Mans J. and **Cynthia Selin**. "Institutionalizing Innovation: Instances of Changes in the Danish System of Innovation." *Research Policy*, Accepted pending revision.

107. ‡**Monahan, Torin** and Tyler Wall. 2007. "Somatic Surveillance: Corporeal Control through Information Networks." *Surveillance and Society*, 4(3/4).

108. Musee, Ndeke, **Jameson Wetmore**, John N. Zyimba and Peter J. Ashton. Forthcoming, "Nanotechnology Regulation Challenges in the Context of Developing Countries." *Nature Nanotechnology*.

109. Neff, Mark and **Elizabeth A. Corley**. 2009. "35 Years and 160,000 Articles: A Bibliometric Exploration of the Evolution of Ecology." *Scientometrics*, 80(3): 657-682.

110. **Ozdemir, Vural**, **Erik Fisher**, **Edward S. Dove**, Hilary Burton, Galen E.B. Wright, **Mario Massellis**, et al. 2012. "End of the Beginning and Public Health Pharmacogenomics: Knowledge in Mode 2 and P5 Medicine." *Current Pharmacogenomics and Personalized Medicine*, 10(1): 1-6.

111. ‡Pandza, Krsto and Paul Ellwood. In preparation, 2013. "Strategic and Ethical Foundations for Responsible Innovation." *Research Policy. DOI: http://dx/doi.org/10.1016/j.respol.2013.02.007*.

112. Patel, Anil and **Cynthia Selin**. Under review, "Scenario Planning at the U.S. Army Corp of Engineers: a Public Sector Case Study." *Long Range Planning*.

113. ‡Pei, R. and **Alan L. Porter.** 2011. "Profiling Leading Scientists in Nano-Biomedical Science: Interdisciplinarity and Potential Leading Indicators of Research Directions." *R&D Management*, 41(3): 288-306.

114. ‡Philbrick, Mark and Javiera Barandiaran. 2009. "The National Citizens Technology Forum: Lessons for the Future." *Science and Public Policy*, 36(5): 335-347.

115. **Porter, Alan L.** and **Ismael Rafols**. 2009. "Is Science Becoming more Interdisciplinary? Measuring and Mapping Six Research Fields over Time." *Scientometrics*, 81(3): 719-745.

116. ‡**Porter, Alan L.** and **Jan Youtie**. 2009. "Where does Nanotechnology belong in the Map of Science?" *Nature Nanotechnology*, 4: 534-536.

117. ‡**Porter, Alan L.** and **Jan Youtie**. 2009. "How Interdisciplinary is Nanotechnology." *Journal of Nanoparticle Research*, 11: 1023-1041.

118. ‡**Porter, Alan L.**, **Jan Youtie**, **Philip Shapira** and David J. Schoeneck. 2008. "Refining Search Terms for Nanotechnology." *Journal of Nanoparticle Research*, 10: 715-728.

119. ‡**Porter, Alan L.**, **Ying Guo** and Denise Chiavetta. 2011. "Tech Mining: Text Mining and Visualization Tools, as Applied to Nano-enhanced Solar Cells." *Wiley Interdisciplinary Reviews: Data Mining and Knowledge*, 1(2): 172-181.

120. ‡**Powell, Maria**, **Jason A. Delborne** and Mathilde Colin. 2011. "Beyond Engagement Exercises: Exploring the US National Citizens Technology Forum from the Bottom-Up." *Journal of Public Deliberation*, 7(1): article 4.

121. ‡**Powell, Maria**, Mathilde Colin, **Daniel L. Kleinman**, **Jason A. Delborne** and Ashley A. Anderson. 2011. "Imagining Ordinary Citizens? Conceptualized and Actual Participants for Deliberations on Emerging Technologies." *Science as a Culture*, 30(1): 37-70.

122. **Rafols, Ismael**, **Alan L. Porter** and **Loet Leydesdorff**. 2010. "Science Overlay Maps: A New Tool for Research Policy and Library Management." *Journal of the American Society for Information Science and Technology*, 61(9): 1871-1887.

123. ‡Ramirez, R. and **Cynthia Selin**. Forthcoming, "Plausibility and Probability in Scenario Planning." *Foresight*.

124. **Robinson, Douglas K. R.**, Lu Huang, Ying Guo and **Alan L. Porter**. 2013. "Forecasting Innovation Pathways for New Emerging Science and Technologies." *Technological Forecasting and Social Change*, 80(2): 267-285.

125. ‡Rodriguez, Hannot. 2013, In Press. "Integrating Science and Society in European Framework Programmes: Trends in Project-Level Solicitation." *Research Policy. DOI: http://dx.doi.org/10.1016/j.respol.2013.02.006*.

126. ‡**Rogers, Juan D.** 2010. "Citation Analysis of Nanotechnology at the Field Level: Implications of R and D Evaluation." *Research Evaluation*, 19(4): 281-290.

127. **Rogers, Juan D.**, **Jan Youtie** and **Luciano Kay**. 2012. "Program-level Assessment of Research Centers: Contribution of Nanoscale Science and Engineering Centers to US Nanotechnology National Initiative Goals." *Research Evaluation*, 21(5): 368-380.

128. Runge, Kristin K., Sarah K. Yeo, Michael A. Cacciatore, **Dietram A. Scheufele**, **Dominique E. Brossard**, Michael A. Xenos, et al. 2013. "Tweeting Nano: How Public Discourses about Nanotechnology Develop in Social Media Environments." *Journal of Nanoparticle Research*, 15(1): 1381-1388.

129. **Sabharwal, Meghna** and **Elizabeth A. Corley**. 2009. "Faculty Job Satisfaction across Gender and Discipline." *Social Science Journal*, 46: 539-556.

130. ‡**Scheufele, Dietram A.**, **Elizabeth A. Corley**, **Sharon Dunwoody**, Tsung-Jen Shih, Elliott D. Hillback and **David H. Guston**. 2007. "Nanotechnology Scientists Worry about Some Risks More than the General Public." *Nature Nanotechnology*, 2(12): 732-734.

131. ‡**Scheufele, Dietram A.**, **Elizabeth A. Corley**, Tsung-Jen Shih, Kajsa E. Dalrymple and Shirley S. Ho. 2008. "Religious Beliefs and Public Attitudes toward Nanotechnology in Europe and the United States." *Nature Nanotechnology*, 4(2): 91-94.

132. Schuurbiers, Daan, **Patricia Osseweijer** and **Julian Kinderlerer**. 2009. "Implementing The Netherlands Code of Conduct for Scientific Practice A Case Study." *Science and Engineering Ethics*, 15(2): 213-231.

133. Schuurbiers, Daan. 2011. "What Happens in the Lab: Applying Midstream Modulation to Enhance Critical Reflection in the Laboratory." *Science and Engineering Ethics*, 17(4): 769-788.

134. ‡Schuurbiers, Daan and **Erik Fisher**. 2009. "Lab-scale intervention." *EMBO Reports. Science & Society Series on Convergence Research*, 10(5): 424-427.

135. ‡**Seager, Thomas**, **Evan Selinger** and **Arnim Wiek**. 2012. "Sustainable Engineering Science for Resolving Wicked Problems." *Journal of Agricultural and Environmental Ethics*, 25(4): 467-484.

136. ‡**Selin, Cynthia**. 2007. "Expectations and the Emergence of Nanotechnology." *Science, Technology and Human Values*, 32(2): 196-220.

137. ‡**Selin, Cynthia**. 2006. "Time Matters: Temporal Harmony and Dissonance in Nanotechnology Networks." *Time and Society*, 15(1): 121-139.

138. ‡**Selin, Cynthia**. 2011. "Negotiating Plausibility: Intervening in the Future of Nanotechnology." *Science and Engineering Ethics*, 17(4): 723-737.

139. ‡**Selin, Cynthia**. 2008. "The Sociology of the Future: Tracing Stories of Technology and Time." *Sociology Compass*, 2(60): 1875-1895.

140. ‡Selin, Cynthia. 2006. "Trust and the Illusive Force of Scenarios." *Futures*, 38(1): 1-14.

141. ‡**Selin, Cynthia**. Under review, "Diagnosing Futures: Producing Scenarios to Support Reflexive Governance of Technology." *Social Studies of Science, special issue*.

142. ‡**Selin, Cynthia** and **Prasad Boradkar**. 2010. "Prototyping Nanotechnology: A Pedagogic Approach to Responsible Innovation." *Journal of Nanotechnology Education*, 2(1-2): 1-12.

143. ‡**Selin, Cynthia** and Rebecca Hudson. 2010. "Envisioning Nanotechnology: New Media and Future-oriented Stakeholder Dialogue." *Technology in Society*, 32(3): 173-182.

144. ‡**Shapira, Philip** and **Jan Youtie**. 2008. "Emergence of Nanodistricts in the United States: Path Dependence or New Opportunities." *Economic Development Quarterly*, 22(3): 187-199.

145. ‡**Shapira, Philip**, **Jan Youtie** and Stephen Carley. Forthcoming, "Prototypes of Emerging Metropolitan Nanodistricts in the United States and Europe." *Les Annales d'Economie et de Statistique*.

146. ‡**Shapira, Philip** and **Jan Youtie**. 2011. "Introduction to the Symposium Issue: Nanotechnology Innovation and Policy Current Strategies and Future Trajectories." *Journal of Technology Transfer*, 36(6): 581-586.

147. ‡**Shapira, Philip**, **Jan Youtie** and **Alan L. Porter**. 2010. "The Emergence of Social Science Research in Nanotechnology." *Scientometrics*, 85(2): 595-611.

148. ‡**Shapira, Philip**, **Jan Youtie** and Luciano Kay. 2011. "National Innovation Systems and the Globalization of Nanotechnology Innovation." *Journal of Technology Transfer*, 36(6): 604.

149. ‡**Shapira, Philip**, **Jan Youtie** and Sanjay Arora. 2012. "Early Patterns of Commercial Activity in Graphene." *Journal of Nanoparticle Research*, 4(4) 811-826.

150. ‡**Shapira, Philip** and Ju Wang. 2009. "From Lab to Market? Strategies and Issues in the Commercialization of Nanotechnology in China." *Journal of Asian Business Management*, 8(4): 461-489.

151. ‡**Slade, Catherine.** 2011. "Public Value Mapping of Equity in Emerging Nanomedicine." *Minerva*, 49(1): 71-86.

152. **Strumsky, Deborah**, **Jose Lobo** and **Sander van der Leeuw**. 2012. "Using Patent Technology Codes to Study Technological Change." *Economics of Innovation and New Technology*, 21(3): 267-286.

153. ‡Su, Leona Yi-Fan, Michael A. Cacciatore, **Dietram A. Scheufele**, **Dominique E. Brossard** and **Michael A. Xenos**. Under review, "Inequalities in Scientific understanding: Connecting Traditional Media, Science Blog Attention and Interpersonal Discussion with Factual and Perceived Knowledge Gaps." *Mass Communication and Society*.

154. ‡Subramanian, Vrishali, **Jan Youtie**, **Alan L. Porter** and **Philip Shapira**. 2010. "Is There a Shift to Active Nanostructures?" *Journal of Nanoparticle Research*, 12(1): 1-10.

155. ‡**Tahan, Charles**, Ricky Leung, Greta M. Zenner, **K. D. Ellison**, **Wendy C. Crone** and **Clark A. Miller**. 2006. "Nanotechnology and Society: A Discussion-Based Undergraduate Course." *American Journal of Physics*, 74(5): 443-448.

156. ‡Tang, Li, Stephen Carley and **Alan L. Porter**. 2011. "Charting Nano Environmental Health and Safety Research Trajectories: Is China Convergent with the United States." *Journal of Science Policy & Governance*, 1(1): 1-16.

157. ‡Tang, Li and **John P. Walsh**. 2010. "Bibliometric Fingerprints: Name Disambiguation Based on Approximate Structure Equivalence of Cognitive Maps." *Scientometrics*, 84(3): 763-784.

158. ‡Tang, Li and **Philip Shapira**. 2012. "Effects of International Collaboration and Knowledge Moderation on Chinas Nanotechnology Research Impacts." *Journal of Technology Management in China*, 7(1): 94-110.

159. ‡Tang, Li and **Philip Shapira**. 2011. "Regional Development and Interregional Collaboration in the Growth of Nanotechnology Research in China." *Scientometrics*, 2011(86): 299-315.

160. ‡Tang, Li and **Philip Shapira**. 2011. "China-US Scientific Collaboration in Nanotechnology: Patterns and Dynamics." *Scientometrics*, 88(1): 1-16.

161. Te Kulve, Haico and **Arie Rip**. 2011. "Constructing Productive Engagement: Pre-engagement Tools for Emerging Technologies." *Science and Engineering Ethics*, 17(4): 699-714.

162. ‡Valdivia, Walter. 2011. "The Stakes in Bayh-Dole: Public Values Beyond the Pace of Innovation." *Minerva*, 49(1): 25-46.

163. Van Est, Rinie. 2011. "The Broad Challenge of Public Engagement in Science Commentary on: Constitutional Moments in Governing Science and Technology." *Science and Engineering Ethics*, 17(4): 639-648.

164. Van Oudheusden, Michiel. 2011. "Questioning 'Participation': A Critical Appraisal of its Conceptualization in a Flemish Participatory Technology Assessment." *Science and Engineering Ethics*, 17(4): 673-690.

165. Von Schomberg, Rene. 2011. "On Identifying Plausibility and Deliberative Public Policy. Commentary on Negotiating Plausibility: Intervening in the Future of Nanotechnology." *Science and Engineering Ethics*, 17(4): 739-742.

166. ‡**Wang, Jue** and **Philip Shapira**. 2012. "Partnering with Universities: A Good Choice for Nanotechnology Start-up Firm." *Small Business Economics*, 38(2): 197-215.

167. ‡**Wang, Jue** and **Philip Shapira**. 2011. "Funding Acknowledgement Analysis: an Enhanced Tool to Investigate Research Sponsorship Impacts: the Case of Nanotechnology." *Scientometrics*, 87(3): 563-586.

168. ‡Wang, Qian, Qin Zhu and Li Yi Yun. 2010. "Philosophical Reflections on the Management of Nanotechnological Risks." *Chinese Science Bulletin*, 55(00): 0-8.

169. ‡Wender, Benjamin, Rider W. Foley, **David H. Guston**, **Thomas P. Seager** and **Arnim Wiek**. 2012. "Anticipatory Governance and Anticipatory Life Cycle Assessment of Single Wall Carbon Nanotube Anode Lithium ion Batteries." *Nanotechnology, Law and Business*, 9(3): 101-118.

170. ‡**Wetmore, Jameson**. 2012. "A Place for Religion in Nanotechnology Debates." *Covalence, special issue on Faith, Ethics and Nanotechnology*, June 2012.

171. **Wiek, Arnim**, Barry Ness, Petra Schweizer-Ries and Francesca Farioli. 2012. "From Complex Systems Analysis to Transformational Change: a Comparative Appraisal of Sustainability Science Projects." *Sustainability Science*, 7(Supplement 1): 5-24.

172. ‡**Wiek, Arnim**, **David H. Guston**, **Sander van der Leeuw**, **Cynthia Selin** and **Philip Shapira**. In Press. "The Nano-Enhanced City, Sustainability Challenges, and Anticipatory Governance." *Journal of Urban Technology*, DOI: 10.1080/10630732.2012.735415.

173. ‡**Wiek, Arnim**, Lauren Withycombe Keeler, Vanessa Schweizer and Daniel J. Lang. Under review, 2012. "Plausibility Indications in Future Scenarios." *International Journal of Foresight and Innovation Policy*.

174. ‡**Wiek, Arnim**, Rider W. Foley and **David H. Guston**. 2012. "Nanotechnology for Sustainability: What Does Nanotechnology Offer to Address Complex Sustainability Problems." *Journal of Nanoparticle Research*, 14(9): 1093-1112.

175. ‡Woodson, Thomas. 2012. "Inequality in Nanomedicine." *Journal of Business Chemistry*, 9(3): 133-146.

176. **Wynne, Brian**. 2011. "Lab-Work Goes Social, and Vice-Versa: Strategising Public Engagement Processes. Commentary on: What Happens in the Lab Does Not Stay in the Lab: Applying Midstream Modulation to Enhance Reflection in." *Science and Engineering Ethics*, 17(4): 791-800.

177. ‡**Xenos, Michael A.**, **Amy B. Becker**, Ashley A. Anderson, **Dominique E. Brossard** and **Dietram A. Scheufele**. 2011. "Stimulating Upstream Engagement: An Experimental Study of Nanotechnology Information Seeking." *Social Science Quarterly*, 92(5): 1191-1214.

178. ‡Ye, X., Y. Liu and **Alan L. Porter**. 2012. "International Collaborative Patterns in China's Nanotechnology Publications." *Journal of Technology Management*, 59(3-4): 255-272.

179. ‡Yeo, Sara K., Xuan Liang, **Dominique E. Brossard** and **Michael A. Xenos**. Under review, "Is the Online Environment Changing the Construction of Scientific Controversies?" *Public Understanding of Science*.

180. ‡**Youtie, Jan**, **Alan L. Porter**, **Philip Shapira**, Li Tang and Troy Benn. 2011. "The Use of Environmental Health and Safety Research in Nanotechnology Research." *Journal of Nanoscience and Nanotechnology*, 11: 158-166.

181. ‡**Youtie, Jan**, **Diana Hicks**, **Philip Shapira** and Travis Horsley. 2011. "Pathways from Discovery to Commercialization: Using Web Sources to Track Small and Medium-sized Enterprise Strategies in Emerging Nanotechnologies." *Technology Analysis & Strategic Management*, 24(10): 981-995.

182. ‡**Youtie, Jan**, **Maurizio Iacopetta** and **Stuart Graham**. 2008. "Assessing the Nature of Nanotechnology: Can We Uncover an Emerging General Purpose Technology." *Journal of Technology Transfer*, 33: 315-329.

183. ‡**Youtie, Jan** and **Philip Shapira**. 2008. "Mapping the Nanotechnology Enterprise: A Multi-indicator Analysis of Emerging Nanodisticts in the U.S. South." *Journal of Technology Transfer*, 33: 209-223.

184. ‡**Youtie, Jan**, **Philip Shapira** and **Alan L. Porter**. 2008. "Nanotechnology Publications and Citations by Leading Countries and Blocs." *Journal of Nanoparticle Research*, 10(6): 981-986.

185. ‡**Youtie, Jan**, Stephen Carley, **Philip Shapira**, **Elizabeth A. Corley** and **Dietram A. Scheufele**. 2011. "Perceptions and Actions: Relationships of Views on Risk with Citation Actions of Nanotechnology Scientists." *Research Evaluation*, 20(5): 377-388.

186. ‡**Youtie, Jan**, Stephen Carley, **Philip Shapira**, **Elizabeth A. Corley** and **Dietram A. Scheufele**. Under review, "Perceptions and Actions: Examining the Relationship between Views on Risk and Citation Actions of Nanotechnology Scientists." *Risk Analysis*.

Trade Journal Article

1. ‡**Corley, Elizabeth A.** and **Dietram A. Scheufele**. January, 2010. "Outreach Going Wrong? When We Talk Nano to the Public, We are Leaving Behind Key Audiences." *The Scientist*, 24(1): 22.

2. ‡**Guston, David H.** October 17, 2010. "5 Questions: About Nanoscience." *Phoenix Business Journal*.

3. Ladwig, Peter, Ashley A. Anderson, **Dominique E. Brossard**, **Dietram A. Scheufele** and Bret Shaw. May, 2010. "Narrowing the Nano Discourse?" *Materials Today*, 13(5): 52-54.

4. ‡Liang, Xuan, Ashley A. Anderson, **Dietram A. Scheufele**, **Dominique E. Brossard** and **Michael A. Xenos**. 2012. "Information Snapshots: What Google Searches Really Tell Us About Emerging Technologies." *Nano Today*, 7: 72-75.

5. ‡**Nisbet, Matthew C**. and **Dietram A. Scheufele**. October, 2007. "The Future of Public Engagement." *The Scientist*, 21(10): 38-44.

6. ‡Ostman, Rae, Brad Herring, Ali Jackson, **Ira Bennett** and **Jameson Wetmore**. 2013. "Making Meaning Through Conversations about Science and Society." *Exhibitionist*, Spring.

7. ‡**Scheufele, Dietram A.** 2007. "Nano Does Not Have a Marketing Problem Yet." *Nano Today*, 2(5): 48.

8. ‡**Scheufele, Dietram A.** 2006. "Five Lessons in Nano Outreach." *Materials Today*, 9(5): 64.

9. ‡**Scheufele, Dietram A.** 2006. "If We Are to Communicate Successfully With the Public, We Need to Learn How to Frame the Message for Different Audiences." *Materials Today*, 9(5): 64.

10. ‡**Scheufele, Dietram A.** and **Dominique E. Brossard**. 2008. "Nanotechnology as a Moral Issue? Religion and Science in the U.S." *AAAS Professional Ethics Report*, 21(1): 1-3.

11. ‡**Scheufele, Dietram A.**, **Dominique E. Brossard**, **Sharon Dunwoody**, **Elizabeth A. Corley**, **David H. Guston** and **Hans P. Peters**. 2009. "Are Scientists Really Out of Touch?" *The Scientist*.

12. ‡**Scheufele, Dietram A.** and **Elizabeth A. Corley**. 2008. "The Science and Ethics of Good Communication." *Next Generation Pharmaceutical*, 4(1): 66.

13. ‡**Wetmore, Jameson** and **Jonathan Posner**. June, 2009. "Should Corporations Contribute to Nano-Regulation?" *Nano Today*, 4(3): 217-219.

Other Journal Article

1. ‡**Brossard, Dominique E.** and **Dietram A. Scheufele**. 2013. "Science, New Media, and the Public." *Science*, 339(40): 40-41.

2. ‡Cacciatore, Michael A., Sara K. Yeo, **Dominique E. Brossard**, **Dietram A. Scheufele**, Kristin K. Runge, Leona Yi-Fan Su, et al. Under review, "Partisan Amplification of Risk: American Perceptions of Nuclear Energy Risk in the Wake of the Fukushima Daiichi Disaster." *Energy Policy*.

3. ‡Conley, Shannon. 2011. "Engagement Agents in the Making: On the Front Lines of Socio-Technical Integration." *Science and Engineering Ethics*, 17(4): 715-721.

4. Cunningham, S. W. and **Alan L. Porter**. 2011. "Bibliometric Discovery of Innovation and Commercialization Pathways in Nanotechnology." *Conference Proceedings, Portland International Conference on Management of Engineering and Technology*.

5. ‡Davies, Sarah R., **Cynthia Selin**, Gretchen Gano and **Angela Pereira**. 2013. "Finding Futures: A Spatio-Visual Experiment in Participatory Engagement." *Leonardo*, 46(1): 76-77.

6. ‡De Ridder-Vignone, Kathryn. 2012. "Public Engagement and the Art of Nanotechnology." *Leonardo*, 45(5): 433-438.

7. ‡De Ridder-Vignone, Kathryn. 2012. "The Images and Art of Nanotechnologies." *Leonardo*, 45(5): 431-432.

8. ‡De Ridder-Vignone, Kathryn and Michael Lynch. 2012. "Images and Imaginations: An Exploration of Nanotechnology Image Galleries." *Leonardo*, 45(5): 447-454.

9. ‡**Fisher, Erik**. 2011. "Editorial Overview: Public Science and Technology Scholars: Engaging Whom." *Special Issue of Science and Engineering Ethics*, 17(4): 607-620.

10. ‡Fisher, Erik. 2006. "Embedded Nanotechnology Policy Research." *Ogmius*, 14: 3-4.

11. ‡**Guston, David H.** 2011. "Participating Despite Questions: Toward a More Confident Participatory Technology Assessment." *Science and Engineering Ethics*, 17(4): 691-697.

12. ‡**Guston, David H.** December, 2009. "Deliberating Nanotechnology in the U.S." *British Science Association's People & Science*: 22.

13. ‡**Guston, David H.** August, 2008. "Innovation Policy: Not Just a Jumbo Shrimp." *Nature*, 454: 940-41.

14. ‡**Guston, David H.** 2006. "Responsible Knowledge-based Innovation." *Society*, 43(4): 19-21.

15. **Leung, Ricky C.** 2012. "Cluster-Based Advantages in the Innovation Process: The Diffusion of Nanotechnology in Two Chinese Cities." *Frontiers of Business Research in China*, 6(1): 25-54.

16. ‡**Leung, Ricky C.** 2011. "Network Building in the Innovation Journey: How Chinese Science Institutes Jump on the Nanotech Bandwagon." *East Asian Science, Technology and Society: An International Journal*, 6: 167-197.

17. ‡Pirtle, Zach. 2006. "Nanotechnology: Constructing a Proactive Science Policy towards Democracy." *The Triple Helix: The International Journal of Science, Society and Law*, 3(1): 48.

18. ‡**Roco, Mihail C.**, **Barbara Harthorn**, **David H. Guston** and **Philip Shapira**. 2011. "Innovative and Responsible Governance of Nanotechnology for Societal Development." *Journal of Nanoparticle Research*, 13(9): 3557-3590.

19. ‡**Schneider, Jennifer** and **Carl Mitcham**. May 01, 2008. "Working Toward Nanotechnology Consensus." *ethix*, 59: 18-19.

20. ‡**Shapira, Philip** and **Jue Wang**. 2010. "Comment: Follow the Money. What was the Impact of the Nanotechnology Funding Boom of the Past Ten Years." *Nature*, 468(7324): 627-628.

21. ‡**Wetmore, Jameson**. 2012. "The Value of the Social Sciences for Maximizing the Public Benefits of Engineering." *The Bridge*, 42(3): 40-45.

22. **Wetmore, Jameson**. 2010. "Sciences Influence: Response to Sciences Uncertain Authority in Policy by John Marburger." *Issues in Science and Technology*, 27(1): 10-12.

23. ‡**Wetmore, Jameson**. 2007. "Introduction to Special Issue on Science, Policy, & Inequities." *Science and Public Policy*, 34(2): 83-84.

24. ‡**Wiek, Arnim**, **David H. Guston**, Emma Frow and **Jane Calvert**. 2012. "Sustainability and Anticipatory Governance in Synthetic Biology." *International Journal of Ecology and Sustainable Development.* 3(2): 25-38.

Periodical (popular magazines, newspapers)

1. ‡Brossard, Dominique E. and Dietram A. Scheufele. March 13, 2013. "This Story Stinks." *The New York Times*: SR5.

Internet

1. **Allenby, Braden** and **Daniel Sarewitz**. May 27, 2010. "Telepathic Helmets! Power-Generating Pants! How Will Military Technology Change the Way We Live." Post on Interview on National Radio Program, the Takeaway. http://www.thetakeaway.org/2010/may/27/how-military-tech-will-change-way-we-live/

2. **Anbar, Ariel** and **Michael E. Smith**. February 19, 2010. "The End of Earth: If Not in 2010, Then When." CNS Science Cafe presentation at the Arizona Science Center. http://www.youtube.com/watch?feature=player_embedded&list=PL1A16C368795630FA&v=Wvy4RjN25_k#!

3. ASU Herberger Institute, School of Theatre and Film. October 16, 2009. "Bone Portraits: Scenes from a Play about the Invention of the X-ray." Podcast on CNS Science Cafe' Presentation at the Arizona Science Center. http://www.youtube.com/user/CNSCSPO#p/u/3/oxKLLuSWsAc

4. Calabrese, Francesco. December 02, 2010. "Modeling Urban Mobility Using Pervasive Technologies." Presentation for the Emerging Technology & the Future Series. http://vimeo.com/27543685

5. **Conz, David**. February 23, 2012. "What Beer Can Teach Us About Emerging Technologies. The Home-Brew Movement Serves as a Lesson in DIY Innovation." Post on Slate. http://www.slate.com/articles/technology/future_tense/2012/02/home_brew_and_the_diy_innovation_movement_.html

6. **Conz, David**. September 15, 2010. "Getting from Here to There: Aiming at a Moving Target in a Changing Landscape." Blog post on CSPO Soapbox. http://www.cspo.org/soapbox/view/100915P8IM/getting-from-here-to-there-aiming-at-a-moving-target-in-a-changing-landscape/

7. **Cozzens, Susan** and **Jameson Wetmore**. 2011. "Yearbook of Nanotechnology in Society, Volume 2: Nanotechnology and the Challenge of Equity, Equality and Development." http://www.youtube.com/watch?v=R_WfmJjTLZ0&list=UU2hhshdW_r3vnk5E_PYybXg&index=6&feature=plcp

8. Davies, Sarah R. February 16, 2010. "Risk, Narrative, and Dilemma: Reading Public Responses to Emerging Technologies." Podcast on the CNS Occasional Speaker Presentation. http://www.youtube.com/watch?v=UgffTUFP1Dc&feature=player_embedded

9. **Fisher, Erik** and **Daniel Sarewitz**. 2011. "STIR (Socio-Technical Integration Research)." Short Film. Consortium for Science, Policy and Outcomes. http://www.cspo.org/scisip/movies/

10. **Foladori, Guillermo**. November 24, 2010. "Opinion: Nanotech for health is not just about disease." SciDev Net - Science and Development Network. http://www.scidev.net/en/new-technologies/opinions/nanotech-for-health-is-not-just-about-disease-1.html

11. Foley, Rider W. April 18, 2012. "Innovation + City = Prosperity." Post on the Sustainability Review. http://www.thesustainabilityreview.org/2012/04/18/innovation-city-prosperity/

12. Foley, Rider W. February 03, 2012. "Sports Science, Technology, and Society." Blog post on CSPO Soapbox. http://www.cspo.org/soapbox/view/1202031604P86888696LH/sports--science-technology-and-society/

13. **Garreau, Joel**. August 26, 2009. "The Future of Cities." Podcast on the CNS Occasional Speaker Presentation. http://www.youtube.com/watch?v=Q99ga43ZNd8&feature=player_embedded

14. **Goodnick, Stephen** and **Tim Lant**. November 20, 2009. "Good to the Last Drop? The Water-Energy Connection." CNS Science Cafe' Presentation at the Arizona Science Center. http://www.youtube.com/watch?v=HryWsrq4XSA&feature=player_embedded#at=154

15. Guston, David H. March 03, 2013. "The Scholars Circle and Insighters Radio." KPFK Radio. http://www.armoudian.com/log/scholars-circle/the-scholars-circle-insighters-radio-mar-3rd-2013/

16. **Guston, David H.** December 05, 2011. "Michael Crichtons Last Stand." Post on Slate. http://www.slate.com/articles/technology/future_tense/2011/12/michael_crichton_s_micro_and_how_scientists_talk_to_the_public_.single.html

17. **Guston, David H.** February 21, 2011. "Are We Alone - Nano Nano." SETI"s Radio Program Interview. http://radio.seti.org/blog/2011/02/are-we-alone-nano-nano-david-guston/

18. **Guston, David H.** December 10, 2010. "Golden Fleece 2.0." Blog post on CSPO Soapbox. http://www.cspo.org/soapbox/view/101210P6OT/golden-fleece-20/

19. **Guston, David H.** August 09, 2010. "The Puddle Gator." Blog post on CSPO Soapbox. http://www.cspo.org/soapbox/view/100809P5HQ/the-puddle-gator/

20. **Guston, David H.** March 30 2010. "Public Engagement with Nanotechnology" Guest entry on 2020Science.org, http://2020science.org/2010/03/30/public-engagement-with-nanotechnology/

21. **Guston, David H.** September 25, 2009. "Who by Fire.." Blog post on CSPO Soapbox. http://www.cspo.org/soapbox/view/090925P5PS/who-by-fire/

22. **Guston, David H.** March 20, 2009. "Nanotechnology and Public: Data for Decision Makers Briefing to the U.S. Congressional Nanotechnology Caucus." Podcast on ASU President's Office Podcast. http://president.asu.edu/node/661

23. **Guston, David H.** September 25, 2007. "Toward Anticipatory Governance." Podcast on nanoHUB.org. http://nanohub.org/resources/3270/

24. **Guston, David H.** and **Cynthia Selin**. January, 2013. "Life In 2030." Podcast on Spectrum Radio - Engineers of the New Millennium. http://www.prx.org/pieces/89782-life-in-2030

25. **Guston, David H.**, George Poste and Subhash Mahajan. October 10, 2007. "Tools of the Trade - Nanotechnology." Podcast on ASU Spotlight. http://www.youtube.com/watch?v=E-cxH_KShNQ

26. Harsh, Matthew. May 12, 2011. "Careful design is key to success of development prizes." Post on Science and Development Network. http://www.scidev.net/en/opinions/careful-design-is-key-to-success-of-development-prizes-1.html

27. **Irwin, Alan**. February 12, 2010. "The Good, the Bad, and the Perfect: Anticipating Engagement amidst Critical Regimes." Podcast on the CNS Occasional Speaker Presentation. http://www.youtube.com/watch?v=TFns52m-wL4&feature=player_embedded#at=15

28. **Kosal, Margaret E.** February 04, 2010. "Nanotechnology for Chemical and Biological Defense: Policy, Programs, and Threat Anticipation." Podcast on the CNS Occasional Speaker Presentation. http://www.youtube.com/watch?v=ETnhbdyWVTg&feature=player_embedded#at=70

29. **Martins, Paulo**. May 03, 2011. "Dr. David Guston, Center for Nanotechnology in Society at Arizona State University." Web-TV Interview for Renanosomo Brazilian Research Network. http://nanotecnologiadoavesso.org/tv/programa-n-112-0

30. **Miller, Clark A.** October 26, 2010. "Why Nano Matters: Saving the World." Blog post on Nanoscale Informal Science Education Network. http://www.nisenet.org/blogs/real_world_nano/why_nano_matters_saving_world

31. **Miller, Clark A.** April 27, 2010. "Nanotechnology for Human Enhancement: What Does the Public Think." Blog post on Nanoscale Informal Science Education Network. http://www.nisenet.org/blogs/real_world_nano/nanotechnology_human_enhancement_what_does_public_think

32. **Miller, Clark A.** April 22, 2010. "Why Does Nano Matter? Bio-Non-Bio Interfaces." Blog post on Nanoscale Information Science Education Network. http://www.nisenet.org/blogs/real_world_nano/why_does_nano_matter_bio-non-bio_interfaces

33. **Miller, Clark A.** February 15, 2010. "Why does Nano Matter? Surface Area." Blog post on nisenet.org. http://www.nisenet.org/blogs/real-world-nano

34. **Miller, Clark A.** January 26, 2009 "Welcome to Real World Nano." http://www.nisenet.org/blogs/real-world-nano

35. **Rittmann, Bruce** and **Dawn Schwenke**. September 18, 2009. "Ending Age-Related Disease: How Will Our Lives Change if We're Healthier Longer." CNS Science Cafe presentation at the Arizona Science Center. http://www.youtube.com/user/CNSCSPO#p/u/0/OosMX0OHi14

36. **Sarewitz, Daniel** and **Erik Fisher**. 2011. "New Tools for Science Policy." Short Film. Consortium for Science, Policy and Outcomes. http://www.cspo.org/scisip/movies/

37. **Scheufele, Dietram A.** 2011. "Science 2.0: Media. Politics and Emerging Technologies." University of Wisconsins-Madison public iTunes course. http://deimos3.apple.com/WebObjects/Core.woa/Browse/wisc-public.4152237876

38. **Selin, Cynthia.** October 30, 2009. "Does Time Need Saving." Blog post on CSPO Soapbox. http://www.cspo.org/soapbox/view/091030P7XS/does-time-need-saving/

39. **Selin, Cynthia.** August 13, 2009. "More than a Policy: the Future of Energy Technologies." Blog post on CSPO Soapbox. http://www.cspo.org/soapbox/view/090813P0QU/more-than-a-policy-the-future-of-energy-technologies/

40. **Selin, Cynthia.** June 14, 2009. "Flag Day 2009." Blog post on CSPO Soapbox. http://www.cspo.org/soapbox/view/090620P2PP/flag-day-2009/

41. **Selin, Cynthia**, **Thanassis Rakakis** and **Joel Garreau**. February 28, 2012. "Emerge: Artists, Scientists Redesigning the Future." Interview on KAET Horizon Program. https://asunews.asu.edu/20120229_video_emerge

42. **Sommerfield, Milton R.**, **Mark Edwards** and **David Conz**. January 15, 2010. "Bugs for Fuel? Microbes in Our Energy Future." CNS Science Cafe' Presentation at the Arizona Science Center. http://www.youtube.com/watch?v=T0IbiYOH4TU&feature=player_embedded#at=26

43. **Wetmore, Jameson**. January 09, 2013. "Creating Space in Science Centers for Public Discussions about the Social Aspects of Science and Technology." Blog post on Genotype, ESRC Genomics Policy and Research Forum, University of Edinburgh, Scotland. http://esrcgenomicsforum.blogspot.com/2013/01/creating-space-in-science-centers-for.html

44. **Wetmore, Jameson**. December 24, 2012. "New Technology is making us more like the Amish." Post on Slate's Future Tense. http://www.slate.com/blogs/future_tense/2012/12/24/smartphones_tablets_make_us_think_about_technology_like_the_amish_do.html

45. **Wetmore, Jameson**. December 24, 2012. "Were Becoming a Bit More Amish." Post on CSPO's As We Now Think. http://aswenowthink.wordpress.com/2012/12/03/were-becoming-a-bit-more-amish/

46. **Wetmore, Jameson**. December 20, 2012. "The Frustrations of a Luddite Handwasher." Blog post on CSPO's As We Now Think. http://aswenowthink.wordpress.com/2012/12/20/the-frustrations-of-a-luddite-handwasher/

47. **Wetmore, Jameson**. October 31, 2012. "Dubai: Technology or Freedom." Blog post on CSPO's As We Now Think. http://aswenowthink.wordpress.com/2012/10/31/dubai-technology-or-freedom/

48. **Wetmore, Jameson**. 2012. "Decisions in Personal Lives." NISE Net produced Nano and Society Video to train museum staff across the country. http://vimeo.com/50532883

49. **Wetmore, Jameson**. 2012. "Light Switch." NISE Net produced Nano and Society Video to train museum staff across the countr.http://vimeo.com/50538701

50. **Wetmore, Jameson**. 2012. "Cell Phone Rules." NISE Net produced Nano and Society Video to train museum staff across the country.http://vimeo.com/50530764

51. **Wetmore, Jameson**. 2012. "Speed Bump." NISE Net produced Nano and Society Video to train museum staff across the country. http://vimeo.com/50530523

52. **Wetmore, Jameson**. September 07, 2010. "Engaging Policymakers: Not an Academic Exercise." Blog post on CSPO Soapbox on the 2010 IHEST Conference. http://www.cspo.org/soapbox/view/100907P1JQ/engaging-policymakers-not-an-academic-exercise/

53. **Wetmore, Jameson**. August 29, 2010. "Blogging from France: Consensus Conferences." Blog post on CSPO Soapbox on the 2010 IHEST Conference. http://www.cspo.org/soapbox/view/100829P5YL/blogging-from-france-consensus-conferences/

54. **Wetmore, Jameson**. August 27, 2010. "Blogging from France: Benny was the Star." Blog post on CSPO Soapbox on the 2010 IHEST Conference. http://www.cspo.org/soapbox/view/100827P5HQ/blogging-from-france--benny-was-the-star/

55. **Wetmore, Jameson**. August 26, 2010. "Blogging from France: The Deficit Model." Blog post on CSPO Soapbox on the 2010 IHEST Conference. http://www.cspo.org/soapbox/view/100826P5YJ/blogging-from-france-the-deficit-model/

56. **Wetmore, Jameson**. August 25, 2010. "Blogging from France: Values and Airplane Food." Blog post on CSPO Soapbox on the 2010 IHEST Conference. http://www.cspo.org/soapbox/view/100825P5SJ/blogging-from-france-values-and-airplane-food/

57. **Wetmore, Jameson**. August 24, 2010. "Blogging from France: Science and the Public Debate." Blog post on CSPO Soapbox on the 2010 IHEST Conference. http://www.cspo.org/soapbox/view/100824P9QS/blogging-from-france--science-and-the-public-debate/

58. **Wetmore, Jameson.** 2010. "Powering Down on Valentines Day." Blog post on CSPO Soapbox. http://www.cspo.org/soapbox/view/100212P3YZ/powering-down-on-valentines-day/

59. **Wetmore, Jameson.** 2010. "The Dangers of Hype and Hope." Blog post on CSPO Soapbox. http://www.cspo.org/soapbox/view/100524P3FA/the-dangers-of-hype-and-hope/

60. **Wetmore, Jameson.** April 05, 2009. "The View from a Tuc-Tuc." Blog post on CSPO Soapbox. http://www.cspo.org/soapbox/view/090620P9VF/the-view-from-a-tuctuc/

61. **Wienroth, Matthias.** August 26, 2009. "Strategic Science: Research Intermediaries and the Governance of Innovation". CNS Occasional Speaker Presentation. http://www.youtube.com/user/CNSCSPO#p/u/2/6xsBtM3Rdno

62. **Youtie, Jan** and **Philip Shapira**. June, 2007. "US Nanodistrict Development: 1990-2006." Post on YouTube. http://www.youtube.com/watch?v=tpBxLGcFjug

Report

1. ‡Carley, Stephen. 2008. *RTTA1 Nanotechnology Research Publication Databases: Updated to 2008*. CNS-ASU Report # R08-0004. Center for Nanotechnology in Society at ASU, Georgia Institute of Technology, Atlanta, GA.

2. ‡Davies, Sarah R. 2011. *Nanotechnology, Business, and Anticipatory Governance*. CNS-ASU Report #R11-0004. Center for Nanotechnology in Society, Arizona State University, Tempe, AZ.

3. ‡Davies, Sarah, **Cynthia Selin** and Rebecca Allen. 2010. *Solar to Fuels: Report on Interdisciplinary Workshop*. CNS-ASU Report #R10-0002. Center for Nanotechnology in Society, Arizona State University, Tempe, AZ.

4. ‡**Fisher, Erik**. 2012. *STIR: Socio-Technical Integration Research Project Annual Report to the NSF*. Year 3. Tempe, AZ, United States.

5. ‡**Fisher, Erik**. 2011. *STIR: Socio-Technical Integration Research Project Annual Report to the NSF*. Year 2. Tempe, AZ, United States.

6. ‡**Fisher, Erik**. 2010. *STIR: Socio-Technical Integration Research Project Annual Report to the NSF*. Year 1. Tempe, AZ, United States.

7. ‡**Guston, David H.**, et al. 2012. *CNS-ASU Annual Report to the National Science Foundation, Year 7*. Annual Report for NSF Award #0937591 for the period of September 15, 2011 to September 14, 2012. Center for Nanotechnology in Society, Arizona State University, Tempe, AZ.

8. ‡**Guston, David H.**, et al. 2011. *CNS-ASU Annual Report to the National Science Foundation, Year 1.* Annual Report for NSF Award #0937591 for the period of September 15, 2010 to September 14, 2011. Center for Nanotechnology in Society, Arizona State University, Tempe, AZ.

9. ‡**Guston, David H.** 2010. *Societal Dimensions Research in the National Nanotechnology Initiative*. CSPO Report # 10-02. Consortium for Science, Policy and Outcomes and Center for Nanotechnology in Sociey, Arizona State University, Tempe, AZ.

10. ‡**Guston, David H.,** et al. 2010. *CNS-ASU Annual Report to National Science Foundation, Year 5.* Annual Report for NSF Award #0531194 for the period October 1, 2009 to September 30, 2010. Center for Nanotechnology in Society, Arizona State University, Tempe, AZ.

11. ‡**Guston, David H.**, et al. 2009. *CNS-ASU Annual Report to National Science Foundation, Year 4*. Annual Report for NSF Award #0531194 for the period October 1, 2008 to September 30, 2009. Center for Nanotechnology in Society, Arizona State University, Tempe, AZ.

12. ‡**Guston, David H.**, et al. 2008. *CNS-ASU Annual Report to National Science Foundation, Year 3*. Annual Report for NSF Award #0531194 for the period October 1, 2007 to September 30, 2008. Center for Nanotechnology in Society, Arizona State University, Tempe, AZ.

13. ‡**Guston, David H.**, et al. 2007. *CNS-ASU Annual Report to National Science Foundation, Year 2*. Annual Report for NSF Award #0531194 for the period October 1, 2006 to September 30, 2007. Center for Nanotechnology in Society, Arizona State University, Tempe, AZ.

14. ‡**Guston, David H.**, et al. 2006. *CNS-ASU Annual Report to National Science Foundation, Year 1*. Annual Report for NSF Award #0531194 for the period October 1, 2005 to September 30, 2006. Center for Nanotechnology in Society, Arizona State University, Tempe, AZ.

15. ‡**Hamlett, Patrick**, **Michael Cobb** and **David H. Guston**. 2008. *National Citizens Technology Forum: Nanotechnologies and Human Enhancement*. CNS-ASU Report #R08-0003. Center for Nanotechnology in Society, Arizona State University, Tempe, AZ.

16. ‡Hays, Sean. 2011. *Can Art and Religion Serve as Methods for Governing Emerging Science and Technology*. CNS-ASU Report # R11-0005. Center for Nanotechnology in Society, Arizona State University, Tempe, AZ.

17. ‡**Miller, Clark A.** 2006. *Boundary Organizations: Strategies for Linking Knowledge to Action*. CNS-ASU Report #R06-0001. Center for Nanotechnology in Society, Arizona State University, Tempe, AZ.

18. ‡**Miller, Clark A.** 2006. *Nanotechnology in Society: A New Model of Anticipatory Governance*. Workshop Report No. 8 (ECETOC: Brussels). CNS-ASU Report #R06-0002. Center for Nanotechnology in Society, Arizona State University, Tempe, AZ.

19. ‡**Miller, Clark A.**, **David H. Guston**, **Daniel Barben**, **Jameson Wetmore**, **Cynthia Selin** and **Erik Fisher**. 2007. *Nanotechnology and Society: Ideas for Education and Public Engagement*. CNS-ASU Report #R07-0001. Center for Nanotechnology in Society, Arizona State University, Tempe, AZ.

20. Rothwell, Jonathan, **Jose Lobo**, **Deborah Strumsky** and Mark Muro. 2013. *Patenting Prosperity: Invention and Economic Performance in the United States and its Metropolitan Areas*. Brookings Institute Report, Washington, DC.

21. ‡**Porter, Alan L.**, **Jan Youtie** and **Philip Shapira**. 2006. *Briefing Paper: Refining Search Terms for Nanotechnology*. CNS-ASU Report #R06-0003. Center for Nanotechnology in Society, Arizona State University, Tempe, AZ.

22. **Scheufele, Dietram A. and Elizabeth A. Corley**. 2010. *Capstone: Risk Management Methods & Ethical, Legal, and Societal Implications of Nanotechnology*. Report of the March 2010 Nantional Nanotechnology Initiative Workshop. Part IV of IV in the 2009-2010 NNI Environmental, Health, and Safety Workshop Series.

23. ‡**Selin, Cynthia**. 2011. *Gaming the Future*. CNS-ASU Report #R11-0003. Center for Nanotechnology in Society, Arizona State University, Tempe, AZ.

24. ‡**Selin, Cynthia**. 2008. *The Future of Medical Diagnostics*. Scenario Development Workshop Report, CNS-ASU Report #R08-0001. Center for Nanotechnology in Society, Arizona State University, Tempe, AZ.

25. ‡**Selin, Cynthia**. 2008. *CNS Visioning Workshop: Creating Scenarios about the Future of Anticipatory Governance*. CNS-ASU Report #R08-0002. Center for Nanotechnology in Society, Arizona State University, Tempe, AZ.

26. ‡**Selin, Cynthia**, **Arnim Wiek**, **David H. Guston**, **Angela Wilkinson**, **Rafael Ramirez**. 2010. *Plausibility Project Workshop: Creating Research Agendas*. CNS-ASU Report #R10-0001. Center for Nanotechnology in Society, Arizona State University, Tempe, AZ.

27. **Shapira, Philip**. 2012. *The Economic Contributions of Nanotechnology to Green and Sustainable Growth, Working Party on Nanotechnology, Organisation for Economic Cooperation and Development*. DSTI/STP/NANO(2012)14.

28. ‡**Shapira, Philip**, **Jan Youtie**, **Ajay S. Bhaskarabhatla**, et al. 2006. *Connecting the Dots: Creating a Southern Nanotechnology Network*. Southern Growth Policies Board and the Georgia Tech Program in Science, Technology and Innovation Policy, Southern Growth Policies Board, Research Triangle Park, NC.

29. ‡Valdivia, Walter and **David H. Guston**. 2006. *Public Value Mapping*. Workshop Report, CNS-ASU Report #R06-0004. Center for Nanotechnology in Society, Arizona State University, Tempe, AZ.

30. ‡**Van Horn, Carl** and **Aaron Fichtner**. 2008. *The Workforce Needs of Companies Engaged in Nanotechnology Research in Arizona*. #R08-0005. John J. Heldrich Center for Workforce Development, Rutgers, The State University of New Jersey, New Brunswick, NJ.

31. ‡**Van Horn, Carl**, Jennifer Cleary and **Aaron Fichtner**. 2009. *The Workforce Needs of Pharmaceutical Companies in New Jersey That Use Nanotechnology: Preliminary Findings*. #R09-0002. John J. Heldrich Center for Workforce Development, Rutgers, The State University of New Jersey, New Brunswick, NJ.

32. ‡**Van Horn, Carl**, Jennifer Cleary, Leela Hebbar and **Aaron Fichtner**. 2009. *A Profile of Nanotechnology Degree Programs in the United States*. #R09-0001. John J. Heldrich Center for Workforce Development, Rutgers, The State University of New Jersey, New Brunswick, NJ.

33. **Von Schomberg, Rene** and Sarah Davies. 2010. *Understanding Public Debate on Nanotechnologies: Options for Framing Public Policy*. European Commission.

34. ‡**Wiek, Arnim** and Rider W. Foley. 2011. *CNS Systematic Analysis Workshop: Urban Sustainability Syndromes*. CNS-ASU Report #R11-0001. Center for Nanotechnology in Society, Arizona State University, Tempe, AZ.

35. ‡**Wiek, Arnim** and Rider W. Foley. 2011. *CNS Systematic Analysis Workshop: Urban NanoScape - Nanotechnology Expert Panel: Urban NanoScape Review*. CNS-ASU Report #R11-0002. Center for Nanotechnology in Society, Arizona State University, Tempe, AZ.

Working Papers

1. ‡Anderson, Ashley A**.**, **Jason A. Delborne**, **Daniel L. Kleinman**, Maria Powell and Mathilde Colin. 2009. "Communication of Emerging Technologies: How Individuals Engage in Information Seeking in Deliberative Settings." Working Paper.

2. ‡Carley, Stephen. 2010. "Charting the Growth of a New Field: Who is Citing Nanotoxicology Research." Working Paper. STIP.

3. ‡Carley, Stephen. 2009. "Diffusion Indicators for Nanotechnology Research in the United States and Europe." Working Paper. Science, Technology and Innovation Policy, Georgia Institute of Technology, Atlanta, GA.

4. ‡**Corley, Elizabeth A.** and **Meghna Sabharwal**. 2011. "Scholarly Collaboration and Productivity Patterns in Public Administration: Analyzing Recent Trends." Working Paper. Public Administration.

5. Davies, Sarah R. and **Cynthia Selin**. "Peopling Energy: The Difficulty with Deliberation on Nanotechnology, Energy, and Society." Working Paper. Under preparation for Environmental Communication: a Journal of Nature and Culture.

6. ‡**Fernandez-Ribas, Andrea**. 2009. "Global Patent Strategies of SMEs in Nanotechnology." Working Paper. Science, Technology, and Innovation Policy, Georgia Institute of Technology, Atlanta, GA.

7. Foley, Rider W., **Arnim Wiek** and **David H. Guston**. In preparation, "Guiding Emerging Technologies: Applying Principles from Sustainability and Anticipatory Governance." Working Paper.

8. Foley, Rider W. and B. Kay. In preparation, "Thinking about Technology in Society? Take a Walk." Working Paper.

9. Foley, Rider W., Braden Kay and **Arnim Wiek**. In preparation, "Walking the City: A Structured Approach to Learning with the Community." Working Paper.

10. **Garcia-Mont, Aixa** and **David Conz**. 2009. "Latinas/os in Science, Technology, Engineering and Mathematics: Culture, Gender and Mentorship." Working Paper.

11. Guo, Ying, Lu Huang and **Alan L. Porter**. 2009. "Profiling Research Patterns for a New and Emerging Science and Technology: Dye-sensitized Solar Cells." Working Paper. Atlanta Conference on Science and Innovation Policy, October 2-3, 2009.

12. **Guston, David H.** "Understanding Anticipatory Governance." Working Paper. Social Studies of Science. Revise and resubmit.

13. Keeler, Lauren Withycombe and **Arnim Wiek**. In preparation, "What if the Future is not what we Envisioned? Advances in Sustainability Research and Planning through Contrasting, Non-intervention Scenarios." Working Paper.

14. ‡Laurent, Brice and **Erik Fisher**. In preparation. "Integration Discourses: Neo-determinism, Reflexivity, and the Mainstreaming of Science Studies."

15. ‡McKeon, Patrick. 2008. "Characterization of State-Level Nanotechnology Policy Initiatives and What It Means for Georgia." Working Paper. Program in Science, Technology and Innovation Policy, Georgia Institute of Technology, Atlanta, GA.

16. ‡Meng, Yu and **Philip Shapira**. 2008. "Women in Patenting: Does Nanotechnology Make a Difference." Working Paper. Program in Science, Technology and Innovation Policy, Georgia Institute of Technology, Atlanta, GA.

17. ‡Meng, Yu, **Philip Shapira** and Li Tang. 2010. "A Case Study of Nano-pigment Innovation in China: Probing the Co-evolution of Nanotechnology and the Innovation System." Working Paper. Nanomaterial Innovation Case Study, Chemical Heritage Foundation.

18. **Pereira, Angela** and **Cynthia Selin**. "Plausibility in Post-normal Times." Working Paper. Under development.

19. ‡Powell, Maria, **Mathilde Colin**, **Daniel L. Kleinman**, **Jason A. Delborne** and Ashley A. Anderson. 2009. "Imagining Ordinary Citizens? Conceptualized and Actual Participants for Deliberations on Emerging Technologies." Working Paper.

20. ‡Powell, Maria, **Mathilde Colin**, **Jason A. Delborne**, **Daniel L. Kleinman** and Ashley A. Anderson. 2009. "Citizens' Reflections on their Participation in a Deliberative Exercise on Emerging Technologies." Working Paper.

21. **Rafols, Ismael**. 2010. "Missing Links in Nanomaterials Governance: Bringing Industrial Dynamics and Downstream Policies into view." Working Paper.

22. ‡Robinson, Douglas K. R., Lu Huang, Ying Guo and **Alan L. Porter**. 2010. "Towards a Systematic Framework for Anticipating and Evaluating Emerging S and T: Forecasting Innovation Pathways in Nanobiosensors and Deep Brain Interface Devices." Working Paper.

23. ‡**Rogers, Juan D.** 2008. "Research Centers as a Policy Tool in the U.S. National Nanotechnology Initiative: An Assessment of their Role in the U.S. System of Innovation." Working Paper. Program in Science, Technology and Innovation Policy, Georgia Institute of Technology, Atlanta, GA.

24. ‡**Shapira, Philip** and **Jan Youtie**. 2012. "The Economic Contributions of Nanotechnology to Green and Sustainable Growth." Working Paper. Prepared for the International Symposium on Assessing the Economic Impact of Nanotechnology, Organization for Economic Cooperation and Development and the U.S. National Nanotechnology InitiativeWashington, DC.

25. ‡**Shapira, Philip**, **Jan Youtie** and **Alan L. Porter**. 2009. "The Emergence of Social Science Research in Nanotechnology." Working Paper. Science, Technology and Innovation Policy, Georgia Institute of Technology, Atlanta, GA.

26. ‡**Shapira, Philip**, **Jan Youtie** and Luciano Kay. 2010. "Corporate Entry into Nanotechnology through Patents and Publications: 1990 to 200." Working Paper. Georgia Tech Program in Science, Technology and Innovation Policy. White Paper.

27. ‡**Shapira, Philip** and Jue Wang. 2008. "Case Study: Nanotechnology in the USA." Working Paper. The Policy Mix Project, UNU-MERIT, University of Maastricht and the United Nations University, the Netherlands.

28. **Strumsky, Deborah**, **Jose Lobo** and **Sander van der Leeuw**. 2011. "Measuring the Relative Importance of Reusing, Recombining and Creating Technologies in the Process of Invention." Working Paper. Working paper #11-02-003 of the Santa Fe Institute.

29. ‡Subramanian, Vrishali. 2009. "Active Nanotechnology: What Can We Expect? A Perspective for Policy from Bibliographical and Bibliometric Analysis." Working Paper. Program on Nanotechnology Research and Innovation System Assessment, School of Public Policy and Enterprise Innovation, Georgia Institute of Technology, Atlanta, GA.

30. ‡Tang, Li and **Philip Shapira**. 2007. "Networks of Research Collaboration in China: Evidence from Nanotechnology Publication Activities, 1990-2006." Working Paper. Program on Nanotechnology Research and Innovations Assessment, Georgia Institute of Technology, Atlanta, GA.

31. Tang, Li, **Philip Shapira** and Yu Meng. 2010. "A Spin-in Model of Nanomaterials Innovation in China." Working Paper. Nanomaterial Innovation Case Study, Chemical Heritage Foundation.

32. Ying, Gao, **Alan H. Porter** and Lu Huang. 2009. "Nanotechnology-Enhanced Thin-Film Solar Cells: Analysis of Global Research Activities with Future Prospects." Working Paper. 2009 IAMOT Conference.

33. ‡**Youtie, Jan**, **Philip Shapira** and **Juan D. Rogers**. 2009. "Nanotechnology-Enhanced Thin-Film Solar Cells: Analysis of Global Research Activities with Future Prospects."

34. Zhou, X. and **Alan L. Porter**. 2013. "Patent and Publication Comparison for a Promising Emerging Industry Nano-Enabled Drug Delivery." Working Paper. 14th International Society of Scientometrics and informetrics Conference (ISSI) Vienna, Austria.

35. Zhou, X., **Alan L. Porter** and Douglas K. R. Robinson. 2013. "Analyzing Research Publication Patterns to Gauge Future Innovation Pathways for Nano-Enabled Drug Delivery." Working Paper. Portland International Conference on Management of Engineering and Technology (PICMET) San Jose, CA.

Thesis/Dissertation

1. ‡Anderson, Ashley A. 2012. *The Social Context of Online News: How Incivility in Online Comments Impacts Public Perceptions of and Public Engagement with Science*. Doctoral Dissertation. Mass Communications, University of Wisconsin-Madison, Madison, WI.

2. ‡Benn, Troy M. 2009. *The Release of Engineered Nanomaterials from Commercial Product.* Doctoral Dissertation. Civil and Environmental Engineering, Arizona State University. Tempe, AZ.

3. ‡Bhaskarabhatla, Ajay S. 2006. *Nanotechnology Enterprise in the United States: Structure and Location*. School of Public Policy, Georgia Institute of Technology, Atlanta, GA.

4. ‡Brants, Tanner. 2009. *Undergraduate Honors Thesis*. Innovation Space, Arizona State University. Tempe, AZ.

5. ‡Burdis, Connie M. 2008. *Nanotechnology and Electricitrees: A Strategic Plan for a Future-Oriented Technology and Product*. Undergraduate Honors Thesis. The Barrett Honors College, Arizona State University. Tempe, AZ.

6. ‡Cacciatore, Michael A. Forthcoming, 2013. *Title TBD*. Doctoral Dissertation. Mass Communications, University of Wisconsin-Madison, Madison, WI.

7. Choi, Joshua. 2007. *miRNA Expression Analysis in Aligadendroliama with and without 1p/19e Deletions*. Undergraduate Honors Thesis. The Barrett Honors College, Arizona State University, Tempe, AZ.

8. ‡Conley, Shannon. 2007. *Voting Rights Act of 1965 Renewal: The Official Congressional Report on Voting Rights in Arizona (1982-2006)*. Undergraduate Honors Thesis. The Barrett Honors College, Arizona State University, Tempe, AZ.

9. ‡Davis, Robert W. 2007. *Nanotechnology in Society: Stakeholder Analysis and Nanotechnology Stakeholders*. Undergraduate Honors Thesis. The Barrett Honors College, Arizona State University. Tempe, AZ.

10. Edwards, David. 2011. *Elderly and the E-Health Barrier*. Undergraduate Honors Thesis. The Barrett Honors College, Arizona State University, Tempe, AZ.

11. Egnatios, Tara. 2008. *Myspace: Ultimate Authorship of the Youniverse*. Undergraduate Honors Thesis. The Barrett Honors College, Arizona State University, Tempe, AZ.

12. ‡Finney, Sharyn. 2007. *Multinational Comparative Analysis of Nanotechnology Research: 1990 to 2005 Knowledge Flow Assessment*. Undergraduate Honors Paper. Georgia Tech. Atlanta, GA.

13. ‡Fisher, Erik. 2006. *Midstream Modulation: Integrating Societal Considerations Into and During Nanotechnology Research and Development: A Case Study in Implementing U.S. Federal Legislation*. Doctoral Dissertation. Environmental Sciences, University of Colorado, Boulder, CO.

14. ‡Flipse, Steven. 2013. *Enhancing Socially Responsible Innovation in Industry: Practical Use for Considerations of Social and Ethical Aspects in Industrial Life Science and Technology*. Doctoral Dissertation. Technical University of Delft.

15. ‡Fremling, Alicia. 2008. *SCIO: An Innovative Health Product that Uses Nanotechnology to Monitor for Cancer*. Undergraduate Honors Thesis. Barrett Honors College, Arizona State University. Tempe, AZ.

16. Fu, Jinglin. 2010. *Exploring Peptide Space for Enzyme Modulation*. Undergraduate Honors Thesis. The Barrett Honors College, Arizona State University, Tempe, AZ.

17. Gallo, Jason. 2008. *Speaking of Science: The Role of the National Science Foundation in the Development of the United States Information Infrastructure*. Doctoral Dissertation. Media, Technology and Society, Northwestern University, Evanston, IL.

18. Hall, Hannah. 2011. *Nanotechnology Applications in Urban Sustainability: An Innovative Solution to Electronic Waste Management*. Undergraduate Honors Thesis. Innovation Space, Arizona State University, Tempe, AZ.

19. ‡Hays, Sean. 2009. A Genealogical Examination and Grounded Theory of the Role of Human Enhancement Technology in American Political Culture. Doctoral Dissertation. School of Politics and Global Affairs, Arizona State University, Tempe, AZ.

20. ‡Ho, Shirley **S.** 2008. *Value Predispositions, Communication, and Attitudes Toward Nanotechnology: The Interplay of Public and Experts*. Doctoral Dissertation. Philosophy, University of Wisconsin, Madison, WI.

21. ‡Hu, Qian. 2011. *Fostering Collaboration through IT Tools and Experimental Study of Public Deliberation on Water Sustainability*. Doctoral Dissertation. Public Affairs, Arizona State University, Tempe, AZ.

22. Jolley, Craig C. 2007. *Structure and Dynamics in Photosystem I.* Doctoral Dissertation. Physics, Arizona State University, Tempe, AZ.

23. Kibel, Ashley A. 2010. *Instrumentation for Molecular Electronics Device Research.* Doctoral Dissertation. Physics, Arizona State University, Tempe, AZ.

24. Lappe, Jason. 2009. *Photoreactivation and Positive Cell Selection for the Directed Evolution of Proteins*. Doctoral Dissertation. Chemistry and Biochemistry, Arizona State University, Tempe, AZ.

25. ‡Lee, Caroline. 2009. *Innovation in Nanotechnology Services and Products: Strategic Marketing Plan*. Undergraduate Honors Thesis. Barrett Honors College, Arizona State University. Tempe, AZ.

26. Lepkowski, William. 2010. *Optimizing the Design of Partially and Fully Depleted MESFETs for Low Dropout Regulators*. Doctoral Dissertation. Electrical Engineering, Arizona State University, Tempe, AZ.

27. ‡Leung, Ricky. 2007. *Doing Nanotechnology in 21 Century China*. Doctoral Dissertation. Sociology, University of Wisconsin, Madison, WI.

28. ‡Lidberg, Shannon. 2008. *Examining Potential Futures: A Designers Toolbox for Identifying Potential Social and Cultural Implications*. Master's Thesis. School of Design, Arizona State University, Tempe, AZ.

29. ‡Lohmeier, Stephanie. 2008. *Innovation Space: Nanotechnology for Human Health*. Undergraduate Honors Thesis. Barrett Honors College, Arizona State University. Tempe, AZ.

30. ‡Lougee, Michelle. 2009. *Bridging Technology and Environment to Provide Shelter for Natural Disaster Victims*. Undergraduate Honors Thesis. Innovation Space, Arizona State University. Tempe, AZ.

31. ‡Lowder, Jessica. 2008. *Creating Sustainable Solutions with Nanotechnology, Energy, and Equity for Natural Disaster Victims*. *Undergraduate Honors Thesis*. Innovation Space, Arizona State University. Tempe, AZ.

32. ‡Lucivero, Federica. 2012. *Too Good to be True? Appraising Expectations for Ethical Technology Assessment*. Doctoral Dissertation. Technical University of Delft.

33. ‡Lull, Madeline. 2008. *Innovation Space Strategic Marketing Plan for Braille PDA*. Undergraduate Honors Thesis. Barrett Honors College, Arizona State University. Tempe, AZ.

34. Maricle, Genevieve. 2008. *Shaping Science: How to Turn Science Studies into Science Action*. Doctoral Dissertation. Environmental Studies, University of Colorado, Boulder, CO.

35. ‡McIntosh, Daniel. 2008. *Integrated New Product Development for Nanotechnology*. Undergraduate Honors Thesis. Barrett Honors College, Arizona State University. Tempe, AZ.

36. ‡Mellinger, Michelle. 2011. *Innovation Space and the Center for Nanotechnology in Society: Creating an Educational Energy Harvesting Playground*. Undergraduate Honors Thesis. Innovation Space, Arizona State University, Tempe, AZ.

37. Merkerk, Rutger van. 2008. *Intervening in Emerging Nanotechnologies: A CTA of Lab-on-a-chip Technology*. Doctoral Dissertation. Innovation & Environmental Sciences, University of Twente, The Netherlands.

38. ‡Milford, Richard. 2008. *A Dialog on Nanotechnology and Religion: New Methods in Public Engagement*. Undergraduate Honors Thesis. Barrett Honors College, Arizona State University. Tempe, AZ.

39. Panaretos, Anastasios. 2007. *A Discrete Time-Domain Electromagnetics Formulation with Minimized Numerical Artifacts*. Doctoral Dissertation. Electrical Engineering, Arizona State University, Tempe, AZ.

40. ‡Panjwani, Azra. 2007. *The Psychological Impact of Mass Surveillance on Society: A Quantitative Approach*. Master's Thesis. Department of Mathematics, Arizona State University, Tempe, AZ.

41. Philbrick, Mark. 2010. *Operationalizing Anticipatory Governance: Steering Emerging Technologies Towards Sustainability*. Doctoral Dissertation. Graduate Division, University of California, Berkeley, Berkeley, CA.

42. Pirtle, Zach. 2007. *Democratizing Nanotechnology: Intersecting the Philosophy of Science with Science Policy*. Undergraduate Honors Thesis. The Barrett Honors College, Arizona State University. Tempe, AZ.

43. ‡Reed, Jaron. 2010. *A Geospatial Analysis of Fast-Food Outlets and Demographic Variables in Phoenix, AZ: The Political Economy of Food*. Undergraduate Honors Thesis. The Barrett Honors College, Arizona State University, Tempe, AZ.

44. ‡Rogers, Lucas. 2010. *Fire Into Ice: Refrigeration Through Waste Heat in Ghanu*. Undergraduate Honors Thesis. The Barrett Honors College, Arizona State University, Tempe, AZ.

45. ‡Sandler, Shane. 2011. *Nano-piezoelectrics for Energy Generation*. Undergraduate Honors Thesis. Innovation Space, Arizona State University, Tempe, AZ.

46. ‡Schnell-Vivas, Dusana. 2008. *Innovation Space: Creating Sustainable Solutions with Nanotechnology, Energy and Equity for Native Americans Living Off the Electricity Grid*. Undergraduate Honors Thesis. Innovation Space, Arizona State University. Tempe, AZ.

47. Schuurbiers, Daan. 2009. *Social Responsibility in Scientific Practice*. Doctoral Dissertation. Department of Biotechnology, Delft Technical University, Delft, the Netherlands.

48. ‡Shaw, Timothy. 2007. *An Innovation Space Addendum: An Analysis and Critique of the Dialog Design, with the Presentation of Alternate Designs and Implications*. Undergraduate Honors Thesis. The Barrett Honors College, Arizona State University. Tempe, AZ.

49. ‡Shih, Tsung-Jen. 2009. *Public Opinion and Nanotechnology: Linking Psychological and Cultural Factors in Constructing an Integrated Theory of Public Understanding of Science*. Doctoral Dissertation. School of Journalism and Mass Communication, University of Wisconsin, Madison, WI.

50. ‡Silverman, Arielle M. 2007. *Healing the Blind? Perspectives of Blind Persons on Methods to Restore Sight*. Undergraduate Honors Thesis. The Barrett Honors College, Arizona State University. Tempe, AZ.

51. ‡Spadola, Quinn Acelia. 2008. *Novel Approaches to DNA Sequencing*. Doctoral Dissertation. Department of Physics, Arizona State University, Tempe, AZ.

52. Stubbings, Maria. 2012. *Media Portrayal of Gene Patents: Overall and Thematic Coverage*. Master's Thesis. Life Sciences Communication, University of Wisconsin-Madison, Madison, WI.

53. ‡Tang, Li. 2010. *U.S.-China Scientific Collaboration and the Role of Knowledge Moderation in Nanotechnology Development*. Doctoral Dissertation. School of Public Policy, Georgia Institute of Technology, Atlanta, GA.

54. ‡Tassiello, Lauren. 2009. *Undergraduate Honors Thesis*. Innovation Space, Arizona State University, Tempe, AZ.

55. Tosi, Justin. 2007. *Hobbe's Reply to the Foole: Obligation and Personal Identity*. Master's Thesis. Political Science, Arizona State University, Tempe, AZ.

56. Tufail, Yusuf Z. 2011. *Development of a Neurostimulation Method Using Pulsed Ultrasound*. Doctoral Dissertation. Biology, Arizona State University, Tempe, AZ.

57. ‡Valdivia, Walter. 2011. *Equity Considerations in the Assessment of the Bayh-Dole Act*. Doctoral Dissertation. Public Administration, Arizona State University, Tempe, AZ.

58. ‡Verdiani, Jennifer. 2008. *Undergraduate Honors Thesis*. Innovation Space, Arizona State University, Tempe, AZ.

59. ‡Wang, Jue. 2007. *Resource Spillover from University to High Tech Industry: Evidence from New Nanotechnology Based Firms in the U.S*. Doctoral Dissertation. School of Public Policy, Georgia Institute of Technology, Atlanta, GA.

60. ‡Watkins, Jennifer. 2008. *Altruism in Community Healthcare by Medical Professionals*. Master's Thesis. Biochemistry, Arizona State University, Tempe, AZ.

61. Williams, Berea. 2010. *Designing Recognition Elements Based on DNA Scaffolds*. Doctoral Dissertation. Chemistry, Arizona State University, Tempe, AZ.

62. ‡Wu, Ke. 2010. *Pedagogical Approach towards Socially and Economically Disadvantaged Children: An Analysis of Education-Based Non-Governmental Organizations around the World*. Undergraduate Honors Thesis. The Barrett Honors College, Arizona State University, Tempe, AZ.

63. Zhang, Jinglei. 2010. *Evolving Functional Peptides by mRNA Display*. Doctoral Dissertation. Biochemistry, Arizona State University, Tempe, AZ.

Presentations

1. **Allenby, Braden**. August, 2006. "Schumpeters Next Wave: Convergence of Nanotechnology, Biotechnology, Information Science, and Cognitive Science." Chaired and contributed to the session. Gordon Research Conference on Science and Technology Policy, Big Sky, MT.

2. Anbar, Ariel and Michael E. Smith. February 19, 2010. "The End of Earth: If Not in 2010, Then When." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

3. Anderson, Ashley A., **Dietram A. Scheufele** and **Dominique E. Brossard**. May, 2010. "Trust in Scientists: The Role of Media in Establishing Trust in Sources of Information about Nanotechnology." Presentation. Annual Convention of the World Association for Public Opinion Research, Chicago, IL.

4. Anderson, Ashley A., **Dominique E. Brossard**, **Dietram A. Scheufele** and **Michael A. Xenos**. March, 2012. "Parole Toxique? Comment L'incivilite "En Ligne" Peut Miner Les Perceptions de la Credibilite des Medias." Texte Presente au Colloque International "Com. L'Information et la Communication dans Les Enjeux Contemporains de la "Mondailisation, Co-Organise par ICA, GERIICO et la SFSIC, Roubaix, France.

5. Anderson, Ashley A., **Michael A. Xenos**, **Dominique E. Brossard** and **Dietram A. Scheufele**. August, 2012. "Caustic Comments: Measuring Incivility in Online Comments and Testing its Effects on Political Participation." Paper Presentation. The Annual Convention of the Association for Education in Journalism and Mass Communication, Chicago, IL.

6. Arora, Sanjay. May, 2012. "Website Indicators for the Strategic Management of Emerging Technologies." Poster Session. International Conference on Innovative Methods for Innovation Management and Policy, Beijing, China.

7. Arora, Sanjay, et al. February, 2012. "Commercialization of New and Emerging Technologies: A Cross Country Comparison of Graphene Firms." Poster Session. Georgia Tech Research and Innovation Conference, Atlanta, GA.

8. Arora, Sanjay, **Alan L. Porter**, **Jan Youtie** and **Philip Shapira**. 2012. "Capturing New Developments in an Emerging Technology: An Updated Search Strategy for Identifying Nanotechnology Research Output." Presentation. Global Tech Mining Conference, Montreal.

9. Arora, Sanjay, Rider W. Foley, P. Shapiro and **Arnim Wiek**. November, 2011. "Nanotechnology in Building Construction - an Industry Study of Innovation." Poster Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

10. **Askland, Andrew** and **James Elser**. October 15, 2010. "A Weak Link: Phosphorous Scarcity and Our Food Chain." Presentation. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

11. **Barben, Daniel**. July 18, 2009. "Was ist "neu" an neuen Technologien? Die vergangene und gegenwaertige Zukunft der Biotechnologie in soziologischer Perspektive." Talk. Deutsches Museum, Neue Technologien im Spannungsfeld von Wissenschaft, Politik, Oeffentlichkeit und Wirtschaft, Munich, Germany.

12. **Barben, Daniel**. June 05, 2009. "Reflexive Governance toward Sustainable Development: Combining Deliberation, Anticipation, and Transformation." Talk. 1st European Conference on Sustainability Transitions: Dynamics and Governance of Transitions to Sustainability, Amsterdam, The Netherlands.

13. **Barben, Daniel**. May 23, 2009. "Antizipatorische Governance von Zukunftstechnologien: Kapazitaetsbildung im Spannungsfeld von Technikgestaltung und Akzeptanzpolitik." Talk. German Political Science Association (DVPW), Section on Politics und Technology, Berlin University of Technology: Governance von Zukunftstechnologien, Berlin, Germany.

14. **Barben, Daniel**. June 16, 2008. "Biotechnologieregime im Gesellschaftsvergleich. Zur Soziologie neuer Wissenschaft und Technik." Guest lecture. Institute for Science and Technology Studies, University of Bielefeld, Bielefeld, Germany.

15. **Barben, Daniel**. April 16, 2007. "Innovation Regimes and Institutional Reflexivity in Comparative Perspective." Talk. Swiss Federal Institute of Technology, EAWAG: Innovation, Institutions and Path Dependency: The Management of Variation and Diversity in Innovation Systems, Zurich, Switzerland.

16. Barben, Daniel. August, 2006. "Visions of Nanotechnology in a Divided World: The Acceptance Politics of a Future Key Technology." Panel Series on Social Studies of Nanotechnology. Conference of the European Association for the Study of Science Technology (EASST), University of Lausanne, Lausanne, Switzerland.

17. Barben, Daniel and **Frank Laird**. June, 2006. "Acceptance Politics of Contested Technologies: A Comparison between Nuclear Power, Biotechnology, and Nanotechnology." Annual Meeting of the Science and Democracy Network, Kennedy School of Government, Harvard University, Cambridge, MA.

18. Benn, Troy M. November, 2008. "The Transport of Nanomaterials in Various Environments." Workshop on Nanotechnology, Equity and Equality. Center for Nanotechnology in Society at Arizona State University and Project Resultar at the Technology Policy and Assessment Center, Georgia Institute of Technology, Tempe, AZ.

19. Benn, Troy M., **Jameson Wetmore** and Ira Bennett. July, 2008. "Nanosilver from Socks into Wastewater." Experiment demonstration. Arizona Science Center, Triple Play Days, Phoenix, AZ.

20. **Bennett, Ira**. March, 2010. "Visions for Future Innovation and Implications." Presentation. Atlanta Transatlantic Workshop on Nanotechnology Innovation and Policy. Georgia Tech, Atlanta, GA.

21. **Bennett, Ira**. February, 2010. "Lessons of Engagement: Learning from Policymakers and the Public." Presentation. Annual Meeting of the American Association for the Advancement of Science, San Diego, CA.

22. **Bennett, Ira**. March, 2009. "Anticipatory Governance of Emerging Nanotechnologies." American Chemical Society, Salt Lake City, UT.

23. **Bennett, Ira**. 2009. "Thinking Longer Term about Technologies: is there Value in Science Fiction-Inspired Appraoches to Constructing Futures." Presentation. Publics and Emerging Technologies, Banff, Canada.

24. Bennett, Ira. 2007. "Frozen in Time: A Tour of Alcor Life Extension Foundation." Tour. Spirit of the Senses, Scottsdale, AZ.

25. Bennett, Ira. 2007. "What if I Dont Want My Advisors Job: Careers Outside (gasp) the Academic Laboratory." Talk. Association of Women in Science Central Arizona Chapter, Tempe, AZ.

26. Bennett, Ira. 2006. "Emerging Technologies." Talk. Spirit of the Senses, Phoenix, AZ.

27. **Bennett, Ira** and **Jameson Wetmore**. December 18, 2012. "Exploring Nanotechnology around the World." Presentation. Books and Beakers, Yard Gnome Bookstore, Phoenix, AZ.

28. **Bennett, Ira** and **Jameson Wetmore**. September 12, 2011. "Science and Regulatory Challenges of Commercial Nanoparticles." Presentation. Science Cafe', Berkeley, CA.

29. Bennett, Ira and Tim Boyd. November 16, 2012. "Equity in the Nano City: How Can Nanotechnology Empower Equitable Water Distribution?" Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

30. Binder, Andrew R., Michael A. Cacciatore, **Dietram A. Scheufele**, Bret R. Shaw and **Elizabeth A. Corley**. August, 2010. "Measuring Perceptions of Emerging Technologies: Errors in Survey Self-Reports and their Potential Impact on Communication of Public Opinion Toward Science." Presentation. Annual Convention of the Association for Education Journalism and Mass Communication, Denver, CO.

31. **Bowditch, Rachel**, Matt Watkins and **Karin D. Ellison**. October 16, 2009. "Bone Portraits: Scenes from a Play about the Invention of the X-Ray." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

32. **Brossard, Dominique E.**, Eunkyung Kim and **Dietram A. Scheufele**. May, 2007. "The Politics of Nanotech: Communication and Opinion Formation about Scientific Issues and Policies." Paper presentation. Annual convention of the International Communication Association, San Francisco, CA.

33. **Brune, Daniel C.** and **David Conz**. October 29, 2006. "Alternative Fuels: What We Can Do (and Cant Do) to Make Our Skies Blue Again." Public talk. CNS-ASU Science Cafe, Changing Hands Bookstore, Tempe, AZ.

34. Cacciatore, Michael A., **Dietram A. Scheufele** and **Elizabeth A. Corley**. December, 2012. "Communicating Risks about Science: Exploring the Interactive Effects of Cognitive Schema and Journalist News Frames on Public Risk Perceptions." Paper Presentation. The Annual Convention of the Society for Risk Analysis, San Francisco, CA.

35. Cacciatore, Michael A., **Dietram A. Scheufele** and **Elizabeth A. Corley**. August, 2011. "Institutional Trust, Risk Information Processing and Support for an Emerging Technology." Paper Presentation. Annual Convention of the Association for Education in Journalism & Mass Communication, St. Louis, MO.

36. Cacciatore, Michael A., **Dietram A. Scheufele** and **Elizabeth A. Corley**. January, 2011. "Re-examining Science Knowledge Acquisition: Exploring the Internet as a Leveler of Education-Based Nanotechnology Knowledge Gaps." Paper Presentation. All Hands Meeting for the Center for Nanotechnology in Society at ASU, Tempe, AZ.

37. Cacciatore, Michael A., **Dietram A. Scheufele** and **Elizabeth A. Corley**. August, 2010. "A New (Methodological) Look at Science Knowledge Gaps: Merging Trend-Data to Examine Widening Nanotechnology Knowledge Gaps." Presentation. Annual Convention of the Association for Education in Journalism and Mass Communication, Denver, CO.

38. Cacciatore, Michael A., **Dietram A. Scheufele** and **Elizabeth A. Corley**. May, 2010. "The Emergence of Nanotechnology Knowledge Gaps: Differences in Knowledge across Education Levels and Media Exposure." Presentation. Annual Convention of the American Association for Public Opinion Research, Chicago, IL.

39. Cacciatore, Michael A., **Dietram A. Scheufele** and **Elizabeth A. Corley**. May, 2010. "From Enabling Technology to Applications: The Evolution of Risk Perceptions about Nanotechnology." Paper Presentation. National Science Foundation Site Visit for the Center for Nanotechnology in Society at ASU, Tempe, AZ.

40. Cacciatore, Michael A., **Dietram A. Scheufele** and **Elizabeth A. Corley**. November, 2009. "In God we Trust? Exploring the Link between Religiosity and Risk Perceptions in Nanotechnology Attitude Formation." Presentation. Annual Convention of the Midwest Association for Public Opinion Research, Chicago, IL.

41. Cacciatore, Michael A., **Dietram A. Scheufele** and **Elizabeth A. Corley**. August, 2009. "It depends on what you have heard: Exploring the Link between Risk Perception and Attitudes across different Applications of Nanotechnology." Presentation. Annual Convention of the Association for Education in Journalism and Mass Communication, Boston, MA.

42. Cacciatore, Michael A., **Dietram A. Scheufele**, **Elizabeth A. Corley**, **Philip Shapira** and **Jan Youtie**. April, 2012. "Practicing what they preach? Comparing the Self-Reported Attitudes of Nanoscientists with their EHS Publication Records." Paper Presentation. 12th International Public Communication of Science and Technology Conference, Florence, Italy.

43. Cacciatore, Michael A., **Dietram A. Scheufele**, **Elizabeth A. Corley**, **Philip Shapira** and **Jan Youtie**. December, 2011. "Do Leading U.S. Nanoscientists Practice what they preach? Using Publication Records as a Predictor of Scientists' Attitutudes toward the Regulation and Communication of Nanoscience." Paper Presentation. Annual Convention of the Society for Risk Analysis, Charleston, SC.

44. Cacciatore, Michael A., **Dietram A. Scheufele**, Sarah K. Yeo, Michael A. Xenos, Doo-Hun Choi, **Dominique E. Brossard**, et al. June, 2013. "Misperceptions in Polarized Politics: The Role of Knowledge, Religiosity and Media." Paper Presentation. The Annual Convention of the International Communication Association, London, England.

45. Cacciatore, Michael A., Doo-Hun Choi, **Dietram A. Scheufele** and **Elizabeth A. Corley**. November, 2011. "Unpacking the Relationships between Religiosity, Deference to Scientific Authority and Support for Nanotechnology: A Structural Equation Modeling Approach." Paper Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

46. Cacciatore, Michael A., Doo-Hun Choi, **Dietram A. Scheufele** and **Elizabeth A. Corley**. August, 2011. "Support for Emerging Technologies: Disentagling the Predispositional, Affective and Cognitive Pathways." Paper Presentation. Annual Convention of the Association for Education in Journalism & Mass Communication, St. Louis, MO.

47. Cacciatore, Michael A., Doo-Hun Choi, **Dietram A. Scheufele** and **Elizabeth A. Corley**. Under review, "Religiosity, Deference to Scientific Authority and Support for Nanotechnology: A Structural

Equation Modeling Approach." Paper submission. Annual meeting of the Association for Education in Journalism and Mass Communication, St. Louis, MO.

48. Cacciatore, Michael A., Sara K. Yeo, **Dominique E. Brossard**, **Dietram A. Scheufele**, Kristin K. Runge, Leona Yi-Fan Su, et al. November, 2012. "Partisan Amplification of Risk: American Perceptions of Nuclear Energy Risk in the Wake of the Fukushima Daiichi Disaster." Paper Presentation. The Annual Convention of hte Midwest Associate for Public Opinion, Chicago, IL.

49. Cacciatore, Michael A., Sara K. Yeo**, Dominique E. Brossard**, **Dietram A. Scheufele**, Kristin K. Runge, Leona Yi-Fan Su, et al. Under review, "Partisan Amplification of Nuclear Energy Risk in the Wake of the Fukushima Daiichi Disaster." Paper Presentation. The Annual Conference of the Association for Education in Journalism and Mass Communication, Washington, DC.

50. Cacciatore, Michael A., Sarah K. Yeo, L. Y-F Su, Doo-Hun Choi, Michael A. Xenos, **Dietram A. Scheufele**, et al. 2012. "Is Facebook Making us Dumber? Exploring Social Media use as a Predictor of Political Knowledge." Paper Presentation. Annual Convention of the Association for Education in Journalism and Mass Communication, Chicago, IL.

51. Calleja, Antonio and **Erik Fisher**. 2009. "Dialogues from the Lab: Contemporary Maieutics for Socio-Technical Inquiry." Presentation. Converging Technologies, Changing Societies. Proceedings for Philosophy and Technology. University of Twente, the Netherlands.

52. Carley, Stephen. November 16, 2012. "Valuing Government Collaborator Inovolvement in University-Industry Partnerships." Doctoral Research on Nanotechnology Triple Helix C. Workshop on Original Policy Research, Georgia Institute of Technology School of Public Policy, Atlanta, GA.

53. Carley, Stephen. October 19, 2007. ""Nano Research Profiling on Demand" on nanotechnology datamining techniques and applications." Poster Presentation. Atlanta Conference on Science, Technology, and Innovation Policy, Atlanta, GA.

54. Carley, Stephen and **Alan L. Porter**. November 05, 2011. "A New Measure of Knowledge Diffusion." Session. Measuring Research Interdisciplinarity and Knowledge Diffusion, American Evaluation Association.

55. Carley, Stephen, **Alan L. Porter** and Li Tang. November, 2011. "Testing for Nano EHS Convergence at the State Level." Poster Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

56. **Carlson, Marilyn P.** April, 2006. "An Overview of a Project to Improve Mathematics and Science Education for a Technical Society: Cognitive Research Informs Curriculum Development and Instructional Support." Presentation. Materials Research Society Symposium on Education in Nanoscience and Engineering, San Francisco, CA.

57. Choi, Doo-Hun, Anthony D. Dudo and **Dietram A. Scheufele**. November, 2011. "U.S. Newspaper Coverage of Neuroscience Nanotechnology." Paper Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

58. Choi, Doo-Hun, Anthony D. Dudo and **Dietram A. Scheufele**. January, 2011. "Food Nanotechnology in the News: Coverage Patterns and Thematic Emphases during the Last Decade." Paper Presentation. All Hands Meeting for the Center for Nanotechnology in Society at ASU, Tempe, AZ.

59. Choi, Doo-Hun, Michael A. Cacciatore, **Dietram A. Scheufele** and **Elizabeth A. Corley**. November, 2011. "Nanotechnology and Talk: Differential Gains Model for an Emerging Technology." Paper Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

60. Choi, Doo-Hun, Michael A. Cacciatore, **Dietram A. Scheufele** and **Elizabeth A. Corley**. August, 2011. "Connecting Interpersonal Discussion and the Internet: How Interpersonal Discussion Moderates the Effect of the Internet on being informed about Nanotechnology." Paper Presentation. Annual Convention of the Association for Education in Journalism & Mass Communication, St. Louis, MO.

61. Choi, Doo-Hun, Michael A. Cacciatore, **Dominique E. Brossard** and **Michael A. Xenos**. May, 2012. "Disentangling Public Opinion of Nanotechnology: Exploring the Interactive Effects of News Media, Values, and Information Processing on Opinion Formation." Paper Presentation. Annual Convention of the American Association for Public Opinion Research, Orlando, FL.

62. Choi, Doo-Hun, Michael A. Cacciatore, **Michael A. Xenos**, **Dietram A. Scheufele** and **Dominique E. Brossard**. May, 2012. "The Digital Producation Gap: The Role of News Media Use, Information Processing, and Opinion Expression." Paper Presentation. Annual Conference of the International Communication Association, Phoenix, AZ.

63. Choi, Doo-Hun, Michael A. Cacciatore, **Michael A. Xenos**, **Dietram A. Scheufele**, **Dominique E. Brossard** and **Elizabeth A. Corley**. Under review, "How do Individuals Develop Attitude Extremity in the New Media Environment? The Interplay between the Internet, Schemas, and Information Seeking." Paper Presentation. The Annual Conference for the Association for Education in Journalism and Mass Communication, Washington, DC.

64. Choi, Doo-Hun, Michael A. Cacciatore, Youngjae Kim, **Dietram A. Scheufele** and **Dominique E. Brossard**. Forthcoming, May, 2013. "Issue Publics in Nanotechnology in the New Media Environment." Paper Presentation. The Annual Convention of the American Association for Public Opinion Research, Boston, MA.

65. **Cobb, Michael D.** March, 2009. "Public Engagement: National Citizens Technology Forum." Presentation. Nanotechnology and Public: Data for Decision Makers briefing to the U.S. Congressional Nanotechnology Caucus, Washington, DC.

66. **Cobb, Michael D.** January, 2009. "U.S. Public Opinion about Nanotechnologies used for Human Enhancements: Consensus Conferences, Deliberation and Framing Effects on Risk Perceptions." Communicating Emerging Technologies II: Risks and Uncertainties, University of Nevada, Las Vegas, NV.

67. **Cobb, Michael D.** and **Patrick Hamlett**. June 27, 2008. "The First National Citizens Technology Forum on Converging Technologies and Human Enhancement: Adapting the Danish Consensus Conference in the USA." Paper presentation. Tenth International Conference on Public Communication of Science and Technology (PCST-10), Malmo, Sweden.

68. Coleman, Grisha and Aaron Golub. October 19, 2012. "Moving in the Nano City: What Will the Impact Be." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

69. Conley, Shannon. April, 2009. "Nanotechnology Policy in Cambridge, Massachusetts: Local Reflexive Governance." Presentation. Midwest Political Science Association Conference, Chicago, IL.

70. Conley, Shannon. November, 2008. "Regulating Life: The Regulation of Assisted Reproduction in Canada and the UK." Center for the Study of Institutional Diversity Weekly Seminar Series, Arizona State University, Tempe, AZ.

71. **Conz, David**. October 12, 2007. "Reflexivity Assessment of STS Engagement of Nanotechnology." Presentation. Annual Meeting of the Society for Social Studies of Science, Montreal, Canada.

72. **Corley, Elizabeth A.** April, 2011. "Soft Law Mechanisms for Nanotechnology Governance." Paper Presentation. Workshop on Soft Law Oversight Mechanisms for Nanotechnology, Scottsdale, AZ.

73. **Corley, Elizabeth A.** March, 2011. "Public Attitudes about Nanotechnology Regulation." Paper Presentation. Biggest Issues for the Smallest Stuff: Regulation and Risk Management of Nanotechnology, Phoenix, AZ.

74. **Corley, Elizabeth A.** March, 2010. "Public Attitudes about Nanotechnology." Paper Presentation. NNI Capstone Workshop: Risk Management Methods & Societal, Ethical, and Legal Implications of Nanotechnology, Washington, DC.

75. **Corley, Elizabeth A.** 2010. "Expert and Public Perceptions about Nanotechnology Risks, Benefits and Regulations." Paper Presentation. David Lincoln Lecture Series, Paradise Valley, AZ.

76. **Corley, Elizabeth A.** 2009. "Public and Nano-Scientist Perceptions about Nanotechnology. Workshop on Emerging Technologies, Military Operations and National Security." Presentation. Case Western University, Cleveland, OH.

77. **Corley, Elizabeth A.** 2009. "Eliciting Public Understanding of and Values toward Emerging Technologies through Opinion Polls." Presentation. Society for the Study of Nanoscience and Emerging Technologies, Seattle, WA.

78. **Corley, Elizabeth A.** July, 2008. "Societal Dimensions of Nanotechnology: An Exploration of Public and Scientist Perceptions." Invited presentation. Young Scientists Nanotechnology Workshop, French Embassy, Washington, DC.

79. **Corley, Elizabeth A.** April, 2008. "Scientists and the Public: Comparing Views on Nanotechnology Risks and Regulations." Talk. CSPO Enlightening Lunch, Arizona State University, Tempe, AZ.

80. **Corley, Elizabeth A.** 2008. "Scientist and the Public Risk Perceptions about Nanotechnology." Societal Implications of Nanotechnology 2008 Principal Investigators Meeting at National Science Foundation, Arlington, VA.

81. **Corley, Elizabeth A.** and Dietram A. Scheufele. February, 2008. "A Comparative Look at Markets, Media, and Emerging Attitudes about Nanotechnology." Presentation. American Association for the Advancement of Science (AAAS) Annual Meeting, Boston, MA.

82. **Corley, Elizabeth A.** and **Dietram A. Scheufele**. November, 2006. "Factors Impacting Public Support of Federal Funding for Nanotechnology." Presentation. 28th Annual Association for Public Policy Analysis and Management Research Conference, Madison, WI.

83. **Corley, Elizabeth A.**, **Dietram A. Scheufele** and Qian Hu. November, 2008. "Exploring Public and Scientist Attitudes About the Risks and Regulation of Nanotechnology Research: What Does the Future Hold for Policy-Making?" Presentation. Annual convention of the Association for Policy Analysis and Management, Los Angeles, CA.

84. **Corley, Elizabeth A.**, **Dietram A. Scheufele**, **Sharon Dunwoody**, **Elliott D. Hillback**, **Tsung-Jen Shih** and **David H. Guston**. October, 2007. "Nanotechnology Attitudes among Scientists and the Public." Presentation. Annual Meeting, Society for Social Studies of Science, Montreal, Canada.

85. **Corley, Elizabeth A.** and **Jan Youtie**. 2009. "Learning to Manage Multi-institutional Multidisciplinary Research Centers: A Case Study the LIFE Center." Paper Presentation. 10th Public Management Research Association Conference.

86. Cortes Lobos, Rodrigo. October, 2012. "Advocacy Groups Participation in the Public U.S. agrifood Nanotechnology Research Agenda." Presentation. Fourth Annual Conference of Society for the Study of Nanoscience and Emerging Technologies, Twente, the Netherlands.

87. Cortes Lobos, Rodrigo. March, 2012. "Can Nanotechnology research contribute to Sustainable Development of the US Agri-food sector?" Presentation. S&T Global PhD Conference, Washington, DC.

88. Cortes Lobos, Rodrigo. November, 2011. "The Chilean Nanotechnology Sector: Catching up or falling behind." Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

89. Cortes Lobos, Rodrigo. September, 2011. "Nanotechnology and the Millennium Development Goals: Energy, Water, and Agri-food." Presentation. Atlanta Conference on Science and Innovation Policy, Atlanta, GA.

90. Cortes Lobos, Rodrigo. May, 2011. "Can Agri-food Nanotechnology contribute to achieve the Millennium Development Goals in Developing Countries?" Presentation. 7th International Globelics Academy, Tampere, Finland.

91. **Cozzens, Susan**. March, 2013. "Invited Lecture." Tshwane University of Technology, South Africa.

92. **Cozzens, Susan**. October, 2012. "Equity, Equality, and National Contexts: The U.S. and South Africa as Environments for Nanotechnologies." Presentation. Fourth Annual Conference of Society for the Study of Nanoscience and Emerging Technologies, Twente, the Netherlands.

93. **Cozzens, Susan**. April 03, 2012. "Keynote Lecture." NanoAfrica Conference, Bleoemfontein, South Africa.

94. **Cozzens, Susan**. April, 2012. "Environmental Health and Safety in Nanotechnology: A Critical Interface with the Public." Presentation. NanoAfrica 2012, University of Freestate, South Africa.

95. **Cozzens, Susan**. November, 2011. "Equity, Equality, and Development: A Framework for Analyzing Nanotechnology Potentials." Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

96. **Cozzens, Susan**. July, 2011. "Equity, Equality, and Nanotechnology." Presentation. Tshwane University of Technology, Pretoria, South Africa.

97. **Cozzens, Susan**. January, 2011. "TRC 1 - Equity and Responsibility Program Assessment." Presentation. Center for Nanotechnology in Society at ASU, Tempe, AZ.

98. **Cozzens, Susan**. December 03, 2010. "Knowledge to Policy: Contributing to the Measurement of Social, Health, and Environmental Benefits." Presentation. Science Measurement Workshop presented by the Office of Science and Technology Policy, Washington, DC.

99. **Cozzens, Susan**. July, 2010. "Nanotechnology and Society." Presentation. REU students at GA Tech NNIN Node, Atlanta, GA.

100. **Cozzens, Susan**, Rodrigo Cortes Lobos, Diran Soumonni and Thomas Woodson. November, 2011. "Nanotechnology and the Millennium Development Goals: Energy, Water, and Agri-food." Presentation. Globelics, Argentina.

101. **Dalrymple, Kajsa E.**, Amy B. Becker, **Dominique E. Brossard, Dietram A. Scheufele** and Al C. Gunther. August, 2009. "Getting Citizens Involved: How Controversial Science Policy Debates Stimulates Issue Participation during a Political Campaign." Presentation. Annual Convention of the Association for Education in Journalism and Mass Communication, Boston, MA.

102. **Dalrymple, Kajsa E.**, **Dietram A. Scheufele** and **Elizabeth A. Corley**. May, 2009. "Proximity to Experts? Rethinking Operationalizations of Cognitive Outcomes Based on Dual-source Measures." Paper presentation. International Communication Association (Mass Communication Division) Conference, Chicago, IL.

103. Davies, Sarah R. November, 2011. "Knowing and Loving: Pleasure in Public Engagement." Presentation. 4S Annual Meeting, Cleveland, OH.

104. Davies, Sarah R. September, 2011. "Invited Discussant." Inaugural Conference of the Belgian Science, Technology and Society (BSTS) Network, Brussels.

105. Davies, Sarah R. September, 2011. "Deliberating Futures: Pathways, Locales, and Imagery in the Imagination of Technoscientific Change." Paper Presentation. Governing Futures Conference, Vienna.

106. Davies, Sarah R. May 16, 2011. "NanoEthics: Responsibility, Risk, and Responsible Innovation." Presentation to Private Sector audience. Training Session, SESHA (ESH for High Technology) Annual Symposium, Scottsdale, AZ.

107. Davies, Sarah R. December, 2010. "Deliberation beyond Discourse: Experimenting with Science-Society Engagement." Presentation. CSPO Enlightening Lunch, Arizona State University, Tempe, AZ.

108. Davies, Sarah R. November, 2010. "Public Engagement: Genealogies and Reflections." Presentation. Practices of Anticipatory Governance Workshop, Arizona State University, Tempe, AZ.

109. Davies, Sarah R. September, 2010. ""Unethical for them": The Ethical as a Category in Public Talk." Presentation. Annual Meeting of the Society for the Study of Nanoscience and Emerging Technologies, Darmstadt, Germany.

110. Davies, Sarah R. April, 2010. "How we talk when we talk about Nano: Public Discussion of Future Technologies." Presentation. Center for Nanotechnology in Society, University of California Santa Barbara, Santa Barbara, CA.

111. Davies, Sarah R., **Cynthia Selin**, Gretchen Gano and **Angela Pereira**. May, 2011. "Finding Futures." Presentation. Science in a Digital Society, EC-JRC Workshop, Lisbon.

112. Davies, Sarah R. and **Denisa Kera**. February, 2012. "DIY Micro-Governance: Hackerspaces as Science Policy." Presentation. Inaugural Asia Pacific Science Policy Studies Research Conference, Wellington, New Zealand.

113. Davies, Sarah R. and **Noela Invernizzi**. November, 2011. "Nanotechnology and the Private Sector: Innovation, Governance, and Regulation." Panel Organizer. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

114. Dudo, Anthony D. May, 2010. "Project Overview: Nanotechnology in the News." Paper Presentation. National Science Foundation Site Visit for the Center for Nanotechnology in Society at ASU, Tempe, AZ.

115. Dudo, Anthony D., **Dominique E. Brossard**, **James Shanahan**, **Dietram A. Scheufele**, Michael Morgan and **Nancy Signorelli**. August, 2009. "Science on Television in the 21st Century: Recent Trends in Portrayals and their Contributions to Public Attitudes toward Science." Presentation. Annual Conference of the Association for Education in Journalism and Mass Communication, Boston, MA.

116. Dudo, Anthony D., Doo-Hun Choi and **Dietram A. Scheufele**. January, 2011. "Food Nanotechnology in the News: Coverage Patterns and Thematic Emphases during the Last Decade." Paper Presentation. All Hands Meeting for the Center for Nanotechnology in Society at ASU, Tempe, AZ.

117. Dudo, Anthony D., **Sharon Dunwoody** and **Dietram A. Scheufele**. August, 2009. "The Emergence of Nano News: Tracking Thematic Trends and Changes in Media Coverage of Nanotechnology." Presentation. Annual Convention of the Association for Education in Journalism & Mass Communication, Boston, MA.

118. Falls, Dee Dee and Adriene Jenik. January 18, 2013. "Learning in the Nano City." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

119. **Fernandez-Ribas, Andrea**. October 03, 2009. "Firms' Global Patent Strategies in an Emerging Technology." Paper presentation. Atlanta Conference on Science and Innovation Policy, Atlanta, GA.

120. **Fernandez-Ribas, Andrea** and **Philip Shapira**. October, 2009. "The Globalization of Innovation in Nanotechnology: Some Empirical Evidence for US, Japanese, and European Firms." Presentation. 2009 Atlanta Conference on Science and Innovation Policy, Atlanta, GA.

121. **Fernandez-Ribas, Andrea** and **Philip Shapira**. May, 2008. "Technological Diversity, Scientific Excellence and the Location of Inventive Activities Abroad: The Case of Nanotechnology." Presentation. National Bureau of Economic Research (NBER) Nanobank Conference, Boston, MA.

122. **Fichtner, Aaron**. 2007. "Preliminary Results: The Workforce Needs of Companies Using Nanotechnology in Arizona." Presentation. Nanotechnology 2007 Conference, San Jose, CA.

123. Finn, Edward and Arnim Wiek. September 12, 2012. "Envisioning the Nano City: How Will it Look." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

124. **Fisher, Erik**. September, 2012. "Exploring the Possibility, Utility, and Meaning of Lab-based Socio-Technical Collaborations." Preentation. Science of Science and Innovation Policy Conference 2012. The National Academy of the Sciences, Washington, DC.

125. Fisher, Erik. June, 2012. "Broader Societal Implications: Long-Term Scenarios, Challenges for Humankind." Presentation. NBIC2: International Study on Converging Technologies for Societal Benefit. The National Science Foundation.

126. Fisher, Erik. April 26, 2012. "Self-Critical Public Science: How to Integrate Creativity and Responsiblity." Presentation. New Tools for Science Policy Seminar. ASU Washington Center, Washington, DC.

127. **Fisher, Erik**. March 22, 2012. "The Code of Conduct for Responsible Nanosciences and Nanotechnologies Research as a Platform for Deliberation." Presentation. Soft Law Oversight Mechanisms for Nanotechnology. Skysong, Arizona State University.

128. **Fisher, Erik**. November, 2011. "Stirring the Governance Capacities of Experts-in-the-Making." Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

129. Fisher, Erik. November, 2011. "Lost in the NanoWorld: 10 years of Emergence." Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

130. **Fisher, Erik**. June 17, 2011. "Future Regimes of Science, Politics and Convergence Work." Presentation. The Future of Science and Society: A Symposium in Honor of Arie Rip, University of Twente.

131. **Fisher, Erik**. May, 2011. "Responsible Innovation R&D: the US Experience." Presentation. . Franco-British Workshop on Responsible Innovation: From Concepts to Practice. Residence of the French Ambassador, London.

132. **Fisher, Erik**. May, 2011. "STIR Spin-offs: Beyond the Laboratory Engagement Study." Presentation. Institute for Innovation and Governance Studies. University of Twente.

133. **Fisher, Erik**. February 16, 2011. "Workshop Public Agenda: International Network for Responsible Innovation." Workshop organizer and principal investigator. STIR Project Workshop 4, Washington, DC.

134. **Fisher, Erik**. February, 2011. "STIR Project Overview." Presentation. International Network for Responsible Innovation. STIR Project Workshop. Woodrow Wilson International Center for Scholars, Washington, DC.

135. **Fisher, Erik**. December 03, 2010. "Public Value Integration in Science and Innovation Policy Processes." Presentation. Science Measurement Workshop presented by the Office of Science and Technology Policy, Washington, DC.

136. **Fisher, Erik**. October 28, 2010. "Science, Democracy and the Reinvention of the Liberal Arts." Presentation. Lowdenslager Annual Lecture. Western State College, Gunnison, CO.

137. **Fisher, Erik**. October, 2010. "Midstream Modulation and Socio-Technical Integration Research." Presentation. Ethics on the Work Floor: Interdisciplinary Research and Responsible Innovation workshop. Technical University of Delft, Delft, Netherlands.

138. **Fisher, Erik**. October, 2010. "Socio-Technical Integration Research." Presentation. NSF Science of Science and Innovation Policy Workshop: Building a Community of Practice II. American Association for the Advancement of Science, Washington, DC.

139. **Fisher, Erik**. August, 2010. "Integration Outcomes." Presentation. Integration Study Comparisons. STIR Project Workshop. University of Tokyo, Tokyo, Japan.

140. **Fisher, Erik**. June 09, 2010. "Lab-level Socio-technical Integration." Presentation. Genome British Columbia, GSEAC Retreat, Vancouver, Canada.

141. **Fisher, Erik**. June 02, 2010. "Midstream Modulation of Emerging Technology: Probing the Capacity of Research Decisions." Presentation. Research Council of Norway, Oslo, Norway.

142. **Fisher, Erik**. April, 2010. "The Political Ethnography of Lab-Level Bureaucrats: Probing the Capacity of Research Decisions." Presentation. Midwest Political Science Association 68th Annual National Conference, Chicago, IL.

143. **Fisher, Erik**. February 27, 2010. "What is Midstream Modulation?" Presentation. Reflexive Systems Biology Kick-Off Meeting. University of Bergen, Bergen, Norway.

144. **Fisher, Erik**. February 26, 2010. "TA-Trends in the U.S.." Keynote Lecture. TA Workshop: Keeping Pace with T.A. Instituut Samenleving and Technologie. Flemish Parliament, Brussels, Belgium.

145. **Fisher, Erik**. September 08, 2009. "Integration and Reflexivity: Integrating Social Science and Humanisitic Work with Laboratory Research in Emerging Science and Technology." Presentation. S.NET Pre-Conference Workshop: Real-time Technology Assessment and Anticipatory Governance. University of Washington.

146. **Fisher, Erik**. July, 2009. "Inquiry as Intervention." STIR Workshop 2: Inquiry as Intervention, Vatnahalsen, Norway. July 4-7, 2009.

147. **Fisher, Erik**. June, 2009. "Laboratory Engagement, STIR: Initial Project Results." Presentation. TA NanoNed Annual Meeting, Utrecht, the Netherlands.

148. **Fisher, Erik**. June, 2009. "The Two Cultures in Science Policy." Presentation. Center for Science and Technology Policy Research. University of Colorado at Boulder, Boulder, CO.

149. **Fisher, Erik**. June, 2009. "Science and Society in the Laboratory? Reflections of an Embedded Humanist." Presentation. Colorado Fuel Cell Center. Colorado School of Mines, Golden, CO.

150. **Fisher, Erik**. June, 2009. "Integrating Science and Society in Nanotechnology Laboratories." Presentation. The Nano Renewable Energy Summit, Denver, CO.

151. **Fisher, Erik**. June, 2009. "Integrating Ethics and Engineering in the Laboratory: Reflections of an Embedded Humanist." Presentation. Graduate Interdisciplinary Liberal Engineering Ethics Workshop on Integrating Ethics and Societal Issues into a Graduate Curriculum. Virginia Tech, Blacksburg, VA.

152. **Fisher, Erik**. May 18, 2009. "Inquiry and Nanotechnology." Presentation. Human Practices Workshop. University of California at Berkeley, Berkeley, CA.

153. **Fisher, Erik**. May, 2009. "The "Two Cultures" in Science Policy Today." Presentation. University of Colorado-Denver, School of Public Affairs, Denver, CO.

154. **Fisher, Erik**. March, 2009. "Socio-Technical Integration Research." Presentation. Research Funding and the Good Life, University of Twente, the Netherlands.

155. **Fisher, Erik**. January, 2009. "STIR Project Overview." STIR Workshop 1: Constructing Foundations. Arizona State University, Tempe, AZ.

156. **Fisher, Erik**. November, 2008. "Deliberation on the Implementation of a Code of Conduct and fostering International Dialogue and Collaboration." Expert participant. European Commission, Brussels, Belgium.

157. **Fisher, Erik**. November, 2008. "Nanotechnology: Environment, Health and Safety." Presentation. Environmental Professionals of Arizona / Academy of Certified Hazardous Materials Managers, Tempe, AZ.

158. **Fisher, Erik**. October, 2008. "Laboratory Engagements: Risky Discourse and Research Decisions." Presentation. Networks, Risk and Knowledge Sharing, University of Massachusetts, Amherst, MA.

159. **Fisher, Erik**. July, 2008. "Collaborations for Financial Success: Universities Collaborating with Government and the Private Sector." Panelist. The Nano Renewable Energy Summit, Denver, CO.

160. **Fisher, Erik**. July, 2008. "Midstream Modulation: Embedding the Humanities in Engineering Practice and Education." Presentation. Kluyver Colloquium, Delft Technical University, Delft, the Netherlands.

161. **Fisher, Erik**. April, 2008. "Embedded Humanists." Presentation. Engineering in Context, Colorado School of Mines, Golden, CO.

162. **Fisher, Erik**. March, 2008. "Midstream Modulation and the Politics of Engagement." Presentation. STS in Action, Claremont, CA.

163. **Fisher, Erik**. December, 2007. "Inventing the Socially Conscious Laboratory." Presentation. Consortium for Science, Policy & Outcomes, Arizona State University, Tempe, AZ.

164. **Fisher, Erik**. September, 2007. "Integrating Social Considerations into Nanotechnology Research." Presentation. 1st Rocky Mountain Nanotechnology Showcase, Denver, CO.

165. **Fisher, Erik**. August, 2007. "Broader Impacts and the Embedded Humanist." Presentation. Making Sense of the Broader Impacts of Science and Technology, Golden, CO.

166. **Fisher, Erik**. July, 2007. "Integrating Societal Considerations and Nanotechnology in the Four Corners Region." Presentation. Colorado Nanotechnology Alliance, Denver, CO.

167. **Fisher, Erik**. June 27, 2007. "Integrating Science and Society in the Laboratory." Presentation. Center for Integrated Nanotechnologies, Los Alamos National Laboratory, Los Alamos, NM.

168. **Fisher, Erik**. June, 2007. "Drilling Down on U.S. Ethics Policy for Nanotechnology." Presentation. Center for Interdisciplinary Research (ZiF), Bielefeld University, Bielefeld, Germany.

169. **Fisher, Erik**. June, 2007. "Socio-technical Integration and the Nanotechnology Laboratory." Presentation. Visions about Nanoscience and Technology Workshop, Leuven, Belgium.

170. **Fisher, Erik**. June, 2007. "Investigating the Implementation of U.S. Ethics Policy for Nanotechnology." Presentation. Institute for Technology Assessment and Systems Analysis, Forschungszentrum Karlsruhe in der Helmholtz-Gemeinschaft, Karlsruhe, Germany.

171. **Fisher, Erik**. June, 2007. "Engaging the Reflexive Capacity of Nanotechnology Researchers." Presentation. Nanotechnology, Ethics & Sustainability; NANOMAT Conference, Bergen, Norway.

172. **Fisher, Erik**. June, 2007. "Socio-technical Integration at Macro and Micro Levels." Presentation. Rathenau Institute, Den Haag, The Netherlands.

173. **Fisher, Erik**. January, 2007. "Social and Policy Issues in Nanotechnology." Presentation. 5th CINT Users Workshop, Center for Integrated Nanotechnologies, Albuquerque, NM.

174. **Fisher, Erik**. November 20, 2006. "Current Societal Considerations in Nanotechnology." Presentation. Center for Integrated Nanotechnologies, Los Alamos National Laboratory, Los Alamos, NM.

175. **Fisher, Erik**. November, 2006. "Reflecting on the Shape of Nanotechnology Research from Within." Presentation. 4S Conference (Society for Social Studies of Science), Vancouver, Canada.

176. **Fisher, Erik**. September, 2006. "Socratic Engagement of Nanotechnology: A Case Study in Ethics Policy." Presentation. University of North Texas, Department of Philosophy and Religion Studies, Denton, TX.

177. Fisher, Erik. August, 2006. "From Upstream Engagement to Midstream Modulation: Shaping Technology from Within." Poster presentation. Gordon Research Conference on Science and Technology Policy, Big Sky, MT.

178. Fisher, Erik. July, 2006. "Midstream Modulation: U.S. Federal Nanotechnology Policy Implementation." Presentation. TA NanoNed Day, Utrecht University, the Netherlands.

179. Fisher, Erik. May, 2006. "Midstream Modulation of Technological Trajectories." Trading Zones and Interactional Expertise Workshop, Arizona State University, Tempe, AZ.

180. **Fisher, Erik** and Antonio Calleja. October, 2009. "Reflexive Modulation of Laboratory Practices for the Governance of Science and Technology." Presentation. Society for the Social Studies of Science Annual Meeting, Washington, DC.

181. **Fisher, Erik**, **Daan Schuurbiers** and **Harro Van Lente**. June, 2011. "A Whole New Set of Lab Responsibilities? Responsible Innovation and its Consequences for Research Practices." Presentation. Risky Entanglements? Contemporary Research Cultures Imagined and Practiced, Vienna, Austria.

182. **Fisher, Erik** and **David H. Guston**. July, 2011. "Integration of Social Science and Humanities Scholars with Natural Scientists." Presentation. Anticipatory Governance of Emerging Technologies: Foresight, Engagement and Integration. Euroscience Open Forum, Turino, Italy.

183. **Fisher, Erik** and **David H. Guston**. June, 2010. "Changing Practices: An Engagement of Expert Epistemologies in the Making." Presentation. Ninth Annual Meeting of the Science and Democracy Network. Kavli Royal Society International Centre, Chicheley Hall, United Kingdom.

184. **Fisher, Erik** and Derrick Anderson. December 04, 2009. "From Lab to Legislature: Public Value Mapping of Nanotechnology Science and Innovation Policy Making." Presentation. Dupont Summit on Science and Technology Policy, "The New Administrations Challenges on Science and Technology: Staying the Course in Times of Crisis." Policy Studies Organization, Carnegie I, Washington, DC.

185. **Fisher, Erik**, Derrick Anderson and David Renolds. August, 2008. "Mapping and Modulating the Public Value of Academic Research." Poster presentation. Gordon Research Conference on Science and Technology Policy, Big Sky, MT.

186. **Fisher, Erik** and Francois Thoreau. September, 2010. "On Reflection and Reflexiveness: Positioning the Self, Enframing the Other." Presentation. Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Darmstadt, Germany.

187. **Fisher, Erik** and Hannot Rodriguez. August, 2010. "Socio-technical Integration in European Framework Programmes." Poster Presentation. Gordon Research Conference on Science and Technology Policy, Waterville Valley, NH.

188. **Fisher, Erik** and Hannot Rodriguez. April, 2010. "Tracking the Pervasiveness of Socio-Technical Integration in the European Research and Development Framework Programmes." Presentation. Science and Governance: Global and Comparative Perspectives. Arizona State University, Tempe, AZ.

189. **Fisher, Erik** and **Roop L. Mahajan**. November, 2006. "Midstream Modulation." Presentation. International Mechanical Engineering Conference, Chicago, IL.

190. **Fisher, Erik** and Shannon Conley. November, 2011. "Socio-Technical Integration: Collaborating with Geneticists in Patient Engagement." Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

191. **Fisher, Erik** and Topi Heikkero. May, 2011. "Public Deliberation in the Education of Science: Contemporary Practices and Classical Ideals." Presentation. Annual Meeting of the Society for Philosophy and Technology. University of North Texas.

192. Foley, Rider W. November, 2012. "Guilding Innovation Sustainably: Applying Principles of Sustainaility and Anticipatory Governance." Paper Presentation. 1st Sustainable Nanotechnology Organization Conference (SNO), Washington, DC.

193. Foley, Rider W. and **Arnim Wiek**. February, 2013. "Risk versus Reward: Comparing Cultures of Innovation." Poster Presentation. AAAS, Boston, MA.

194. Foley, Rider W. and **Arnim Wiek**. October, 2012. "Nanotechnology Innovation: Governance by Urban Actors." Paper Presentation. 4th Annual Conference for the Society for the Studies of Nanoscience and Emerging Technologies (S.NET), Enschede, the Netherlands.

195. Foley, Rider W. and **Arnim Wiek**. November, 2011. "Reconciling Urban Sustainability Syndromes and Urban Nanoscape." Poster Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

196. Foley, Rider W., B. Kay, Richard Rushforth and **Arnim Wiek**. May, 2012. "Can Nanotechnology Decontaminate Water in a Morally Contested Contex?" Presentation. International Symposium on Sustainable Systems and Technology, Boston, MA.

197. Foley, Rider W., C. Kuzdas, B. Warner, Lauren Withycombe Keeler, D, Iwaniec and **Arnim Wiek**. February, 2012. "Designing Sustainable Governance: Cross-Domain Comparison and Evaluation." Poster Presentation. 3rd Annual International Conference on Sustainability Science, Tempe, AZ.

198. Foley, Rider W., **Ira Bennett**, **Jameson Wetmore**, **David H. Guston** and **Arnim Wiek**. October, 2012. "Applied Nanoethics: Who is Reponsible for what." Paper Presentation. 4th Annual Conference for the Society for the Studies of Nanoscience and Emerging Technologies (S.NET), Enschede, the Netherlands.

199. Foley, Rider W., Thomasz Kalinowski and Richard Rushforth. December, 2012. "Rethinking Participatory Technology Assessment: Integrating Diverse Perspectives from the Community, Engineering, and Sustainability." Paper Presentation. Dupont Summit on Science, Technology, and Environmental Policy, Carnegie Institute for Science, Washington, DC.

200. Gallo, Jason. October 19, 2007. "The National Science Foundation and the Creation of a Standing Army for Science." Paper presentation. Annual Meeting of the Society for the History of Technology, Washington, DC.

201. Gallo, Jason. April, 2007. "The National Science Foundation and the Control of Information." Department of Life Sciences Communication colloquium series, University of Wisconsin, Madison, WI.

202. Gano, Gretchen. 2011. "Local Deliberation and Imagined Transition Epistemologies." Presentation. Annual Meeting of the Society for the Social Studies of Science, Cleveland, OH.

203. Gano, Gretchen. 2011. "Finding Futures." Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

204. Gano, Gretchen. 2011. "Empowerment and Social Learning: Long Term Benefits of Citizen Deliberation about Nanotechnologies for Human Enhancement." Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

205. Gano, Gretchen. 2011. "What we've learned about Nano and Society a Working Session on Data Sharing for NSF NSECs." Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

206. Gano, Gretchen. 2011. "Emergent Technology Assessment: the Transition Initiative and Energy Futures." Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

207. Gano, Gretchen. 2011. "Exploring the Uncertain Technological Future: Lessons in Anticipatory Governance." Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

208. Gao, L., **Alan L. Porter**, Tingting Ma, Wenping Wang, Stephen Carley and X. Zhang. 2011. "Measuring the Interdisciplinarity of Nano-Biosensor Research based on Citation Analysis." Presentation. Atlanta Conference on Science and Innovation Policy 2011, Atlanta, GA.

209. Garay, Manuel and **Erik Fisher**. August, 2008. "NSECs and the Integration of Societal Concerns into R&D." Poster presentation. Gordon Research Conference on Science and Technology Policy, Big Sky, MT.

210. **Garcia, Antonio** and **Joan McGregor**. October 17, 2008. "Will Genetic Discrimination Replace Racial Discrimination?" Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

211. Glerup, Cecilie. October 20, 2012. "Managing Demands for Social Engagement." Presentation. Panel Presentation on "Displacing the Laboratory and STS with It. New Modes of Engagement-Naural Scientists and the Lab. 4S/EASST Conference, Copenhagen, Denmark.

212. Glerup, Cecilie. 2012. "Scientific Social Responsibility as a Mode of Ordering." Presentation. Arizona State University, Tempe, AZ.

213. **Goodnick, Stephen** and **Tim Lant**. November 20, 2009. "Good to the Last Drop? The Water-Energy Connection." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

214. **Gordon, Claire** and Ira Bennett. February 16, 2007. "Why Things (Still) Don't Fit: Human Variation and Ergonomics in the 21st Century." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

215. Guo, Ying, **Alan L. Porter** and Lu Huang. May, 2011. "Empirically Informing a Technology Delivery System Model for an Emerging Technology: Illustrated for Dye-Sensitized Solar Cells." Presentation. 4th International Seville Conference on "Future-Oriented Technology Analysis".

216. Guo, Ying, **Alan L. Porter** and Lu Huang. October, 2009. "Comparing and Probing National Research Strategies for Nanotechnology Thin-film Solar Cells." Presentation. 2009 Atlanta Conference on Science and Innovation Policy, Atlanta, GA.

217. Guo, Ying, **Alan L. Porter** and Lu Huang. April 09, 2009. "Nano-enhanced Thin-film Solar Cells: Global Activity and Forecast." Paper presentation. IAMOT 2009, 18th International Conference on Management of Technology, Management of Green Technology, International Association for Management of Technology, Orlando, FL.

218. Guo, Ying, Lu Huang and **Alan L. Porter**. October, 2009. "Profiling Research Patterns for a New and Emerging Science and Technology: Dye-sensitized Solar Cells." Presentation. 2009 Atlanta Conference on Science and Innovation Policy, Atlanta, GA.

219. Guo, Ying, Lu Huang, L. Zhang, D. Zhu and **Alan L. Porter**. 2011. "Up-to-down Science & Technology Planning: a New Approach Based on Patent Data and Technology Roadmapping." Presentation. Global TechMining Conference, Atlanta, GA.

220. Guo, Ying, Tingting Ma, **Alan L. Porter** and Ismael Rafols. October, 2011. "A Comparative Analysis of Asia-Pacific Research Thrusts vs. Euro-North American for DSSC by Employing Tech Mining Approach." Presentation. The 6th Aceanian Conference on Dye-sensitized and Organic Solar Cells, Beppu, Japan.

221. Guo, Ying, Tingting Ma, **Alan L. Porter**, Jose M. Vicente Gomila and Chen Xu. October, 2011. "Technology Opportunities Analysis for DSSCs using Text Mining and Semantic-TRIZ." Presentation. The 6th Acenian Conference on Dye-sensitized and Organic Solar Cells, Beppu, Japan.

222. **Guston, David H.** March, 2013. "The Role of Real-Time Technology Assessment in STI Processes." Keynote Address. Second Annual International Symposium on Science, Technology and Innovation Governance, University of Tokyo, Tokyo, Japan.

223. **Guston, David H.** October, 2012. "Anticipatory Governance as a Form of Making Science Public." Presentation. Annual Meeting of the Society for Social Studies of Science, Copenhagen, Denmark.

224. **Guston, David H.** October, 2012. "Back to the Future: Why Should We Promote Oublic Engagement with Science?" Presentation. Annual Meeting of the Society for Social Studies of Science, Copenhagen, Denmark.

225. **Guston, David H.** May 11, 2012. "The Pumpkin or the Tiger?: Frederick Soddy, Michael Polanyi and the Anticipatory Governance of Emerging Technologies." Presentation. Come and Tell About the Future Seminar.

226. **Guston, David H.** March 06, 2012. "The Pumpkin or the Tiger? Polanyi, Soddy and the Anticipation of Emerging Technologies." Presentation. Workshop on Pacing Governance with Technology, Scottsdale, AZ.

227. **Guston, David H.** March 01, 2012. "EMERGE: From Technology to Democracy." Presentation. Emerge: Artists + Scientists Redesign the Future, Tempe, AZ.

228. **Guston, David H.** February 14, 2012. "Nanotechnology and Anticipation." Talk. UW Bothell Innovation Forum, with other panelists speaking on Innovation Squared: Why innovations in technology require innovations in ethics, Bothell, WA.

229. **Guston, David H.** February 13, 2012. "Anticipatory Governance of Emerging Technologies." Talk. Biological Futures in a Globalized World colloquium series at University of Washington, Seattle, WA.

230. **Guston, David H.** December, 2011. "Innovation and Advances in Governance of Nanotechnology: New Research in Anticipatory Governance of Nanotechnology." Presentation. National Science Foundation 2011 NSF NSE Grantees Meeting, Arlington, VA.

231. **Guston, David H.** November 03, 2011. "The Pumpkin or the Tiger? Or, Michael Polanyi, Frederick Soddy and the Anticipatory Governance of Emerging Technoscience." Presentation. Society for the Study of Science (4S) Annual Conference, Cleveland, OH. Guston,

232. **David H. June, 2011.** "Shaping Science and Nanotechnology Future." Presentation. 2011 "Environmental Nanotechnology" Gordon Research Conference, Waterville Valley, NH.

233. **Guston, David H.** May 22, 2011. "The Role of Nanotechnologies in our Future." Presentation. Humanist Society of Greater Phoenix.

234. **Guston, David H.** April 04, 2011. "Nano and the City: Anticipatory Governance and Urban Sustainability." Presentation at 8th Annual U.S. - Korea Forum on N. California Technical Institute, Pasadena, CA.

235. **Guston, David H.** March 14, 2011. "Anticipatory Governance: A Strategic Vision for Building Reflexivity into Emerging Technologies." Presentation. Resilience 2011, Arizona State University, Tempe, AZ.

236. **Guston, David H.** March 11, 2011. "CNS-ASU and its Strategic Vision of Anticipatory Governance." Talk. Service Academy Alumni of Arizona.

237. **Guston, David H.** March 02, 2011. "Anticipatory Governance of Emerging Technologies." Presentation. Technology and Ethics Working Group, Yale University, New Haven, CT.

238. **Guston, David H.** December 06, 2010. "Anticipatory Governance of Emerging Technologies." Presentation. "New Tools for Science Policy: Better S&T for the Real World" series, CSPO, Washington, DC.

239. **Guston, David H.** November 17, 2010. "Anticipatory Governance of Emerging Technologies." Presentation. ESRC Genomics Forum, University of Edinburgh, Edinburgh, United Kingdom.

240. **Guston, David H.** November 15, 2010. "The Pumpkin of the Tiger? Or, When to Consider the Risks of Research." Presentation. Institute of Hazard, Risk, and Resilience, Durham University, Durham, United Kingdom.

241. **Guston, David H.** November 10, 2010. "Anticipatory Governance of Emerging Technologies." Presentation. Institute of Systems and Synthetic Biology, Imperial College, London, United Kingdom.

242. **Guston, David H.** November 04, 2010. "Anticipatory Governance of Emerging Technologies: The Center for Nanotechnology in Society at ASU." Presentation. Triple Helix at ASU, Tempe, AZ.

243. **Guston, David H.** July, 2010. "Anticipatory Governance of Emerging Technologies: Foresight, Engagement and Integration." Presentation. Euroscience Open Forum 2010, Torino, Italy.

244. **Guston, David H.** May 10, 2010. "Reflections on Anticipatory Governance of Nanotechnology: Meanings for the Regulatory Environment." Talk. Toward Regulation of Nanomaterials: Conversation between academia, industry, law, and government, University of Notre Dame, IN.

245. **Guston, David H.** March, 2010. "Broader Societal Implications." Plenary remarks. Nano2: International Study of the Long-term Impacts and Future Opportunities for Nanoscale Science and Engineering, Evanston, IL.

246. **Guston, David H.** March, 2010. "The Anticipatory Governance of Emerging Technologies." Plenary remarks. INEW 2010: The Second International Nanomaterials Ethics Workshop, Korea Institute of Science and Technology, Seoul, Korea.

247. **Guston, David H.** March, 2010. "The Center for Nanotechnology at Arizona State University." Lecture. Program in the History and Philosophy of Science, Seoul National University, Seoul, Korea.

248. **Guston, David H.** February, 2010. "Bridging Nanoscience and Society: The Center for Nanotechnology in Society at ASU." Presentation. Annual Meeting of the American Association for the Advancement of Science, San Diego, CA.

249. **Guston, David H.** December, 2009. "Anticipatory Governance at the Center for Nanotechnology in Society." Lecture. ESRC Critical Public Engagement Seminar. Durham Universit, Durham, UK.

250. **Guston, David H.** December, 2009. "Public Engagement at CNS-ASU: The National Citizens Technology Forum and Other Modes." Lecture. Institute for Hazard Risk Research. Durham University, Durham, UK.

251. **Guston, David H.** October, 2009. "Genealogies of Anticipatory Governance." Presentation. Annual Meeting of the Society for Social Studies of Science, Washington, DC.

252. **Guston, David H.** October, 2009. "STS and Policy in the Academy." Chairs Plenary Panel. Annual Meeting of the Society for Social Studies of Science, Washington, DC.

253. **Guston, David H.** October, 2009. "Emerging Technologies and Sustainability: Parts I and II." Webinar briefing. Consultative Group on Biodiversity with the Center for Genetics and Society, San Francisco, CA.

254. **Guston, David H.** September 09, 2009. "The Roots, Branches and First Fruits of Anticipatory Governance." Presentation. Nanoethics Graduate Education Symposium, University of Washington, Seattle, WA.

255. **Guston, David H.** June, 2009. "Anticipatory Governance of Emerging Technologies." Presentation. NINE Summer Students Program. Sandia National Laboratory, Sandia, NM.

256. **Guston, David H.** June, 2009. "From the Lab to the Legislature: Locating Technology Assessment." Lecture on Science and Values. The Politicisation of Science. University of Bielefeld, Bielefeld, Germany.

257. **Guston, David H.** April, 2009. "Anticipatory Governance of Emerging Nanotechnologies at CNS-ASU." Video Plenary Lecture. Nanotechnology: Here and Now Meeting. Ministry of Research, Science and Technology, Wellington, New Zealand.

258. **Guston, David H.**, et al. March 09, 2009. "Nanotechnology and the Public: Data for Decision Makers." Briefing. U.S. Congressional Nanotechnology Caucus, Washington, DC.

259. **Guston, David H.** March, 2009. "Nano, Human Enhancement, and Public Engagement." Presentation. Faculty seminar on transhumanism, Center for the Study of Religion and Conflict, Arizona State University, Tempe, AZ.

260. **Guston, David H.** March, 2009. "Anticipatory Governance at the Center for Nanotechnology in Society at ASU." Presentation. Center for the Study of Institutional Diversity brown bag, Arizona State University, Tempe, AZ.

261. **Guston, David H.** March, 2009. "Public Engagement: National Citizens' Technology Forum." Presentation. Nanotechnology and the Public: Data for Decision Makers briefing before the U.S. Congressional Nanotechnology Caucus, Washington, DC.

262. **Guston, David H.** March, 2009. "Anticipatory Governance at the Center for Nanotechnology in Society at ASU." Presentation. Department of Political Science brown bag, Arizona State University, Tempe, AZ.

263. **Guston, David H.** March, 2009. "Anticipatory Governance at the Center for Nanotechnology in Society at ASU." Video lecture. Graduate class in Science and Technology Policy, Ford School of Public Policy, University of Michigan, Ann Arbor, MI.

264. **Guston, David H.** September 10, 2008. "CNS-ASU and Nano-in-Society in the USA." Presentation by video. Manchester International Workshop on Nanotechnology, Society and Policy, Manchester, UK.

265. **Guston, David H.** July, 2008. "Reflections on CNS-ASU and Nano in Society in the U.." Keynote talk. Dutch NanoNed Flagship TA and Societal Aspects of Nanotechnology meeting, Utrecht, The Netherlands.

266. **Guston, David H.** June, 2008. "The Center for Nanotechnology in Society at ASU and the Anticipatory Governance of Emerging Technologies." Presentation. Institute for Science and Technology Studies, Bielefeld University, Bielefeld, Germany.

267. **Guston, David H.** June, 2008. "Anticipatory Governance of Nanotechnologies: The Center for Nanotechnology in Society at ASU." Special talk. Visiting Japanese technology assessment delegation, Arizona State University, Tempe, AZ.

268. **Guston, David H.** April 04, 2008. "Governing Emerging Technologies." Presentation. Arizona Institute of Nanoelectronics opening ceremonies, Tempe, AZ.

269. **Guston, David H.** February, 2008. "Anticipatory Governance at the Center for Nanotechnology in Society at ASU." Video lecture. Graduate class in Science and Technology Policy, Ford School of Public Policy, University of Michigan, Ann Arbor, MI.

270. **Guston, David H.** November, 2007. "Toward Anticipatory Governance of Emerging Technologies." Presentation. Special Series on Science and Public Policy, Brown University, Providence, RI.

271. **Guston, David H.** November, 2007. "Governing Emerging Technologies." Presentation. Spirit of the Senses Salon, Phoenix, AZ.

272. **Guston, David H.** June 14, 2007. "Anticipatory governance and reflexivity: A means for realtime technology assessment." Talk. The Future of Nanotechnology: A Celebration of the 30th Anniversary of the Cornell NanoScale Science & Technology Facility, Cornell University, Ithaca, NY.

273. **Guston, David H.** December, 2006. "Anticipatory Governance of Emerging Technologies." Presentation. Monthly meeting of the Arizona Nanotechnology Cluster, Tempe, AZ.

274. **Guston, David H.** October, 2006. "Anticipatory Governance of Emerging Technologies: The Center for Nanotechnology in Society at ASU." Presentation. Stanford University Seminar in Science, Technology and Society, Stanford, CA.

275. **Guston, David H.** August, 2006. "Anticipatory Governance of Emerging Technologies." Presentation. Gordon Research Conference on Science and Technology Policy, Big Sky, MT.

276. **Guston, David H.** May, 2006. "CNS-ASU: Interdisciplinary Programs in a Self-Styled Boundary Organization." Presentation. Conference of Trading Zones, Interactional Expertise, and Interdisciplinary Collaboration, Arizona State University, Tempe, AZ.

277. **Guston, David H.** May, 2006. "What Do We Want to Learn from Public Participation in Nanotechnology?" Presentation. NNI Public Participation in Nanotechnology Workshop, Arlington, VA.

278. **Guston, David H.** April, 2006. "Social Science Engages Nanotechnology." Invited talk. Virginia Tech, Blacksburg, VA.

279. **Guston, David H.** February 17, 2006. "The Center for Nanotechnology in Society at ASU." Nanotechnology Seminar: Social Science Engages Nanotechnology, AAAS Annual Meeting 2006, St. Louis, MO.

280. **Guston, David H.** February, 2006. "Anticipatory Governance at the Center for Nanotechnology in Society at ASU." Video lecture. Graduate class in Science and Technology Policy, Ford School of Public Policy, University of Michigan, Ann Arbor, MI.

281. **Guston, David H.** February, 2006. "Societal Implications of Nanotechnology." Lecture. Discovery Lecture Series 2006, Transforming Society Through Emerging Technologies: The National Nanotechnology Initiative at Five Years, Purdue University, West Lafayette, IN.

282. **Guston, David H.** and **Arnim Wiek**. November 16, 2010. "Nano and the City: Anticipatory Governance and Urban Sustainability." Presentation. Department of Geography, Durham University, Durham, United Kingdom.

283. **Guston, David H.** and **Arnim Wiek**. September, 2010. "Urban Design, Materials, and Built Environment: Nano in the City Research at ASU-CNS." Presentation. S.NET Conference, Darmstadt Technical University, Darmstadt, Germany.

284. **Guston, David H.**, **Erik Fisher** and **Daniel Sarewitz**. April 27, 2012. "Introduction to Responsible Innovation." Presentation. International Collaboration Working Group Seminar.

285. **Halden, Rolf** and **Ben Hurlbut**. May 20, 2011. "Germ-Free and other Myths: Examining Antimicrobial Products." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

286. **Hamlett, Patrick**. March, 2008. "Public Deliberations About Science and Technology: Should the Public Have a Say on the Future of Nanotechnology." Presentation. NSF Science and Technology Center Program, Center for Environmentally Responsible Solvents and Processes Innovation Seminar Series, North Carolina State University, Raleigh, NC.

287. **Hamlett, Patrick** and **Michael D. Cobb**. August, 2008. "Reporting the Results of the first National Citizens Technology Forum." Presentation. Gordon Research Conference on Science and Technology Policy, Big Sky, MT.

288. **Hamlett, Patrick** and **Michael D. Cobb**. July, 2008. "The First National Citizens Technology Forum on Human Enhancement: Results and Prospects." Paper presentation. VIPSI-2008 (Information Processing Society, International) Conference: Knowledge Engineering, Tutorials, & Brainstorming, Pisa, Italy.

289. **Hamlett, Patrick** and **Michael D. Cobb**. May, 2008. "The First National Citizens Technology Forum on Nanotechnology - First Results." Presentation. University & Industry Consortium, Spring 2008 Meeting, Lansing, MI.

290. Harsh, Matthew. April, 2012. "Biotechnology and Nanotechnology in Sub-Saharan Africa: Who Decides?" Paper Presentation. Centre for Engineering and Society, Concordia University, Montreal, Canada.

291. Harsh, Matthew. November, 2011. "Issues Facing STS Research on the Governance of Emerging Technologies in sub-Saharan Africa." Presentation. Annual Meeting of the Society for the History of Technology, Cleveland, OH.

292. Harsh, Matthew. March 29, 2011. "Pro-poor Nanotechnology Applications for Water: Characterizing Private Sector Research Using Publication Data." Paper presentation. Winter School on Emerging Nanotechnologies, organized by Grenoble Ecole de Management, Autrans, France.

293. Harsh, Matthew and Thomas Woodson. November, 2011. "Pro-Poor Nanotechnology Applications for Water: Characterizing Private Sector Research." Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

294. Harsh, Matthew and Thomas Woodson. April, 2011. "Mapping Nano-Innovation Systems for Water Applications." Presentation. Winter School on Emerging Nanotechnologies, Grenoble cole de Management, Pinsot, France.

295. Hays, Sean A. July, 2009. "Nietzsche and the Philosophical Underpinnings of Human Enhancement." Presentation. SPT 2009: Converging Technologies, Changing Societies. Society for Philosophy and Technology, University of Twente, the Netherlands.

296. Hays, Sean A. March, 2009. "Transhumanism, Anti-humanism, and Nietzsche's Overman." Presentation. Human Enhancement & Nanotechnology, Western Michigan University, Kalamazoo, MI.

297. **He, Jiping** and Jason S. Robert. June 04, 2006. "Wiring Brains to Machines: Science Fiction or Science Fact." Talk. CNS-ASU Science Cafe, Mills End Coffee Shop, Tempe, AZ.

298. **Hendrickson, Kirstin** and **Scott Lefler**. November 19, 2010. "You Are What You Eat: America's Relationship with Food." Presentation. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

299. **Herkert, Joseph**, **Heather Canary**, **Karin D. Ellison** and **Jameson Wetmore**. November, 2011. "Integrating Microethics and Macroethics in Graduate Science and Engineering Education." Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

300. **Hibner Koblitz**, **Ann**, **Priscilla Greenwood** and **Jennifer McNeill Bekki**. March 21, 2008. "Women in Science: Various Issues and Viewpoints." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

301. **Hillback, Elliott D.**, Anthony D. Dudo, Jiun-Yi Tsai, **Sharon Dunwoody**, **Dominique E. Brossard** and **Dietram A. Scheufele**. December, 2009. "Tracking Online Behavior after Exposure to News of a Local Nanotechnology Risk: A Risk Information Seeking and Processing (RISP) Model Approach." Presentation. Annual Convention of the Society for Risk Analysis (Emerging Nanoscale Materials Specialty Group Student Merit Award), Baltimore, MD.

302. **Ho, Shirley S.**, **Dietram A. Scheufele** and **Elizabeth A. Corley**. June, 2010. "Integrating Models of Mass-Interpersonal Communication: Testing Moderation and Mediation Effects of Elaborative Processing and Interpersonal Discussion on Scientific Knowledge and Public Attitudes Tow." Presentation. Annual Convention of the International Communication Association, Singapore.

303. **Ho, Shirley S.**, **Dietram A. Scheufele** and **Elizabeth A. Corley**. August, 2009. "Value Predispositions, Mass Media, and Attitudes toward Nanotechnology: The Interplay of Public and Experts." Presentation. Annual Convention of the Association for Education in Journalism and Mass Communication, Bostom, MA.

304. **Ho, Shirley S.**, **Dietram A. Scheufele** and **Elizabeth A. Corley**. May, 2009. "Making Sense of Policy Choices: A Closer Look at the Mediating Roles of Elaborative Processing and Interpersonal Discussion on Public Perceptions of Nanotechnology." Paper presentation. Annual convention of the International Communication Association, Chicago, IL.

305. **Ho, Shirley S.**, **Dietram A. Scheufele** and **Elizabeth A. Corley**. August, 2008. "Influences of Mass Media, Interpersonal Communication, and Cognitive Processing on Risks versus Benefits Perception of Nanotechnology." Paper presentation. Annual convention of the Association for Education in Journalism and Mass Communication, Chicago, IL.

306. **Hogle, Linda F.** March, 2007. "Stem Cells as a Study in Transience: A Future History." Paper presentation. Max Planck Institute for the History of Science, Berlin, Germany.

307. **Holbert, Keith** and **Clark A. Miller**. January 18, 2008. "Why Not Nuclear Power? The Science and Politics behind Nuclear Energy." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

308. Huang, Lu, **Alan L. Porter** and Ying Guo. April 06, 2009. "Identifying the Role of Emerging Nanoparticles in Biosensors." Paper presentation. IAMOT 2009, 18th International Conference on Management of Technology, Management of Green Technology, International Association of Management of Technology, Orlando, FL.

309. Huang, Lu, Ying Guo and **Alan L. Porter**. October, 2009. "A Systematic Technology Forecasting Approach for New and Emerging Science and Technology: Case Study of Nano-enhanced

Biosensors." Presentation. 2009 Atlanta Conference on Science and Innovation Policy. The Paper won the Best Graduate Student Paper Award at the 2009 Atlanta Conference on Science and Innovation Policy, Atlanta, GA.

310. Huang, Lu, Ying Guo, D. Zhu, **Alan L. Porter**, **Jan Youtie** and **Douglas K.R. Robinson**. 2011. "Organizing a Multidisciplinary Workshop for Forecasting Innovation Pathways: The Case of Nano-Enabled Biosensors." Presentation. Atlanta Conference on Science and Innovation Policy 2011, Atlanta, GA.

311. Huang, Lu, Ying Guo, **Jan Youtie** and **Alan L. Porter**. "Early Commercialization Pattern Profiling: Nano-Enhanced Biosensors." Presentation. PICMET (Portland International Conference on Management of Engineering and Technology, Vancouver, Canada.

312. Huang, Lu, Ying Guo, Tingting Ma and **Alan L. Porter**. May, 2011. "Text Mining of Information Resources to Inform Forecasting of Innovation Pathways." Presentation. 4th International Seville Conference on "Future-Oriented Technology Analysis".

313. **Huang, Wan-Ling**, **Eric Welch** and **Elizabeth A. Corley**. 2009. "Public Sector Voluntary Initiatives: The Adoption of the Environmental Management System for Biosolids by Public Waste Water Treatment Facilities in the United States." Paper Presentation. Midwest Political Science Association Conference.

314. **Jacobs, Bert** and **Jameson Wetmore**. March 23, 2007. "Transferring Western Technology to Developing Countries: Good Intentions, Unexpected Outcomes." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

315. **Jimenez, Benedict**, **Eric Welch** and **Elizabeth A. Corley**. 2009. "Explaining Differences in the Quality and Effectiveness of Environmental Management Systems in Public Organizations: The Experience of Public Sewage and Wastewater Treatment Facility Operators in the." Paper Presentation. Midwest Political Science Association Conference.

316. Johnson, Darlene, Santiago Manriquez, **Terry Ryan**, Lynda Zeise and **Cynthia Selin**. November 21, 2008. "Democratizing Science: Should the Public Have a Voice in Science Research and Development." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

317. **Johnston, Stephen** and **Joan McGregor**. September, 2006. "Predicting Your Medical Future (Doc-in-a-Box)." CNS-ASU Science Cafe, Changing Hands Bookstore, Tempe, AZ.

318. **Jung, Ranu** and **Jason S. Robert**. January, 2007. "Adaptive Technologies for the Central Nervous System: Are We Changing What It Means to be Human." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

319. **Kambhampati, Subbarao** and David Calverley. November 16, 2007. "Do Robots Need a Bill of Rights? Implications of Artificial Intelligence." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

320. **Kavazanjian, Edward** and **Tim Lant**. April 15, 2011. "Disasters in Arizona: Are We Prepared." Presentation. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

321. Kay, Luciano. November 05, 2011. "Aggregate Patterns of Linkage of Nanotechnology Centers with Industry: Program Outcomes." Session. Evaluation of a Nano Science and Technology Centers Program: Mixed Methods Approach to Assessing its Realization of Policy Objectives, American Evaluation Association.

322. Kay, Luciano. October, 2009. "The Emergence of Nanotechnology Enterprise in Brazil." Presentation. 2nd Manchester International Workshop on Nanotechnology, Society and Policy, Manchester, UK.

323. Kay, Luciano. October, 2009. "Nanotecnologia en America Latina. Brasil y la Emergencia de Nano-empresas." Presentation. VI Seminario Internacional Nanotecnologia, Sociedade e Meio Ambiente - VI Seminanosoma, Manaus, Brazil.

324. Kay, Luciano. May, 2009. "Developing Nanotechnology in Latin America." Poster presentation. NSF Site Visit for CNS Renewal, Tempe, AZ.

325. Kay, Luciano. May, 2009. "Nanotechnology R and D Collaboration with Brazil. Managing Challenges and Opportunities in an Emerging Networked Technology." Presentation. Workshop of International R and D Cooperation with Latin America, Madrid, Spain.

326. Kay, Luciano. January, 2009. "Nanotechnology Research Networks in Brazil." Poster presentation. CNS All Hands Meeting, Tempe, AZ.

327. Kay, Luciano. January, 2008. "Nanotechnology in Latin America." Paper presentation. DRUID-DIME Academy Winter 2008 Ph.D. Conference on Economics and Management of Innovation and Organizational Change, Rebild, Denmark.

328. Kay, Luciano and **Jan Youtie**. October, 2012. "Emerging Technologies and Corporate Strategies: The Case of Nanotechnology for Energy Storage Solutions." Presentation. Society for the Study of Nanoscience and Emerging Technologies (S.NET), University of Twente, the Netherlands.

329. Kay, Luciano, **Noela Invernizzi** and **Philip Shapira**. October, 2009. "The Role of Brazilian Firms in Nanotechnology Development." Presentation. 2009 Atlanta Conference on Science and Innovation Policy, Atlanta, GA.

330. **Kim, Matt** and **Prasad Boradkar**. September, 2007. "Designing Things: Balancing Beauty, Utility and Sustainability in Products." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

331. Kim, Youngjae, **Elizabeth A. Corley** and **Dietram A. Scheufele**. Forthcoming, May, 2013. "The Role of Social Responsibility in Leading Nano-Scientists' Perceptions about Nanotech Research and Regulation." Paper Presentation. The Annual Conference on Governance of Emerging Technologies: Law, Policy, and Ethics, Chandler, AZ.

332. Kim, Youngjae, **Elizabeth A. Corley** and **Dietram A. Scheufele**. November, 2011. "How Should We Regulate Nanotechnology? Perceptions of Leading U.S. Nano-scientists." Paper Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

333. Kim, Youngjae, **Elizabeth A. Corley** and **Dietram A. Scheufele**. January, 2011. "Should we Regulate Nanotech at the Local, National, or International Level." Paper Presentation. All Hands Meeting for the Center for Nanotechnology in Society at ASU, Tempe, AZ.

334. Klochikhin, Evgeny A. and **Philip Shapira**. October, 2012. "Giants in Small Worlds? Innovation and Nanotechnology Development in China and Russia." Presentation. Society for the Study of Nanoscience and Emerging Technologies (S.NET), the Netherlands.

335. Kullman, Joe and **Joel Garreau**. March 19, 2010. "Facts or Hype: What is the Media Telling Us About Nano and Other New Technologies." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

336. Ladwig, Peter, Doo-Hun Choi, Ashley A. Anderson, Michael A. Cacciatore, Xuan Liang, **Dominique E. Brossard**, et al. May, 2011. "Coverage of Emerging Technologies: A Comparison Between Print and Online Media." Paper Presentation. Annual Convention of the International Communication Association, Boston, MA.

337. Ladwig, Peter, Kajsa E. Dalrymple, **Dietram A. Scheufele**, **Dominique E. Brossard** and **Elizabeth A. Corley**. August, 2010. "Perceived or Factual Knowledge? Comparing Operationalizations of Science Knowledge." Paper Presentation. Annual Convention of the Association for Education in Journalism & Mass Communication, Denver, CO.

338. Laurent, Brice and **Erik Fisher**. August, 2007. "The Integration of Public Input into the American Nanotechnology Federal Program: Meanings and Contradictions." Presentation. Third Living Knowledge conference, Ecoles des Mines, Paris, France.

339. **Libaers, Dirk**. September, 2006. "The Role and Contribution of Foreign-born Scientists and Engineers to the U.S. Nano Science and Technology Research Enterprise." Presentation. 2006 Technology Transfer Society Conference, Atlanta, GA.

340. Lidberg, Shannon. November, 2008. "Who Benefits? India's National Design Policy and the Setting of Designers' Priorities." Presentation. CNS-ASU Workshop on Nanotechnology, Equity and Equality, Tempe, AZ.

341. Lidberg, Shannon. August, 2008. "Design Policy Around the Globe: How Developed and Emerging Markets are Using Design for Economic Competitiveness." Poster presentation. Gordon Research Conference on Science and Technology Policy, Big Sky, MT.

342. Lidberg, Shannon. March, 2008. "Examining Potential Futures: A Designer's Toolbox for Identifying Potential Social and Cultural Implications." Presentation. ST Global Conference, Washington, DC.

343. **Lindsay, Stuart**. March 23, 2006. "Humankind's Future on the Head of a Pin: Nanotechnology - What it is, what it can do." Talk. CNS-ASU Science Cafe, Mills End Coffee Shop, Tempe, AZ.

344. **Lobo, Jose**. November 09, 2011. "How Green is Nano." Presentation. Society for the study of Nanoscience and Emerging Technologies 2011 Conference, Tempe, AZ.

345. **Lobo, Jose** and **Deborah Strumsky**. March, 2010. "What Can Be Learned From Successful Nanotechnology Patent Applications." Presentation. Transatlantic Workshop on Nanotechnology Innovation and Policy, Atlanta, GA.

346. **Lynch, John** and Matthew Cooper. February 17, 2012. "Science and Religion: How Can We Peace It All Together." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

347. **Lynch, John** and **Norbert Samuelson**. February 20, 2009. "Evolution and Faith Revisited: Can the Two be Reconciled." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

348. Ma, Tingting, **Alan L. Porter**, J. Ready, Chen Xu, L. Gao, Wenping Wang, et al. May, 2011. "A Technology Opportunities Analysis Model: Applied to Dye-Sensitized Solar Cells for China." Presentation. 4th International Seville Conference on "Future-Oriented Technology".

349. **Mahootian, Farzad**. October, 2012. "Innovation by Disequilibrium." Presentation. Society for the Study of Nanoscience and Emerging Technologies, University of Twente, Twente, the Netherlands.

350. **Mahootian, Farzad**, **Erik Fisher** and **Michael Gorman**. March, 2012. "Self-Reflexive Science and Emergence of Microtrading and Integration Zones in Bio-, Info- and Nano-Science Research Labs." Presentation. 3rd Annual Conference on Empirical Philosophy of Science, Aarhus University, Denmark.

351. **Mahootian, Farzad** and Tara-Marie Linne. October, 2012. "Jung and Laboratory Ethnographies: Lab as Locus of Transformative Research." Presentation. Jung in the Academy and Beyond 100 Years Later, Fordham University, New York, NY.

352. **Maracas, George**, **Patrick Phelan** and **Braden Allenby**. September 19, 2008. "Is Nanotechnology Good for Sustainability or Not." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

353. **Marchant, Gary E.** July, 2006. "Nanotechnology Regulation: The United States Approach." Presentation. Conference on New Global Regulatory Frontiers: Evaluating what will work for Nanotechnology, Monash University, Melbourne, Australia.

354. Maricle, Genevieve. January, 2008. "The State of Policy and Socio-Economic Research." Presentation. American Meteorological Society Annual Meeting, New Orleans, LA.

355. Maricle, Genevieve. December, 2007. "Shaping Science: Turning Science Studies into Science Action." Presentation. Center for Science and Technology Policy Research Noontime Seminar Series, Boulder, CO.

356. Maricle, Genevieve. October, 2007. "Wrestling with Engagement: Tools for Iterating Intervention in STS." Presentation. Society for the Social Studies of Science Annual Meeting, Montreal, Canada.

357. **McGregor, Joan** and **Jameson Wetmore**. August, 2008. "Researching and Teaching the Ethics and Social Implications of Emerging Technologies." Poster presentation. Gordon Research Conference on Science and Technology Policy, Big Sky, MT.

358. McKeon, Patrick. September 23, 2008. "State-Level Nanotechnology Policy Initiatives and Implications for Georgia." Presentation. Nano@Tech, Georgia Institute of Technology, Atlanta, GA.

359. McKeon, Patrick. 2008. "State-Level Nanotechnology Policy Initiatives and Implications for Georgia." Presentation. Fresh Perspectives on Economic Development, Atlanta, GA.

360. **Meldrum, Deirdre** and **Jameson Wetmore**. October 19, 2007. "Less is More Technology: Is Smaller and Cheaper Always Better." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

361. Meng, Yu. April, 2009. "Female Involvement in Nanotechnology Patenting: Does it make a Difference." Presentation. Workshop on Original Policy Research, School of Public Policy, Georgia Institute of Technology, Atlanta, GA.

362. Merkerk, Rutger van, **David H. Guston** and **Ruud Smits**. November, 2006. "An International Comparison of Recent Technology Assessment Approaches: Bypassing Collingridge." Presentation. 4S Conference (Society for Social Studies of Science), Vancouver, British Columbia, Canada.

363. Miao, Liao. 2012. "Laboratory Collaboration as a Way of Practicing Nano-ELSI." Presentation. Institute for Science, Technology, and Society, Tsinghua University, Beijing, P.R. China.

364. Miao, Liao. 2012. "Humanistic Cultivation in the Sciences: Why Do Laboratory Engagements Matter." Presentation. Arizona State University, Tempe, AZ.

365. **Michelaki, Kostalena** and **Sandwip Dey**. February 18, 2011. "Invention Then and Now: Ancient and Modern Materials." Presentation. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

366. **Miller, Clark A.** 2012. "Nanotechnology, the Brain, and the Future." Keynote Lecture. Integrating Nanotechnology with Cell Biology and Neuroscience Symposium, University of New Mexico, Albuquerque, NM.

367. **Miller, Clark A.** September, 2010. "Readying Citizens for Anticipatory Governance: A Challenge for Science Museums." Presentation. NISE Network Meeting, San Francisco, CA.

368. **Miller, Clark A.** March, 2010. "Innovation: Thoughts on Science, Technology, Transformation, and Valuation." Talk. Manifolds-A Social Innovation Symposium, Fergus, Canada.

369. **Miller, Clark A.** 2010. "Systems Integration: The Human and Social Dimensions of Energy System Transformation." Talk. Advisory Meeting, Directorate of Mathematical and Physical Sciences, National Science Foundation, Washington, DC.

370. **Miller, Clark A.** 2009. "Themes in Nanotechnology in Society Research." Talk. Nanoscale Informal Science Education Annual Meeting, San Francisco, CA.

371. **Miller, Clark A.** 2009. "Nanotechnology: Environment, Health, and Safety." Talk. Semiconductor Environment, Safety, and Health Association, Scottsdale, AZ.

372. **Miller, Clark A.** April, 2007. "Commentary: The Law and the Future Brain." Presentation. U.S. District Court and Sandra Day OConnor College of Law, Arizona State University, Tempe, AZ.

373. **Miller, Clark A.** December 09, 2006. "Boundary Organizations: Strategies for Linking Knowledge to Action." Presentation. Workshop on Boundary Organizations, Tempe, AZ.

374. **Miller, Clark A.** November 16, 2006. "Informing Anticipatory Governance of New and Emerging Technologies through Nanotechnology in Society Research." Presentation. Nanoscale Informal Science Education Network (NISE Net).

375. **Miller, Clark A.** October, 2006. "Reflexive, Anticipatory Governance of Science and Technology." Roundtable presentation. Public Administration and Challenges of Emerging Technologies Roundtable, 2006 NASPAA Annual Conference: The Future of the Public Sector, National Association of Schools of Public Administration and A, Minneapolis, MN.

376. **Miller, Clark A.** June, 2006. "Think Differently! Strategies for Success in Nano." Presentation. Food Research Institute, University of Wisconsin-Madison, Madison, WI.

377. **Miller, Clark A.** April 19, 2006. "Nanotechnology in Society Education: Teaching the Mental Habits of Social Engineers and Critical Citizens." Presentation. Education in Nanoscience and Engineering Symposium, 2006 Spring Meeting, Materials Research Society, San Francisco, CA.

378. **Miller, Clark A.** March, 2006. "Nanotechnology in Society." Presentation. Ohio State University, Columbus, OH.

379. **Miller, Clark A.** and **Ira Bennett.** March, 2009. "Imagining the Future: Can Science Fiction Help Us Govern Technology." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

380. **Miller, Clark A.** and **Ira Bennett**. April, 2007. "Science Fiction as Technology Assessment: Some Preliminary Thoughts on Anticipatory Governance for the Rest of Us." Presentation. Cornell University, Ithaca, NY.

381. **Moore, Ana L.** September 27, 2006. "Renewable Energy Through Photosynthesis." Talk. CNS-ASU Science Cafe, Friendly House, Phoenix, AZ.

382. **Newman, Nils**. November, 2006. "Nanotechnology Research Mapping and Assessment." Presentation. STI Indicators Conference, Leuven, Belgium.

383. **Newman, Nils**. June 07, 2006. "Where is Nano Going?" Presentation. Advancing Measures of Innovation: Knowledge Flows, Business Metrics, and Measurement Strategies Workshop, National Science Foundation, Arlington, VA.

384. **Newman, Nils**, **Ismael Rafols**, **Jan Youtie**, **Alan L. Porter** and Luciano Kay. November, 2011. "Patent Overlay Mapping: Visualizing Technological Distance." Panel Presentation. Nanotechnology, Innovation, and Commercialization: Learning about a Technology Cycle through Patent Data, Patent Statistics for Decision Makers 2011.

385. **Pandza, Kristo**, Paul Ellwood and **Erik Fisher**. October, 2009. "From Social Aspirations to Organizational Capability: Identifying Micro-Foundations and the Role of Strategizing." Presentation. Interactive Strategy Work-in-Progress Workshop/SMS Pre-Conference: Advancing Strategy Process Research, Washington, DC.

386. Pei, R., **Alan L. Porter** and P. Gao. December, 2010. "Profiling a Decade of Chinese Nano-Biomedical Science Research." Presentation. IEEE International Engineering and Engineering Management (IEEM), China.

387. Petrucci, Darren and Kelly Campbell Rawlings. February 15, 2013. "Evolving in the Nano City: Urban Design, Urban Culture and Forces of Change." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

388. Philbrick, Mark. September, 2009. "Operationalizing Anticipatory Governance: Steering Emerging Technologies towards Sustainability." Presentation. Inaugural Meeting of the Society for the Study of Nanoscale and Emerging Technologies. September 8-11, 2009, Seattle, WA.

389. Philbrick, Mark. 2009. "The National Citizens Technology Forum: Lessons for the Future." Presentation. Annual Meeting of the Society for the Social Studies of Science. October 28-November 1, 2009, Washington, DC.

390. **Porter, Alan L.** December, 2010. "Profiling and Knowledge Tracking." Presentation. Chinese Academy of Sciences Library, Beijing.

391. **Porter, Alan L.** November, 2009. "Assessing Nanotechnology: Research Metrics and Maps." Presentation. American Evaluation Association Annual Conference, Orlando, FL.

392. **Porter, Alan L.** August, 2009. "Locating Nanotechnology among the Disciplines, Nano @ Tech."

393. **Porter, Alan L.** November 30, 2007. "Trends in Data Treatment in the United States." Keynote presentation. International Conference on Competitive Intelligence, Carlos III University of Madrid, Madrid, Spain.

394. **Porter, Alan L.** October, 2007. "Public Lecture." Institute for S&T Information, Beijing, China.

395. **Porter, Alan L.** November 15, 2006. "Mining Patents and Research Publications to Improve Technology Management: Nano Illustrations." Presentation. 2nd PATINEX Conference, Seoul, South Korea.

396. **Porter, Alan L.**, David J. Schoeneck, **Ajay S. Bhaskarabhatla**, **Jan Youtie** and **Dirk Libaers**. May, 2006. "Explorations in Research and Innovation Systems Assessment: Where Is Nano Going?" Presentation. The Atlanta Conference on Science and Technology Policy 2006 US-EU Policies for Research and Innovation, Atlanta, GA.

397. **Porter, Alan L.**, David J. Schoeneck, **Nils Newman**, **Philip Shapira**, **Jan Youtie** and Rich Kolar. September, 2006. "Nano R&D Profiles: A Deeper Look." Presentation. International Conference on Science & Technology Indicators, Leuven, Belgium.

398. **Porter, Alan L.**, David J. Schoeneck, **Philip Shapira**, **Jan Youtie** and Rich Kolar. September, 2006. "Defining the Nanotechnology Domain in Realtime Technology Assessment." Presentation. Presented at 2006 Technology Transfer Society Conference, Atlanta, GA.

399. **Porter, Alan L.** and **Ismael Rafols**. 2009. "Measuring and Mapping Interdisciplinary in Six Research Fields Over Time (1975-2005)." Presentation. ISSI Conference, Rio de Janeiro.

400. **Porter, Alan L.** and **Ismael Rafols**. September, 2008. "Science Overlay Maps: Easy-to-use Tools to Help Visualize and Track Bodies of Research, A Deeper Look at the Visualization of Scientific Discovery in the Federal Context." Presentation. Workshop at the National Science Foundation, Arlington, VA.

401. **Porter, Alan L.**, **Jan Youtie**, **Philip Shapira**, David J. Schoeneck, Li Tang and Pratik Mehta. April, 2007. "Profiling Nano R&D." Presentation. Presented at Nano-Giga Challenges, Phoenix, AZ.

402. **Porter, Alan L.** and **Jayesh Patil**. March, 2007. "Where Is Nano Going?" Presentation. Nano-Giga Challenges, Phoenix, AZ.

403. **Porter, Alan L.** and Lu Huang. December, 2010. "Tech Mining and Forecasting of Innovation Pathways, as Applied to Nano-enhanced Biosensors." Presentation. International Conference on Technological Innovation and Competitive Technical Intelligence, Beijing.

404. **Porter, Alan L.**, **Martin Meyer** and **Ismael Rafols**. May, 2008. "The Cognitive Geography of Nanotechnologies: Location and Knowledge Flows of Nano-Research in the Map of Science." Presentation. Presentation at the NBER Conference on Emerging Industries: Nanotechnology and NanoIndicators, Cambridge, MA.

405. **Porter, Alan L.**, **Nils Newman** and **Jan Youtie**. October, 2009. "Tech Mining, VantagePoint, and Science Overlay Mapping." Presentation. Pre-conference Workshop of 2009 Atlanta Conference on Science and Innovation Policy, Atlanta, GA.

406. **Porter, Alan L.**, **Philip Shapira** and **Jan Youtie**. October, 2008. "Nano Social Science: An Emerging Specialization." Presentation. Nanotechnology and Society: Emerging Opportunities & Challenges Networks, Risk and Knowledge Sharing, University of Massachusetts, Amherst, MA.

407. **Porter, Alan L.**, **Philip Shapira** and **Jan Youtie**. September, 2006. "Defining the Nanotechnology Domain in a Real Time Technology Assessment." Presentation. Technology Transfer Society Annual Conference, Atlanta, GA.

408. **Porter, Alan L.** and Stephen Carley. November, 2010. "Three Generation Research Knowledge Tracking: Publication and Citation Analyses." Demonstration Workshop. American Evaluation Association Conference, San Antonio, TX.

409. **Porter, Alan L.**, Tingting Ma and Ying Gao. November, 2011. "Tracking Emergence of Nanotechnology Dye-Sensitized Solar Cells (DSSCs)." Panel Presentation. Nanotechnology, Innovation, and Commercialization: Learning about a Technology Cycle through Patent Data, Patent Statistics for Decision Makers 2011.

410. **Porter, Alan L.**, Tingting Ma and Ying Guo. November, 2011. "Patents+ in Newly Emerging Science and Technology: Tracking Emergence of Dye-Sensitized Solar Cells." Presentation. Patent Statistics for Decision Makers, Alexandria, VA.

411. **Porter, Alan L.**, Tingting Ma and Ying Guo. June, 2011. "Multiple Perspective Research Profiling: Illustrated for Dye-Sensitized Solar Cells." Proceedings. International Council for Scientific and Technical Information 2011 Summer Conference.

412. **Porter, Alan L.**, Ying Guo and Lu Huang. October 12, 2010. "Integrating Patent Analysis with R and D and Business Analyses to Forecast Innovation Prospects: Nano-Enhanced Solar Cells." Presentation. Patent Information Users Group PIUG 2010 Northeast Conference, New Brunswick, NJ.

413. **Porter, Alan L.**, Ying Guo, Lu Huang and Douglas K. R. Robinson. November, 2011. "Forecasting Innovation Pathways: The Case of Nano-enhanced Solar Cells." Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

414. **Porter, Alan L.**, Ying Guo, Lu Huang and Douglas K. R. Robinson. December, 2010. "Forecasting Innovation Pathways: The Case of Nano-enhanced Solar Cells." Paper Presentation. International Conference on Technological Innovation and Competitive Technical Intelligence, Beijing.

415. **Posner, Jonathan** and **Jameson Wetmore**. April, 2009. "Technologies of Distraction: Mobile Phones, iPods, and E-mail." Presentation. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

416. **Rafols, Ismael** and **Alan L. Porter**. October, 2009. "Interdisciplinary in Nanoscience: What is the Nano Field and how does it Share its Knowledg." Presentation. 2nd Manchester International Workshop on Nanotechnology, Society and Policy, Manchester, UK.

417. **Rafols, Ismael**, **Alan L. Porter**, **Jan Youtie** and Li Tang. September, 2008. "Nanotechnology as a Multi-polar Science." Presentation. Manchester International Workshop on Nanotechnology, Society and Policy, Manchester, UK.

418. **Rafols, Ismael**, **Alan L. Porter** and **Loet Leydesdorff**. October, 2009. "Science Overlay Maps: A New Tool for Research Evaluation." Presentation. 2009 Atlanta Conference on Science and Innovation Policy, Atlanta, GA.

419. **Rafols, Ismael**, **Alan L. Porter** and **Loet Leydesdorff**. 2009. "The Use of Global Maps of Science in Management and Policy Contexts." Presentation. Accepted. ENID Indicators Conference 2010.

420. **Rafols, Ismael**, **Alan L. Porter** and **Martin Meyer**. September, 2009. "A Model of Interdisciplinarity in Nanotechnology: How Local Knowledge Integration Links a Globally Fragmented Field." Presentation. SNET Conference.

421. **Rafols, Ismael**, **Martin Meyer**, Jung-Hwan Park and **Alan L. Porter**. August, 2008. "The Cognitive Geography of Nanotechnologies: Location and Knowledge Flows of Nano-Research in the Map of Science." Presentation. Presented at Society for Social Studies of Science (4S), Rotterdam, the Netherlands.

422. **Randles, Sally** and **Jan Youtie**. November, 2011. "Responsible Innovation and Responsible Governance." Roundtable Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

423. **Rittmann, Bruce** and **Dawn Schwenke**. September 18, 2009. "Ending Age-Related Disease: How Will Our Lives Change if we're Healthier Longer." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

424. **Robert, Jason S.** January, 2009. "Technology and Human Enhancement: Whats the Connectio." Presentation. Midwestern University, Glendale, AZ.

425. **Robert, Jason S.** June, 2007. "Braving the Brain." Presentation. Canadian Bioethics Society, Toronto, Canada.

426. **Robert, Jason S.** May, 2007. "Cyborgs, Ratbots, and Bionic Humans: Wiring Brains to Machines." Presentation. Discovery Center, Halifax, Nova Scotia, Canada.

427. **Robert, Jason S.** May, 2007. "Neural Interface Systems: Ethical and Conceptual Issues at the Frontier of Brain Repair." Presentation. Neuroethics Program, Stanford Center for Biomedical Ethics, Palo Alto, CA.

428. **Robert, Jason S.** April, 2007. "Problematizing Enhancement." Presentation. Dartmouth College, , N, Hanover, NH.

429. **Robert, Jason S.** February, 2007. "Braving the World of Neurotechnology." Presentation. Health Law Institute Seminar Series, Dalhousie University, Nova Scotia, Canada.

430. **Robert, Jason S.** October, 2006. "Brain Repair and Neural Enhancement." 4S Conference (Society for Social Studies of Science), Vancouver, Canada.

431. **Robert, Jason S.** October, 2006. "Nanotechnology, Neurotechnology, and Society." Presentation. Institute of Nanotechnology Symposium, Northwestern University, Evanston, IL.

432. **Robert, Jason S.** October, 2006. "Forbidden Science Boundaries on New Emerging Science and Technology." Presentation. Jewish Women's Symposium, Tempe, AZ.

433. **Robert, Jason S.** August, 2006. "Controversial Science, Controversial Scientist." Presentation. NABIS Conference, Chicago, IL.

434. **Rogers, Juan D.** November 05, 2011. "Program Level Assessment of Outcomes and Impacts of Research Performance of Centers." Session. Evaluation of a Nano Science and Technology Centers Program: Mixed Methods Approach to Assessing Its Realization of Policy Objectives, American Evaluation Association.

435. **Rogers, Juan D.** December, 2010. "Publication Patterns and Collaborative Work at NSECs." Presentation. 2010 NSF Nanoscale Science and Engineering Grantees Conference, Arlington, VA.

436. **Rogers, Juan D.** October, 2009. "Nanotechnology Research Centers: What Value do they add? What Values do they Operate on." Presentation. 2nd Manchester International Workshop on Nanotechnology, Society and Policy, Manchester, UK.

437. **Rogers, Juan D.**, **Jan Youtie** and Luciano Kay. November, 2011. "Commercialization Patterns of Nanoscale Science and Engineering Centers: The Cafe of Polymer v. Clean-Room based Technology." Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

438. **Rogers, Robert P. Jr.** June, 2008. "Research Centers as Policy Tools in Emerging Technologies: Scientific and Technical Human Capital in Nanotechnology Centers in the U.S." Presentation. Chinese Academy of Sciences, Beijing, China.

439. **Rogers, Robert P. Jr.** April, 2007. "The Role of Research Centers in the US Nanotechnology Initiative." Presentation. Workshop on Social Dimensions of Nanotechnology, Paris, France.

440. **Roland, Kenneth** and **Antonio Garcia**. September 16, 2011. "Vaccines: Can they give us a Disease-Free World." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

441. Runge, Kristin R., Sara K. Yeo, **Dominique E. Brossard, Dietram A. Scheufele** and **Michael A. Xenos**. Forthcoming, May, 2013. "God, Money, Politics, and Science: The Role of Religion, Conservative Economic and Liberal Social Attitudes on Perception of Science in the Last Weeks of the 2012 U.S. Presidential Election." Paper Presentation. The Annual Convention of the American Association for Public Opinion Research, Boston, MA.

442. **Samuelson, Hava** and **Braden Allenby**. April 16, 2010. "Upgrading Ourselves: Can Technology Make Us Better." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

443. **Sarewitz, Daniel.** October, 2008. "Paths to Outcomes Based Innovation Policy." Presentation. National Institutes of Health Science of Science Management Meeting, Bethesda, MD.

444. **Sarewitz, Daniel**. September, 2008. "Science Policy and Innovation." Presentation. Presidential Council of Advisors on Science and Technology, Washington, DC.

445. **Sarewitz, Daniel**. November 26, 2007. "New Tools for Science Policy Making." Presentation. Harvard University, Science, Technology, and Society Circle, Cambridge, MA.

446. **Sarewitz, Daniel**. October, 2007. "Anticipatory Governance of Emerging Technologies: Competing Values, Irreducible Uncertainties, and Transformation Innovation." Presentation. University of Oviedo, Oviedo, Spain.

447. **Sarewitz, Daniel**. October, 2007. "Technology and Effectiveness in Contested Political Settings, Center for Research on Energy, Environment, and Transportation." Presentation. CIEMAT, Madrid, Spain.

448. **Sarewitz, Daniel**. April 16, 2007. "Political Effectiveness in Science and Technology." Presentation. Workshop on Science and Social Values, Center for Interdisciplinary Research, Bielefeld University, Bielefeld, Germany.

449. **Sarewitz, Daniel**. March, 2007. "Connecting Research to Social Outcomes." Presentation. Presentation to the University of Nebraska Board of Regents, Lincoln, NE.

450. **Sarewitz, Daniel**. January, 2007. "Ways of Knowing Novel Materials, Symposium on Environmental Effects of Novel Materials and Processes." Presentation. Royal Commission on Environmental Pollution, London, England.

451. **Sarewitz, Daniel**. August, 2006. "Policy Perspectives." Panel. Meta-Analysis: Emerging Themes in Science Policy. Gordon Research Conference on Science and Technology Policy, Big Sky, MT.

452. **Sarewitz, Daniel**. February, 2006. "Tools for Goldilocks: Rethinking the Relationships among Research, Funding, and Progress." Presentation. AAAS Annual Meeting, Symposium on The Goldilocks Dilemma Facing Science Funding: Can it be Just Righ, St. Louis, MO.

453. **Sarewitz, Daniel** and **Roy Curtis**. May 18, 2007. "Forbidding Science: Are There Things We Just Shouldn't Know." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

454. **Scheufele, Dietram A.** March, 2009. "Public Understanding of and Attitudes toward Nanotechnology: An Overview." Presentation. Presented at the Nanotechnology and Public: Data for Decision Makers briefing to the Congressional Nanotechnology Caucus, Washington, DC.

455. **Scheufele, Dietram A.** February, 2008. "A Comparative Look at Markets, Media, and Emerging Attitudes about Nanotechnology." Panel. The Annual Convention of the American Association for the Advancement of Science, Boston, MA.

456. **Scheufele, Dietram A.** February, 2008. "Engaging Religious Audiences on Nanotechnology." Presentation. Annual Convention of the American Association for the Advancement of Science, Boston, MA.

457. **Scheufele, Dietram A.** May, 2007. "Public Perceptions and Understanding of Nanotechnology." Presentation. Center for Nanoscale Science and Technology (CNST) Nanotechnology Workshop, University of Illinois, Urbana-Champaign, IL.

458. **Scheufele, Dietram A.** March 16, 2007. "Public Perceptions and Understandings of Nanotechnology." Presentation. Nano and Giga Challenges in Electronics and Photonics conference, Tempe, AZ.

459. **Scheufele, Dietram A.** March 08, 2007. "Risky Business? Risk Perception & Nano Business." Panel. Symposium, Illinois Institute of Technology, Center on Nanotechnology and Society, Chicago, IL.

460. **Scheufele, Dietram A.** January 30, 2007. "How Media and Audiences Make Sense of Scientific Issues: The Case of Nanotechnology." Presentation. CMCIS Research Lecture Series, University of South Carolina, Columbia, SC.

461. **Scheufele, Dietram A.** 2007. "Understanding the Opinion and Communication Dynamics Surrounding Nanotechnology." Presentation. Symposium on the Social Studies of Nanotechnology, University of Pennsylvania, Wharton School of Business & Chemical Heritage Foundation, Philadelphia, PA.

462. **Scheufele, Dietram A.** 2006. "Influences on Public Opinion about Nanotechnology." Presentation. Public Participation in Nanotechnology & Nanoscale Science workshop, National Nanotechnology Coordination Office, Washington, DC.

463. **Scheufele, Dietram A.** 2006. "It's Not All About Information: Exploring People's Attitudes Toward New Technologies." Lecture. Science, Democracy, and Public Policy colloquium, La Follette School of Public Affairs, University of Wisconsin, Madison, WI.

464. **Scheufele, Dietram A.** 2006. "Public Communication and Policy Making About Nanotechnology." Talk. Nano Workshop for Policy Makers, Materials Research Science and Engineering Center and Engineering Center on Nanostructured Interfaces, University of Wisconsin, Madrid, WI.

465. **Scheufele, Dietram A.** 2006. "Successful Public Communication about Nanotechnology." Talk. The Baldwin Nano Workshop for Journalists, Materials Research Science and Engineering Center and Engineering Center on Nanostructured Interfaces, University of Wisconsin, Madison, WI.

466. **Scheufele, Dietram A.** 2006. "Successful Public Communication about Nanotechnology." Talk. Integration of Societal Implications into Science workshop, U.S. Department of Energy, Washington, DC.

467. **Scheufele, Dietram A.**, **Dominique E. Brossard** and **Kajsa E. Dalrymple**. November 16, 2007. "Whose Voice Matters Most? Public Opinion about the Role of Scientists, Religious Groups, Officials, and Citizens in Public Discourse about Science." Presentation. Annual Convention of the Midwest Association for Public Opinion Research, Chicago, IL.

468. **Scheufele, Dietram A.**, **Elizabeth A. Corley**, Tsung-Jen Shih, **Kajsa E. Dalrymple** and **Shirley S. Ho**. November, 2008. "Public Opinion Dynamics Surrounding Emerging Technologies in Europe and the U.S." Presentation. Annual convention of the Midwest Association for Public Opinion Research.

469. **Scheufele, Dietram A.**, **Elizabeth A. Corley**, **Elliott D. Hillback**, Tsung-Jen Shih, **Sharon Dunwoody** and **David H. Guston**. October 13, 2007. "Nano Attitudes among Scientists and the Public." Presentation. Annual Convention of the Society for Social Studies of Science, Montreal, Canada.

470. Schuurbiers, Daan. May 04, 2009. "In and Out of the Lab." Lab Meeting. Center for Bioenergy and Photosynthesis, Arizona State University, Tempe, AZ.

471. Schuurbiers, Daan. January 19, 2009. "Bugs in the Petri Dish and Beyond - Results from a Midstream Modulation Study in a Microbiology Lab in Delft." Presentation. STIR Workshop 1: Constructing Foundations, Tempe, AZ.

472. Schuurbiers, Daan. January 17, 2009. "Can Shadows Shed Light." Presentation. STIR Workshop 1: Constructing Foundations, Tempe, AZ.

473. Schuurbiers, Daan. January 15, 2009. "Midstream Modulation as Part of a PhD on Social Responsibility in Science." Presentation. CNS All Hands Meeting, Tempe, AZ.

474. Schuurbiers, Daan. September 19, 2008. "Of Social Responsibility and Scientific Practice - Midstream Modulation in Two Microbiology Laboratories." Presentation. CSG Workshop "Doing Society and Genomics", Nijmegen, The Netherlands.

475. **Seager, Thomas P.**, **Diane Gruber** and **David Uhlman**. November 18, 2011. "Will Our Products Last? Or is it Just a Thing of the Past." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

476. **Selin, Cynthia**. February, 2012. "Materializing Futures: How Artifacts, Prototypes and Objects Support Public Deliberation of Alternative Futures." Presentation. ASU School of Public Affairs Colloquium series, Tempe, AZ.

477. **Selin, Cynthia**. December, 2011. "Climate of Uncertainty: Civic Scenarios for Decision Making." Presentation. New Tools for Science Policy, CSPO, Washington, DC.

478. **Selin, Cynthia**. December, 2011. "Museums as Mediums for Engaging Citizens in Climate Change Adaptation Scenario Planning." Presentation. Dupont Summit 2011: Pressing Issues, Little Time, Washington, DC.

479. **Selin, Cynthia**. July, 2011. "Urban Foresight: Rethinking Technology in Complex Systems." Invited Talk. Joint Research Centre, European Commission, Ispra, Italy.

480. **Selin, Cynthia**. May, 2011. "Diagnosing Futures: How Scenarios Support Reflexive Governance of Socio-Technical Systems." Presentation. School of Sustainability. Future Scenarios of Nanotechnology. Society for the Study of Nanotechnology and Emerging Technologies, Tempe, AZ.

481. **Selin, Cynthia**. May, 2011. "Futuring and Foresight in Nanotechnology." Presentation. CNS Private Sector Engagement Workshop, Tempe, AZ.

482. **Selin, Cynthia**. March 14, 2011. "Rethinking Urban Governance: Knitting together Foresight and Sustainability." Presentation. Resilience, Innovation and Sustainability: Navigating the Complexities of Global Change, Tempe, AZ.

483. **Selin, Cynthia**. March, 2011. "Scenaric Thinking and Earth Systems Engineering and Management: A Generative Dialogue." Presentation. CESEM Distinguished Lecture Series, Arizona State University, Tempe, AZ.

484. **Selin, Cynthia**. March, 2011. "Diagnosing Futures: How Scenarios Support Reflexive Governance of Socio-Technical Systems." Presentation. School of Sustainability Brown Bag, Arizona State University, Tempe, AZ.

485. **Selin, Cynthia**. December, 2010. "Plausibility Reasoning and Nanotechnology Futures." Presentation. Society for Risk Analysis Annual Conference, Salt Lake City, UT.

486. **Selin, Cynthia**. November, 2010. "Foresight and Innovation." Presentation. Practices of Anticipatory Governance Workshop, Arizona State University, Tempe, AZ.

487. **Selin, Cynthia**. October, 2010. "Foresight and Scenarios." Presentation. Nanoscale Informal Science Education Network Annual Meeting, San Francisco, CA.

488. **Selin, Cynthia**. September, 2010. "Plausibilistic Reasoning in Nanotechnology Futures." Presentation. Society for the Study of Nanotechnology and Emerging Technologies, Darmstadt, Germany.

489. **Selin, Cynthia**. August, 2010. "Nanotechnology & Plausibility." Presentation. Society for the Social Studies of Science, Tokyo, Japan.

490. **Selin, Cynthia**. July, 2010. "The Future of Sustainable Phoenix." Presentation. Institute for the Future, Palo Alto, CA.

491. **Selin, Cynthia**. May, 2010. "The Future of Organizing." Presentation. Organization Design Forum Annual Meeting, Denver, CO.

492. **Selin, Cynthia**. April, 2010. "The Future of Nanotechnology." Presentation. Nanotechnology Law and Policy Course, Arizona State University, Tempe, AZ.

493. **Selin, Cynthia**. March, 2010. "Anticipation and Foresight." Presentation. International Study of the Long-term Impacts and Future Opportunities for Nanoscale Science and Engineering Worksho, Chicago, IL.

494. **Selin, Cynthia**. March, 2010. "Envisioning Solar To Fuels." Workshop on Energy Futures, Policy and Society. Arizona State University, Tempe, AZ.

495. **Selin, Cynthia**. November, 2009. "Plausibility." ASU Plausibility Workshop, Tempe, AZ.

496. **Selin, Cynthia**. October, 2009. "Diagnosing Futures." Presentation. Society for the Social Studies of Science, Washington, DC.

497. **Selin, Cynthia**. September, 2009. "Deliberation and Anticipation." Presentation. Society for the Study of Nanoscience and Emerging Technologies, Seattle, WA.

498. **Selin, Cynthia**. June, 2009. "Anticipation and Deliberation on the Nano City." Risoe National Laboratory, Denmark.

499. **Selin, Cynthia**. April, 2009. "Using Scenarios and Foresight to Manage Turbulence." Presentation. Organizational Design Forum, Tacoma, WA.

500. **Selin, Cynthia**. May, 2008. "Managing the Uncertainty of Nanotechnologies." Panel. Challenges to Law, Ethics, and Policy MakingConference at University of Padua, Padua, Italy.

501. **Selin, Cynthia**. February, 2008. "Evidencing the Future and other Dilemmas Working in the Future Tense." Presentation. Anthropology Department, Rice University, Houston, TX.

502. **Selin, Cynthia**. October 12, 2007. "Between Hope and Prudence: Experiments with Scenaric Learning." Presentation. Society for the Social Studies of Science, Annual Meeting, Montreal, Canada.

503. **Selin, Cynthia**. October, 2007. "The Future Tense: The Ways and Means of Anticipation." Presentation. CSPO Enlightening Lunch, Tempe, AZ.

504. **Selin, Cynthia**. September, 2007. "The Future of Nano & Bio Technologies." Panel. CRN conference on Challenges & Opportunities, Tucson, AZ.

505. Selin, Cynthia. July, 2007. "Real Time Technology Assessment: Anticipation, Integration, & Engagement." Presentation. Program on Technology Scenarios, Risoe, National Laboratory, Roskilde, Denmark.

506. Selin, Cynthia. April, 2007. "Hope and Prudence: Experiments in Scenaric Learning." Presentation. Futures of Life: Acquiring and Creating Anticipatory Knowledge, Cornell University, Ithaca, NY.

507. Selin, Cynthia. March 23, 2007. "Anticipatory Governance through Scenarios." Presentation. Workshop on Global Environmental Futures: Interrogating the Practice and Politics of Scenarios, Watson Institute for International Studies, Brown University, Providence, RI.

508. Selin, Cynthia. September, 2006. "The Center for Nanotechnology in Society." Presentation. NanoTX Conference, Dallas, TX.

509. Selin, Cynthia and Ira Bennett. November 19, 2006. "Visions of Nanotechnology." Talk. CNS-ASU Science Cafe, Changing Hands Bookstore, Tempe, AZ.

510. **Selin, Cynthia**, Sarah R. Davies, Gretchen Gano and **Angela Pereira**. December, 2010. "Material Deliberation: Tapping the Dilemmas of Water, Technology, and the City." Presentation. Spaces and Flows Conference, University of California, Los Angeles, CA.

511. **Selover, Nancy** and **Ray Quay**. October 21, 2011. "Will Arizona's Climate Change Leave us Thirsty." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

512. Shanley, Lea A. September, 2006. "Control and Access: GIS Legal Issues for Indian Nations in the United States." Presentation. URISA 2006 Annual Conference, Chicago, IL.

513. Shanley, Lea A. June, 2006. "Privacy and Security: Internet Publication of Digital Spatial Data and Land Records in Wisconsin." Presentation. Presentation at WLIA Regional Meeting on Privacy, Copyright, Data Distribution and GIS Law, Elkhart Lake, WI.

514. Shanley, Lea A. and Steve J. Ventura. August, 2007. "Land Records and Map Services: Internet Privacy Policies in Wisconsin." for URISA 2007Annual Conference, Chicago, IL.

515. **Shapira, Philip**. November 21, 2012. "Nanotechnology: Trajectories and Policies, Challenges in Science, Technology and Innovation Policy." Presentation. Executive Program, University of Manchester, United Kingdom.

516. **Shapira, Philip**. October 19, 2012. "The Future of Nanotechnology: History, Status, and Prospects." Presentation. OECD-HSE International Conference, Foresight for Innovative Responses to Grand Challenges, Moscow, Russia.

517. **Shapira, Philip**. March 27, 2012. "The Economic Contributions of Nanotechnology to Green and Sustainable Growth"." Presentation. OECD/NNI International Symposium on assessing the Economic Impact of Nanotechnology, Washington, DC.

518. **Shapira, Philip**. October 14, 2011. "The Emergence of Distributed Technology Assessment in the USA, Research Workshop: Foresight and Science, Technology and Innovation Policies: Best Practices." Panel. Policy Instruments for Science, Technology and Innovation (Evaluation of Science and Technology Policies). National Research University - Higher School of Economics, Moscow.

519. **Shapira, Philip**. March 29, 2011. "Trajectories of Nanotechnology Research and Innovation." Presentation. Grenoble Ecole de Management's Winter School on Emerging Nanotechnologies, Autrans, France.

520. **Shapira, Philip**. December, 2010. "Trajectories of Nanotechnology Research and Innovation." Presentation. 2010 NSF Nanoscale Science and Engineering Grantees Conference, Arlington, VA.

521. **Shapira, Philip**. October 01, 2010. "Innovation System Dynamics and the Globalization of Nanotechnology Innovation." Presentation. S.NET Conference 2010, Darmstadt, Germany.

522. **Shapira, Philip**. March, 2010. "Nanotechnology Innovation and Commercialization." Panel. Innovative and Responsible Governance to Address Grand Challenges of Human Development, Workshop on the Long-term Impacts and Future Opportunities for Nanoscale Science and Engineering (NANO2), Chicago, IL.

523. **Shapira, Philip**. June, 2009. "Anticipating Nanotechnology: Applying Real-Time Technology Assessment to Develop Strategic Insights for Nanotechnology Research and Innovation." Seminar. Centre for Self Organising Molecular Systems (SOMS), University of Leeds, UK.

524. **Shapira, Philip**. May, 2009. "From Lab to Market: Pathways of Research Commercialization in Nanotechnology Firms in China." Presentation. Colloquium on Nanotechnology Innovation and Commercialization in China, Manchester, UK.

525. **Shapira, Philip**. April, 2009. "State Models for Supporting Emerging Nanotechnology." Presentation. Workshop on Regional, State and Local Initiatives in Nanotechnology, National Nanotechnology Initiative, Oklahoma City, OK.

526. **Shapira, Philip**. March, 2009. "Anticipating Nanotechnology: Real-Time Technology Assessment of Research and Innovation Systems." Presentation. School of Management and Economics, Knowledge Management and Data Analysis Laboratory, Beijing Institute of Technology, Beijing, China.

527. **Shapira, Philip**. March, 2009. "Anticipating Nanotechnology: Real-Time Technology Assessment and the Center for Nanotechnology in Society." Presentation. Institute for Future Technology (IFTECH), Tokyo, Japan.

528. **Shapira, Philip**. March, 2009. "Emergence of Distributed Technology Assessment in the USA: From OTA to the Center for Nanotechnology in Society." Presentation. International Workshop on Innovation and Institutionalization of TA in Japan, I2TA, University of Tokyo, Tokyo, Japan.

529. **Shapira, Philip**. June 20, 2007. "Nanotechnology in Society: Research and Innovation Systems Program Assessment." Presentation. Beijing Institute of Economic Management, Chinese Academy of Science, June 19, 2007; and at Institute of Policy and Management, Chinese Academy of Sciences, Beijing, China.

530. **Shapira, Philip**. February, 2007. "Societal Assessment of Nanotechnology U.S. Experience." Presentation. Symposium on Nanotechnology by the Ministry of Research, Science and Technology at the Advanced Materials and Nanotechnology (AMN-3) 2007 Conference, Wellington, New Zealand.

531. **Shapira, Philip** and **Alan L. Porter**. March 23, 2009. "Nanotechnology: Will it Drive a New Innovation Economy for the US." Presentation. Project on Emerging Nanotechnologies, Woodrow Wilson International Center for Scholars, Washington, DC.

532. **Shapira, Philip** and **Alan L. Porter**. September, 2005. "Mapping the Nanotechnology Enterprise." Presentation. American Political Science Association Annual Meeting, Washington, DC.

533. **Shapira, Philip**, **Alan L. Porter** and **Jan Youtie**. August, 2006. "Refining Search Terms for Nanotechnology." Presentation. Presented at the National Science Foundation, Arlington, VA.

534. **Shapira, Philip**, **Alan L. Porter**, **Jan Youtie** and Li Tang. September, 2008. "Nanotechnology Questions, Methods, Metrics and Results: CNS." Presentation. Manchester International Workshop on Nanotechnology, Society and Policy, Manchester, UK.

535. **Shapira, Philip** and **David H. Guston**. March, 2007. "Societal Assessment of Nanotechnology US Experience." Presentation. Ministry of Research, Science and Technology, Wellington, New Zealand.

536. **Shapira, Philip** and **Jan Youtie**. January, 2013. "Research and Innovation Systems Assessment of Emerging Technologies." Co-taught Modules. CNS Winter School on Anticipatory Governance of Emerging Technology, Mesa, AZ.

537. **Shapira, Philip** and **Jan Youtie**. December 07, 2012. "Interpreting Trajectories of Nanotechnology Research and Innovation (and, is there a "Nanotechnology Paradox?")." Presentation. Center for Nanotechnology in Society at Santa Barbara, Santa Barbara, CA.

538. **Shapira, Philip** and **Jan Youtie**. January, 2011. "RTTA 1 - Research Program Assessment." Presentation. Center for Nanotechnology in Society at ASU, Tempe, AZ.

539. **Shapira, Philip** and **Jan Youtie**. March, 2010. "Transatlantic Workshop on Nanotechnology Innovation and Policy." Presentation. Transatlantic Workshop on Nanotechnology Innovation and Policy, Atlanta, GA.

540. **Shapira, Philip** and **Jan Youtie**. May, 2008. "What's New about Emerging Metropolitan Nanodistricts in the United States and Europe? Characteristics of Research and Commercialization."

Presentation. The NBER Conference on Emerging Industries: Nanotechnology and NanoIndicators, Cambridge, MA.

541. **Shapira, Philip**, **Jan Youtie** and **Alan L. Porter**. November 11, 2011. "Trajectories of Global Nanotechnology Commercialization." Presentation. IGERT Seminar, Georgia Institute of Technology, Atlanta, GA.

542. **Shapira, Philip**, **Jan Youtie** and Luciano Kay. October, 2009. "Global Developments in Nanotechnology Commercialization." Presentation. 2nd Manchester International Workshop on Nanotechnology, Society and Policy, Manchester, UK.

543. **Shapira, Philip**, **Jan Youtie** and Sanjay Arora. November, 2011. "Probing Early Patterns of Commercialization in Graphene." Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

544. **Shapira, Philip** and Jue Wang. April, 2008. "From Lab to Market: Strategies and Issues in the Commercialization of Nanotechnology in China." Presentation. Panel on Cultures Meet Technology: New Approaches to Innovation and Economic Development in Asia and the West, Association for Asian Studies, 2008 Annual Meeting, Atlanta, GA.

545. Shih, Tsung-Jen, **Dietram A. Scheufele** and **Elizabeth A. Corley**. June, 2010. "Exploring Item Non-Response in Public Opinion Surveys about Nanotechnology: Evidence from 21 Countries." Presentation. Annual Convention of the International Communication Association, Singapore.

546. Shih, Tsung-Jen, **Dietram A. Scheufele** and **Elizabeth A. Corley**. June, 2010. "A Multilevel Model of Risk and Benefit Perception." Presentation. Annual Convention of the International Communication Association, Singapore.

547. **Slade, Catherine**. December 04, 2009. "Public Values in Nanomedicine." Presentation. The Dupont Summit on Science and Technology Policy. "The New Administration Challenges on Science and Technology: Staying the Course in Times of Crisis." Policy Studies Organization, Carnegi, Washington, DC.

548. **Slade, Catherine**, Derrick Anderson, **Erik Fisher** and **Barry Bozeman**. August, 2009. "Public Value Mapping of Nanotechnology: A Developing Approach for Tracking Public and Social Values in Science and Innovation Policies." Presentation. Annual Meeting of the American Sociological Association. August 7-11, 200, San Francisco, CA.

549. **Sommerfield, Milton R.**, **Mark Edwards** and **David Conz**. January 15, 2010. "Bugs for Fuels: Microbes in out Energy Future." Presentation. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

550. Soumonni, Diran. February, 2012. "Assessing South Africas Nanotechnology Strategy: What Role for the Private Sector in Pro-Poor Innovation." Presentation. Workshop on Original Policy Research (WOPR) seminar in the School of Public Policy, Atlanta, GA.

551. Soumonni, Ogundiran. August, 2012. "Nanotechnology and Renewable Energy Development in China and South Africa: Bridging the Gap between Research and Innovation." Presentation. Globelics Doctoral Academy, Rio de Janeiro, Brazil.

552. **Stone, Anne** and **William H. Kimbel**. September 17, 2010. "Who Are You Calling Neandertal? Tracing Our Ancient Ancestors." Presentation. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

553. **Strumsky, Deborah**. November 16, 2011. "How Green is Nano." Presentation. The Institute for Operations Research and the Management Sciences (INFORMS) Annual Conference, Charlotte, NC.

554. Su, Leona Yi-Fan, **Ashley A. Anderson**, **Dominique E. Brossard**, **Dietram A. Scheufele** and **Michael A. Xenos**. May, 2012. "Public Opinion and Uncertain Science: Exploring the Dynamics behind Real and Perceived Expertise Gaps in Nanotechnology." Paper Presentation. The Annual Conference of the American Association for Public Opinion Research, Orlando, FL.

555. Su, Leona Yi-Fan, **Dietram A. Scheufele**, **Dominique E. Brossard** and **Michael A. Xenos**. August, 2012. "Seeking Information about Complex Science: The Interplay of Risk-Benefit Perceptions and Prior Knowledge." Paper Presentation. The Annual Convention of the Association for Education in Journalism and Mass Communication, Chicago, IL.

556. Su, Leona Yi-Fan, **Dominque E. Brossard**, Ashley A. Anderson and **Dietram A. Scheufele**. April, 2012. "Audience Tectonics: Implications of Changing News Environments for Public Understanding of Science." Paper Presentation. The Annual Convention of the International Network on Public Communication of Science and Technology (PCST), Florence, Italy.

557. Su, Leona Yi-Fan, Heather E. Akin, **Dominique E. Brossard**, **Dietram A. Scheufele** and **Michael A. Xenos**. Under review, "Science Audience Tectonics: News Consumption Pattern and its Implication for Public Understanding." Paper Presentation. The Annual Conference of the Association for Education in Journalism and Mass Communication, Washington, DC.

558. Su, Leona Yi-Fan, Xuan Liang, Nan Li, **Dietram A. Scheufele**, **Dominique E. Brossard** and **Michael A. Xenos**. Forthcoming, May, 2013. "Public Sentiments Online: New Tools of Measurement Combining Human- and Computer-Based Coding." Paper Presentation. The Annual Convention of the American Association for Public Opinion, Boston, MA.

559. **Suchman, Mark C.** 2007. "The Implications of Nanotechnology for Social Science and Social Policy." Presentation. Cornell CNF Public Interest Talk Series, Ithaca, NY.

560. **Suchman, Mark C.** 2007. "Sharing is (S)caring on the Digital Frontier: The Challenges of Information Technology Governance in Health Care Organizations." Presentation. Cornell Center for the Study of Economy and Society, 2006-2007 Seminar Series on Institutions, Market Processes, and the Firm and to Brown University Department of Sociology Colloquium, Ithaca, NY.

561. **Suchman, Mark C.** 2007. "HIT or Miss? The Governance Challenges of Health Information Technology." Presentation. Cornell Law School Faculty Workshop; and to Duke Law School Faculty Workshop, Ithaca, NY.

562. **Suchman, Mark C.** 2006. "Taming the Market for Medical Information: Sharing is (S)caring on the Digital Frontier." Presentation. University of California-Irvine Critical Legalities Symposium, Irvine, CA.

563. Tang, Li. April, 2008. "Networks of Research Collaboration in China: Evidence from Nanotechnology Publication Activities, 1990-2006." Presentation. Invited Presentation at the University of Maastricht, The Netherlands, Maastricht, the Netherlands.

564. Tang, Li. February, 2008. "Nanotechnology Knowledge Networks in China." Presentation. PRIME Nanotechnology Winter School, Grenoble, France.

565. Tang, Li. October, 2007. "Networks of Research Collaboration in China: Evidence from Nanotechnology Publication Activities, 1990-2006." Presentation. Atlanta Science and Technology Policy Conference, Atlanta, GA.

566. Tang, Li. October, 2007. "New Argonauts & Scientific Networks: Evidence from Chinas Nanotech Publication." Presentation. Atlanta Science and Technology Policy Conference, Atlanta, GA.

567. Thoreau, Francois. September 08, 2009. "Integrated Research and Protected Spaces: A New Role for ST." Poster presentation. Society for the Study of Nanoscience and Emerging Technologies, Seattle, WA.

568. **Thorpe, Michael** and **Manfred Laubichler**. April, 2007. "Reductionism and Emergence in Science: New versus Old Views of Nature and the Universe." Presentation. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

569. **Thorpe, Michael** and **Eric Ramsey**. April 20, 2007. "Could a Computer Become Sentient? Reductionism and Emergence in Science." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

570. Valdivia, Walter. August, 2008. "Technology, Growth, and Inequality." Poster presentation. Gordon Research Conference on Science and Technology Policy, Big Sky, MT.

571. Valdivia, Walter. June, 2008. "Inequality and Nanotechnology." Presentation. Workshop on Inequality and Emerging Technologies, Valleta, Malta.

572. Valdivia, Walter. January, 2008. "Science Policy and Inequality." Presentation. First Indo-American Institute of Nano-scale Science and Engineering, Chennai, India.

573. Valdivia, Walter. January, 2008. "Science Policy and Inequality: A Research Program." Presentation. NISTADS, New Delhi, India.

574. Valdivia, Walter. October, 2007. "Non-Cooperative Games in Science Policy." Presentation. Atlanta Conference on Science and Innovation Policy, Atlanta, GA.

575. Valdivia, Walter. March, 2007. "Anticipatory Governance of Emerging Technologies." Presentation. Science-Society Interface at Universite de Lausanne, Lausanne, Switzerland.

576. **Vermaas, Willem**, **Michael White** and **Barry Ritchie**. February 15, 2008. "Evolution and Faith: Room for Both." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

577. Wang, Jing, **Elizabeth A. Corley** and Eric Welch. 2009. "Barriers and Motivators for the Adoption of Public Sector Environmental Management Systems." Paper Presentation. Western Social Science Association.

578. Wang, Jue. February, 2008. "From Lab to Market: Strategies and Issues in the Commercialization of Nanotechnology in China." Presentation. Presentation at the National Academy of Sciences, Student Forum on Science and Technology Policy, Washington, DC.

579. Wang, Jue. September, 2007. "From Lab to Market: Strategies and Issues in the Commercialization of Nanotechnology in China." Presentation. National Academy of Science, Conference on the Dragon and the Elephant: Understand the Development of Innovation Capacity in China and India, Washington, DC.

580. Wang, Jue. September, 2006. "Resource Spillover from Academia to High Tech Industry: Evidence from Nanotech Start-up Enterprises." Presentation. 2006 Technology Transfer Society Conference, Atlanta, GA.

581. Wang, Wenping. November 05, 2011. "Analyzing the Effect of Interdisciplinary Research on Patent Evaluation: Case Studies in NBS and DSSCs." Session. Measuring Research Interdisciplinarity and Knowledge Diffusion, American Evaluation Association.

582. **Westerhoff, Paul** and Meredith Gartin. January 21, 2011. "A Drop to Drink: What could Wind Up in Our Water." Presentation. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

583. **Wetmore, Jameson**. December 12, 2012. "Engaging the Public in Conversations about Nano and Society." Presentation. NISE Net Network Wide Meeting, Cambridge, MA.

584. **Wetmore, Jameson**. November 28, 2012. "Teaching Ethics, Policy and Societal Implications of Research to Scientists and Engineers: Outlining Content." Presentation. Materials Research Society Fall Meeting, Boston, MA.

585. **Wetmore, Jameson**. November 08, 2012. "Facilitating Conversations on the Science Museum Floor: Engaging Visitors in the Social Aspects of Science and Technology." Workshop. ESRC Genomics Policy and Research Forum, University of Edinburgh, Scotland.

586. **Wetmore, Jameson**. October 24, 2012. "STS Concepts and Educational Approaches for Engaging the Public in Nanotechnology and Society." Presentation. Annual Meeting of the Society for the Study of Nanoscience and Emerging Technologies (S.NET), University of Twente, Twente, the Netherlands.

587. **Wetmore, Jameson**. October 08, 2012. "The Need for Local Sensitivities in International Standards." International Workshop. Engineering Ethics for a Globalized World (EGW12), University of Illinois, Champaign, IL.

588. **Wetmore, Jameson**. October, 2012. "Whose Nano is it anyways? Exploring the Equity Implications of Nanotechnology through an Interactive Game." Presentation. Annual Meeting for the Society for Social Studies of Science, Copenhagen, Denmark.

589. **Wetmore, Jameson**. October, 2012. "STS Engagements with Science Centers: Bringing Broader Implications to the Museum Floor." Panel Organizer. Society for Social Studies of Science, Copenhagen, Denmark.

590. **Wetmore, Jameson**. September 25, 2012. "Social Studies of Technology and Religion." Presentation. Nano Impacts Group, University of Notre Dame, Notre Dame, IN.

591. **Wetmore, Jameson**. September 24, 2012. "Nanotechnology and Society: Actively Engaging the Public to Think about our Collective Future." Facilitating Reflection. ND Nano Seminar, University of Notre Dame, Notre Dame, IN.

592. **Wetmore, Jameson**. September 15, 2012. "World Wide Views on Biodiversity." Facilitator. Arizona State University, Tempe, AZ.

593. **Wetmore, Jameson**. August 08, 2012. "Inclusive Innovation for Inclusion Development." Discussion Leader. Gordon Research Conference on Science and Technology Policy, Waterville Valley, NH.

594. **Wetmore, Jameson**. August 05, 2012. "Ecology Governance Challenges Presented by Emerging Technologies." Moderator. Science Beyond the Field: a Policy (dis)Orientation Workshop, Portland, OR.

595. **Wetmore, Jameson**. March 09, 2012. "A Users Guide to Everyday Technology." Keynote Speech. Issue Day, Maumee Valley Country Day School, Toledo, OH.

596. **Wetmore, Jameson**. March 09, 2012. "Amish Technology." Workshop. Issue Day, Maumee Valley Country Day School, Toledo, OH.

597. **Wetmore, Jameson**. March 09, 2012. "Nano Equity Game: Whose Nano is it?" Workshop. Issue Day, Maumee Valley Country Day School, Toledo, OH.

598. **Wetmore, Jameson**. March, 2012. "Nano Equity Game: Whose Nano is it?" Presentation. Nano and Society training program, Arizona Science Center, Phoenix, AZ.

599. **Wetmore, Jameson**. January, 2012. "Nano Equity Game: Whose Nano is it?" Presentation. NISENet Program committee meeting, Oregon Museum of Science & Industry.

600. **Wetmore, Jameson**. December, 2011. "Nano Equity Game: Whose Nano is it?" Presentation. Adult Night, Arizona Science Center, Phoenix, AZ.

601. **Wetmore, Jameson**. November, 2011. "Equity, Equality, and Responsibility." Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

602. **Wetmore, Jameson**. November, 2011. "Congress on Teaching the Social and Ethical Implications of Research." Conference Organizer. Joint Meeting of the NNIN SEI Coordinators, NSEC SEI Coordinators, ASUs three EESE grants, and NISENets social implications group, Tempe, AZ.

603. **Wetmore, Jameson**. November, 2011. "The Challenges of Equity, Equality, and Development." Panel Organizer. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

604. **Wetmore, Jameson**. November, 2011. "Teaching Social and Ethical Implications of Research to Scientists and Engineers." Panel Organizer. Society for Social Studies of Science, Cleveland, OH.

605. **Wetmore, Jameson**. November, 2011. "Nano Equity Game: Whose Nano is it?" Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

606. **Wetmore, Jameson**. October, 2011. "The Challenge of Path Dependency and the Need for Anticipatory Governance." Presentation. CSPO in DC: New Tools for Science Policy, Washington, DC.

607. **Wetmore, Jameson**. September 20, 2011. "New Technologies New Risks? What are the Implications of a Technologically Complex World on the Way we think about the Risks of Novel Technologies and Practices?" Panel Presentation. Symposium on Risk Uncertainty and Sustainable Innovation, University of Michigan, Ann Arbor, MI.

608. **Wetmore, Jameson**. July 18, 2011. "Swimming Upstream: When Scientists and Engineers are More Concerned about Science & Technology than the Public." Presentation. Upstream Engagement with Science and Technology: Opportunities and Challenges, a mini-symposium, ESRC Genomics Network, University of Edinburgh, Scotland.

609. **Wetmore, Jameson**. March 14, 2011. "The Challenges of Path Dependence and the Need for Anticipatory Governance." Presentation. CNS-ASU Resilience 2011 Workshop at ASU, Tempe, AZ.

610. **Wetmore, Jameson**. April 03, 2010. "Nanodays-Student Presentations of Basic Science and Nanotechnology Applications." Arizona Science Center, Phoenix, AZ.

611. **Wetmore, Jameson**. March 25, 2010. "Opportunities for Engaging with the Public." Asilomar International Conference on Climate Intervention Technologies, Pacific Grove, CA.

612. **Wetmore, Jameson**. March, 2010. "Nanodays-Student Presentations of Basic Science and Nanotechnology Applications." Tempe Festival of the Arts. March 26-28, 2010, Tempe, AZ.

613. **Wetmore, Jameson**. February 22, 2010. "Lessons of Engagement: Learning from Policymakers and the Public." Presentation. Annual Meeting of the American Association for the Advancement of Science.

614. **Wetmore, Jameson**. December 09, 2009. ""Overview of CNS-ASU" with David H. Guston." Presentation. 2009 NSF Nanoscale Science and Engineering Grantees Conference, Arlington, VA.

615. **Wetmore, Jameson**. December 09, 2009. "Best Practices of NSEC's and MRSEC's for Advancing NSE Education-Diversity Aspects." Presentation. 2009 NSF Nanoscale Science and Engineering Grantees Conference, Arlington, VA.

616. **Wetmore, Jameson**. November 08, 2009. "Technology and the City." Presentation. On the Cutting Edge...Today's Jewish Women Symposium, Scottsdale, AZ.

617. **Wetmore, Jameson**. October 30, 2009. "Begging for Regulation: The Quest to Tame Nanotechnology." Presentation. Annual Meeting of the Society for Social Studies of Science, Washington, DC.

618. **Wetmore, Jameson**. July 22, 2009. "Anticipatory Governance of Emerging Technologies." Presentation. National Institute for Nano-Engineering Summer Student Program, Sandia National Labs. Invited.

619. **Wetmore, Jameson**. July 08, 2009. "Nanotechnology and Society." Presentation with Troy Benn. Arizona Science Center's Junior Science Correspondents Program, Phoenix, AZ.

620. **Wetmore, Jameson**. June 16, 2009. "What Should Everyone Know about Technology?" Panel discussion. American Society for Engineering Education Annual Conference, Austin, TX.

621. **Wetmore, Jameson**. June 15, 2009. "Integrating Microethics and Macroethics in Graduate Science and Engineering Education: Developing Instructional Models." Presentation with Joe Herkert. American Society for Engineering Education Annual Conference, Austin, TX.

622. **Wetmore, Jameson**. March, 2009. "Innovation and Graduate Education." Presentation. Presented at Centers, Universities, and the Scient, Arlington, VA.

623. **Wetmore, Jameson**. December, 2008. "Amish Sociologists: Building Society with Technology." Presentation. National Nanotechnology Infrastructure Network, Indian Institute of Technology, Kanpur Winter School on Organic Electronics, Kanpur, India.

624. **Wetmore, Jameson**. November, 2008. "Nanotechnology the Promise, Politics, and Personal Impacts." Presentation. Presentation to the Women's Symposium, co-sponsored by the Jewish Studies Department at Arizona State University and the Bureau of Jewish Education of Greater Phoenix, Phoenix, AZ.

625. **Wetmore, Jameson**. August, 2008. "A Dialogue on Nanotechnology and Religion: Using Religious Expertise to Build Nanotechnology." Poster Presentation. Gordon Research Conference on Science and Technology Policy, Big Sky, MT.

626. **Wetmore, Jameson**. June, 2008. "The Challenge of Path Dependence." Presentation. IEEE Symposium on Technology & Society, Fredericton, New Brunswick, Canada.

627. **Wetmore, Jameson**. April, 2008. "What Do You Think About a Technology You Can't Even Se." Presentation. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

628. **Wetmore, Jameson**. December, 2007. "Amish Technology." Presentation. Spirit of the Senses Salon, Phoenix, AZ.

629. **Wetmore, Jameson**. November, 2007. "ASB 591: Seminar on Professionalism, on the Academic job search." Presentation. Seminar on Professionalism.

630. **Wetmore, Jameson**. October, 2007. "Building a Better Air Bag: the Continuing Search for a Technical Fix." Presentation. Mobility History, Heritage and Design Fifth Annual Conference on History of Transport, Traffic and Mobility (T2M), Helmond, the Netherlands.

631. **Wetmore, Jameson**. September, 2007. "Bureaucrats, Lobbyists, and Regulators, Oh My! Introducing Graduate Students to Science Outside the Lab." Presentation. CSPOs Enlightening Lunch, with Ira Bennett, Arizona State University, Tempe, AZ.

632. **Wetmore, Jameson**. August, 2007. "Cats Cradle, by Kurt Vonnegut." Presentation. Spirit of the Senses Salon, Scottsdale, AZ.

633. **Wetmore, Jameson**. June, 2007. "Teaching the Ethics and Social Implications of Emerging Technologies to Graduate Level Students." Presentation. American Society for Engineering Education Annual Conference, Honolulu, HI.

634. **Wetmore, Jameson**. March, 2007. "Transferring Western Technology to Developing Countries: Good Intentions, Unexpected Outcomes." Presentation. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

635. **Wetmore, Jameson**. March, 2007. "STS in the Trenches: Engaging Scientists and Engineers." Presentation. STS Engaged Workshop, University of Virginia Department of Science, Technology and Society, Charlottesville, VA.

636. **Wetmore, Jameson**. February, 2007. "Nanotech and Religion: Ambitions, Influence, and Policy." Presentation. CNS-UCSB, Santa Barbara, CA.

637. Wetmore, Jameson. August, 2006. "Religious Forays into Nanotechnology Policy." Presentation. Gordon Research Conference on Science and Technology Policy, Big Sky, MT.

638. **Wetmore, Jameson** and **Andrea Lewis**. January 20, 2012. "What's in our Skincare?" Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

639. **Wetmore, Jameson** and **Ira Bennett**. January, 2012. "SEI Professional Development Plans." Presentation. Societal and Ethical Implications Meeting, Nanoscale Informal Science Education Network, Oregon Museum of Science and Industry, Portland, OR.

640. **Wetmore, Jameson**, **Shobita Parthsarathy** and Regula Valerie Burri. October 30, 2009. "The New Sentinels of Progress? Investigating Emerging Approaches to Governing Technology." Panel Organizer. Series of three panels, Society for Social Studies of Science Annual Meeting, Washington, DC.

641. **Wetmore, Jameson M.** September 24, 2012. "Facilitating Reflection on Nanotechnology and Society: Actively Engaging the Public to Think about our Collective Future." Presentation. ND Nano Seminar, University of Notre Dame, Notre Dame, IN.

642. **White, Dave** and Troy M. Benn. May 15, 2009. "To Drink or Not to Drink: What Should We Do to Have Good-Tasting, Safe and Sustainable Water into the Future." Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

643. **Wiek, Arnim**. November, 2011. "STIR and the City: Integration Research and Sustainability Science." Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

644. **Wiek, Arnim**. March 14, 2011. "Resilience, Sustainability, and Anticipatory Governance - Pieces of the Puzzle." Presentation. Resilience 2011, Arizona State University, Tempe, AZ.

645. **Wiek, Arnim** and Rider W. Foley. March 16, 2012. "Will Science and Technology put the Able into Sustainable?" Talk. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

646. **Wiek, Arnim** and Rider W. Foley. December 19, 2011. "The Dragon beneath Phoenix: Meaningful Community Involvement, Effective Remediation, and Sustainable Urban Development at the M52 Superfund Site in Phoenix." Presentation. Jiangsu Senior Executive Public Administration Training Program. Arizona State University, Phoenix, AZ.

647. **Wiek, Arnim** and Rider W. Foley. November, 2011. "Nanotechnology for Sustainability? Analyzing the Demand for and Supply of Nanotechnology in City Environments." Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

648. **Wolbring, Gregor**. August, 2006. "Governance of Nano-bio-info-cogno-synbio." Presentation. NABIS Conference, Chicago, IL.

649. **Wolbring, Gregor**. December, 2005. "The Triangle of Enhancement Medicine, Disabled People, and the Concept of Health: A New Challenge for HTA, Health Research, and Health Policy. Health Technology Assessment (HTA) Initiative #23." Presentation. Alberta Heritage Foundation for Medical Research,, Edmonton, Alberta, Canada.

650. **Woodbury, Neal**. April, 2006. "Evolution on a Chip: Making Molecules Work for U." Presentation. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.

651. **Woodbury, Neal** and **David H. Guston**. November 02, 2010. "Life Saver or Privacy Invasion? Identifying Disease before Symptoms." Presentation. Spirit of the Senses, Tempe, AZ.

652. Woodson, Thomas. March, 2013. "Research Inequality in Nanomedicine." Poster Presentation. Georgia Tech Graduate Student Conference, Atlanta, GA.

653. Woodson, Thomas. August, 2012. "Research Inequality in Nanomedicine." Poster Presentation. Gordon Research Conference: Science and Technology Policy, Waterville Valley Resort, Watervillle Valley, NH.

654. Woodson, Thomas. November, 2011. "Nanotechnology in India: An examination of the Productivity and Equitable Nature of their Research Program." Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

655. Woodson, Thomas. September, 2011. "The 10/90 Gap in Health Related Nanotechnology Research." Presentation. The Atlanta Conference on Science and Innovation Policy, Atlanta, GA.

656. Woodson, Thomas and **Susan Cozzens**. May, 2011. "New Technologies, New Power Relationships?: The Case of Nanomedicine." Presentation. Conference on the Political Sociology of Science and Technology, Troy, NY.

657. Woodson, Thomas, Susan Cozzens, Jameson M. Wetmore, Matthew Harsh, Ogundiran Soumonni and Rodrigo Cortes Lobos. October, 2012. "Assessing Equity and Equality in South Africa's Nanotechnology Intiative." Presentation. Society for the Social Studies of Science, Copenhagen.

658. **Xenos, Michael A.**, **Dietram A. Scheufele**, **Dominique E. Brossard**, Doo-Hun Choi and Michael A. Cacciatore. August, 2012. "News Media Use and the Informed Public in the Digital Age." Paper Presentation. The American Political Science Association (APSA) Political Communication Pre-Conference, Baton Rouge, LA.

659. Xenos, Michael A., **Dietram A. Scheufele**, **Dominique E. Brossard**, Doo-Hun Choi, Michael A. Cacciatore, Sarah K. Yeo, et al. Forthcoming, June, 2013. "News Media use and the Informed Public in the Digital Age." Paper Accepted for Presentation. Annual Convention of the International Communication Association, London, England.

660. Yeo, Sara K., Ashley A. Anderson, Nan Li, Kristin K. Runge, **Dominique E. Brossard**, **Dietram A. Scheufele**, et al. November, 2012. "Exploring the Interplay of Values and Use of Information Channels on Public Opinion of Nuclear Energy." Paper Presentation. The 2012 Behavior, Energy, and Climate Change (BECC) Conference, Sacramento, CA.

661. Yeo, Sara K., **Dominique E. Brossard**, **Dietram A. Scheufele** and **Michael A. Xenos**. Forthcoming, May, 2013. "Dangerous Disconnects? How Public Discourse about Nanotechnology is Missing the Point." Paper Presentation. The Annual Convention of the American Association for Public Opinion Research, Boston, MA.

662. Yeo, Sara K., **Dominique E. Brossard**, **Dietram A. Scheufele** and **Michael A. Xenos**. November, 2012. "Is the Online Environment Changing the Construction of Scientific Controversies?" Paper Presentation. The Annual Convention of the Midwest Association for Public Opinion Research, Chicago, IL.

663. Yeo, Sara K., Kristin K. Runge, Nan Li, **Dominique E. Brossard**, **Dietram A. Scheufele** and **Michael A. Xenos**. May, 2012. "The Opinion Dynamics Surrounding Nuclear Energy in the U.S.: Exploring the Interplay of Risk Perceptions, Values, Mass Media Use and Knowledge on Public Support for Nuclear Energy." Paper Presentation. The Annual Conference of the American Association for Public Opinion Research, Orlando, FL.

664. Yeo, Sara K., **Michael A. Xenos**, **Dominique E. Brossard** and **Dietram A. Scheufele**. Under review, "Information Seeking in an Age of (Un)Reliable Information." Paper Presentation. The Annual Pre-Conference of the American Political Science Association, Chicago, IL.

665. **Youtie, Jan**. November 05, 2011. "Societal Dimensions of the Nano Science and Technology Center Program." Session. Evaluation of a Nano Science and Technology Centers Program: Mixed Methods Approach to Assessing its Realization of Policy Objectives, American Evaluation Association.

666. **Youtie, Jan**. December 03, 2010. "Anticipating Developments in Nanotechnology Commercialization: The Potential Economic Impacts of Nanoelectronics." Presentation. Federal Reserve Bank of Dallas and the Semiconductor Industry, Austin, TX.

667. **Youtie, Jan**. October 26, 2010. "Silos or Systems in Emerging Science Domains." Presentation. Nano@Tech, Atlanta, GA.

668. **Youtie, Jan**. October 23, 2010. "Silos or Systems in Emerging Science Domains." Presentation. National Organization of Black Chemists and Chemical Engineers, Atlanta, GA.

669. **Youtie, Jan**. October 02, 2010. "Silos or Systems in Emerging Science Domains." Keynote. S.NET Conference 2010, Darmstadt, Germany.

670. **Youtie, Jan**. December, 2009. "Anticipating Developments in Nanotechnology Commercialization." Presentation. 2009 NSF Nanoscale Science and Engineering Grantees Conference December 7-9, 2009, Arlington, VA.

671. **Youtie, Jan**. August, 2009. "Understanding and Stimulating Highly Creative Research: Measurement and Analysis - U.S. and Europe." Special Session. Developing a Social Science of Science and Innovation Policy, American Sociological Association Annual Meeting, San Francisco, CA.

672. **Youtie, Jan**. August, 2009. "Center for Nanotechnology in Society." Presentation. Georgia Tech President, Dr. G.P. (Bud) Peterson, Atlanta, GA.

673. **Youtie, Jan**. January, 2009. "Center for Nanotechnology in Society." Presentation. Biotechnology and Public Forum, Georgia Tech, Atlanta, GA.

674. **Youtie, Jan**. November, 2007. "Nanotechnology Workshop: Definitions, Directions, Debate." Presentation. National Organization for the Professional Advancement of Black Chemists and Chemical Engineers, Atlanta, GA.

675. **Youtie, Jan**. October, 2007. "Nanodistricts in the United States: Metropolitan Trajectories and Clustering." Presentation. Atlanta Conference on Science, Technology, and Innovation Policy, Atlanta, GA.

676. **Youtie, Jan**. October, 2006. "Nano Research Enterprise Assessment." Presentation. Workshop on Next Generation Metrics, SRI, Arlington, VA.

677. **Youtie, Jan**. September, 2006. "Searching for Nanotechnology: Explorations in Research and Innovation Systems." Presentation. Technology Transfer Society Annual Meeting, Atlanta, GA.

678. **Youtie, Jan** and **Alan L. Porter**. November, 2011. "Using Large-scale Datasets to Understand the Trajectories." Roundtable Organizers. Society for the study of Nanoscience and Emerging Technologies 2011 Conference, Tempe, AZ.

679. **Youtie, Jan** and **Alan L. Porter**. October, 2009. "Conducting Research on Emerging Innovation Systems through Bibliometric Analysis." Presentation. S.NET Conference 2009, Pre-conference CNS-ASU Workshop, Seattle, WA.

680. **Youtie, Jan** and **Alan L. Porter**. October, 2009. "Datamining Researcher Recognition of Nanotechnology Risk." Presentation. 2nd Manchester International Workshop on Nanotechnology, Society and Policy, Manchester, UK.

681. **Youtie, Jan**, **Alan L. Porter**, Kevin Boyack and **Jose Lobo**. November, 2011. "Using Large-Scale Datasets to Understand the Trajectories of Emerging Technologies." Roundtable Presentation. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

682. **Youtie, Jan** and Luciano Kay. October, 2012. "Acquiring Nanotechnology Capabilities: Role of Mergers and Acquisitions in the Nanotechnology Ecosystem." Presentation. Society for the Study of Nanoscience and Emerging Technologies (S.NET), the Netherlands.

683. **Youtie, Jan**, **Maurizio Iacopetta** and **Stuart Graham**. September, 2006. "Long Views of Nanotechnology: Is it a General Purpose Technolog." Presentation. Technology Transfer Society Annual Conference, Atlanta, GA.

684. **Youtie, Jan** and **Philip Shapira**. February 19, 2013. "Time to Reassess the Promise of Nanotechnology? An Analysis of Research, Developments and Commercialization." Presentation. New Tools for Science Policy, Washington, DC.

685. **Youtie, Jan** and **Philip Shapira**. September 13, 2012. "Emerging Nanotechnologies: Scaling and Scoping Environmental, Health, and Safety Applications." Presentation. Seminar, Center for the Environmental Implications of NanoTechnology, Duke University.

686. **Youtie, Jan**, **Philip Shapira** and **Juan D. Rogers**. October, 2009. "Blind Matching Versus Matchmaking: Comparison Group Selection for Highly Creative Researchers." Presentation. 2009 Atlanta Conference on Science and Innovation Policy, Atlanta, GA.

687. **Youtie, Jan**, **Philip Shapira**, **Juan D. Rogers** and **Thomas Heinze**. September, 2012. "Highly Creative Researchers Careers in Context." Presentation. SciSIP Principal Investigators Conference, The National Academy of Sciences, Wasington, DC.

688. **Youtie, Jan**, **Philip Shapira** and Luciano Kay. December 07, 2011. "Global Innovation in Nanotechnology: Visualization and Modeling." Presentation. NSF Nanoscale Science and Engineering Grantees Conference, Washington, DC.

689. **Youtie, Jan**, **Philip Shapira** and Luciano Kay. November, 2011. "U.S. Nanotechnology Firms from Discovery to Commercialization." Panel Presentation. Nanotechnology, Innovation, and Commercialization: Learning about a Technology Cycle through Patent Data, Patent Statistics for Decision Makers 2011.

690. **Youtie, Jan**, **Philip Shapira** and Luciano Kay. September, 2011. "Nanotechnology Firms from Discovery to Commercialization." Presentation. Technology Transfer Society Conference, Augsburg, Germany.

691. **Youtie, Jan**, **Philip Shapira** and Luciano Kay. July, 2011. "Anticipating Developments in Nanotechnology Commercialization." Presentation. Workshop on Nanotechnologies: Economic and Societal Perspectives, Karlsruhe, Germany.

692. **Youtie, Jan**, **Philip Shapira**, Sanjay Arora, Ying Guo, Lu Huang, **Douglas K. R. Robinson**, et al. November, 2011. "Anticipating Future Commercial Applications of Nanotechnology." Session. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies, Tempe, AZ.

693. **Youtie, Jan**, **Philip Shapira**, **Thomas Heinze** and **Juan D. Rogers**. October, 2009. "Highly Creative Research: How it is defined and Organized." Presentation. 2009 Atlanta Conference on Science and Innovation Policy, Atlanta, GA.

694. **Youtie, Jan**, Stephen Carley, **Philip Shapira**, **Elizabeth A. Corley** and **Dietram A. Scheufele**. September, 2011. "Perceptions and Actions: Examining the Relationship between Views on Risk and Citation Actions of Nanotechnology Scientists." Presentation. Atlanta Conference on Science and Innovation Policy, Atlanta, GA.

Other

1. ‡**Allenby, Braden**. 2010. *Emerging Technologies*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

2. ‡**Allenby, Braden**. 2010. *Enabling Technology*. 2010. Emerging Technologies. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

3. ‡**Allenby, Braden**. 2010. *Life Cycle Analysis and Nanotechnology*. 2010. Enabling Technology. 2010. Emerging Technologies. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

4. ‡**Barandiaran, Javiera**. 2010. *Berkeley, CA, Local Regulatory Efforts*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

5. ‡**Barandiaran, Javiera**. 2010. *California*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

6. ‡**Barben, Daniel**. 2010. *Acceptance Politics*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

7. ‡**Barben, Daniel**. 2010. *Anticipatory Governance*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

8. ‡**Barben, Daniel**. 2010. *Glossary*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

9. ‡**Barben, Daniel**. 2010. *Innovation*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

10. ‡**Barben, Daniel**. 2010. *Reflexive Governance*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

11. ‡**Barben, Daniel**. 2010. *Social Science*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

12. ‡Benn, Troy. 2010. *Nano-Silver*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

13. Calleja-Lopez, Antonio. 2010. *Reflexive Modulation*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publication.

14. ‡Conley, Shannon. 2010. *Cambridge, MA, Local Regulatory Efforts*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

15. ‡**Corley, Elizabeth A.** 2010. *Scientists' Attitudes Toward Nanotechnology*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

16. ‡**Cozzens, Susan.** 2010. *Equity*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

17. ‡**Cunningham, S. W.** and **Alan L. Porter**. 2011. *Bibliometric Discovery of Innovation and Commercialization Pathways in Nanotechnology*. Conference Proceedings, Portland International Conference on Management of Engineering and Technology, Portland OR.

18. ‡Dalrymple, Kajsa E. and **Dietram A. Scheufele**. 2010. *Public Understanding of Nanotechnology*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

19. ‡Davies, Sarah R. 2010. *Democs*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

20. ‡Davies, Sarah R. 2010. *Nanoscale Informal Science Education Network*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

21. **Fiedeler, Ulrich**, **Christopher Coenen**, **Sarah R. Davies** and **Arianna Ferrari**. 2010. *Understanding Nanoscience and Emerging Technologies*. Heidelberg: Akademische Verlagsgesellschaft.

22. ‡**Fisher, Erik**, et al. 2010. *Correspondence: Research Thrives on Integration of Natural and Social Sciences.* Nature. 463(7284): 1018.

23. ‡**Fisher, Erik**. 2010. *21st Century Nanotechnology Research and Development Act*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

24. ‡**Fisher, Erik**. 2010. *Integration*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

25. **Fisher, Erik**. 2008. *Review of Evan Selinger; Robert P. Crease (eds.). The Philosophy of Expertise*. Isis, 99(1): 232-233.

26. **Fisher, Erik** and David Beltran-del-Rio. *Mathematics and Root Interdisciplinarity*. Oxford Handbook of interdisciplinarity. Oxford University Press. Accepted.

27. ‡**Guston, David H.**, **Daniel Sarewitz** and **Clark A. Miller**. 2009. *Correspondence: Scientists Not Immune to Partisanship*. Science, 323:582.

28. ‡**Hamlett, Patrick**. 2010. *National Citizens Technology Forum*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

29. ‡Harsh, Matthew. 2010. *International Development*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

30. ‡Harsh, Matthew. 2010. *UN Millenium Goals*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

31. ‡Hays, Sean. 2010. *Ethical Issues of Brain-Machine Interface*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

32. ‡Hays, Sean. 2010. *Foresight Institute*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

33. ‡Hays, Sean. 2010. *Human Enhancement*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

34. ‡Hays, Sean. 2010. *Transhumanism*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

35. ‡**Ho, Shirley**. 2010. *Media Representations of Nano*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

36. ‡**Ho, Shirley**. 2010. *Nanotech Chronicles*. Encyclopedia on Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA. Sage Publications.

37. ‡**Ho, Shirley**. 2010. *Risk Communication*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

38. ‡**Ho, Shirley**. 2010. *Singapore*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

39. **Hogle, Linda F.** 2007. *Sentinel Beings: The Biopolitics of Human Biosensors*. Invited paper submitted to BioSocieties, theme issue on Biopower, Biotechnology and Globalization.

40. ‡**Kleinman, Daniel Lee**. 2010. *Consensus Conference on Nanotechnology (2005)*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

41. ‡**Marchant, Gary**. 2010. *Law*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

42. ‡Milford, Richard and **Jameson Wetmore**. 2010. *American Scientific Affiliation*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

43. ‡Milford, Richard and **Jameson Wetmore**. 2010. *Journal of Lutheran Ethics*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

44. **Mitcham, Carl** and **Erik Fisher**. 2012. *Ethics and Policy*. In Chadwick, R. (Ed.), Encyclopedia of Applied Ethics. San Diego: Academic Press. 165-172.

45. **Nisbet, Matthew C.**, **Dominique E. Brossard** and **Dietram A. Scheufele**. 2009. *Science Needs a Storyline*. The Observatory/Columbia Journalism Review.

46. ‡**Philbrick, Mark**. 2010. *Environmental Protection Agency*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

47. ‡**Philbrick, Mark**. 2010. *Nanoscale Materials Stewardship Program*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

48. ‡**Philbrick, Mark**. 2010. *Office of Science and Technology Policy*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

49. ‡**Philbrick, Mark**. 2010. *Risk-Benefit Perceptions of Nano*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

50. ‡**Philbrick, Mark**. 2010. *Toxic Substances Control Act and Nanotechnology*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

51. ‡**Porter, Alan L.** 2010. *Bibliometrics*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

52. ‡**Porter, Alan L.** and **Ismael Rafols**. 2010. *Nano Research Patterns*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

53. **Randles, Sally**, **Jan Youtie**, **David H. Guston**, **Barbara Harthorn**, **Chris Newfield**, et al. 2012. *A Trans-Atlantic Conversation on Responsible Innovation and Responsible Governance*. Society for the Study of Nanocience and Emerging Technologies (S.NET) Proceedings.

54. ‡**Robert, Jason S.** 2008. *Review of Nanoethics.* Studies in Ethics, Law and Technology, 2(1).

55. ‡**Rogers, Juan D.** 2010. *Research and Innovation Assessment*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

56. ‡Schuurbiers, Daan. 2009. *In Amerika. A Tryptic on Daily Life at ASU for TU Delta*. Published in the weekly magazine of Delft University of Technology.

57. Schuurbiers, Daan. 2008. *Ethics in Action*. Winning essay of the Mekelprize 2008 for PhD students, Platform for Ethics.

58. ‡**Selin, Cynthia**. 2010. *Anticipation*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

59. ‡**Selin, Cynthia**. 2010. *Foresight*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

60. ‡**Shapira, Philip**. 2010. *Active Nanotechnology*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

61. ‡**Shapira, Philip** and **Jan Youtie**. 2010. *United States*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

62. ‡**Shapira, Philip**, **Jan Youtie** and Stephen Carley. 2010. *Nanodistricts*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

63. ‡**Slade, Catherine**. 2010. *Public Value Mapping*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

64. ‡Tang, Li and **Alan L. Porter**. 2010. *Text Mining*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

65. ‡Tang, Li, **Philip Shapira** and Ju Wang. 2010. *China Nanotechnology*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

66. Thoreau, Francois. 2011. *On Reflections and Reflexivity: Unpacking Research Despositifs*. Third Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies 2010 Proceedings.

67. ‡Toor, Rebecca. 2012. *Causing a STIR*. International Innovation. September:76.

68. ‡Toor, Rebecca. 2012. *Midstream Transformation*. International Innovation. September: 77-79.

69. **Wetmore, Jameson**. 2011. *View from the Street A World of Traffic Jams*. Newsletter of the International Association for the History of Transport, Traffic, and Mobility, VIII(2) , pp. 17-19.

70. ‡**Wetmore, Jameson**. 2010. *Benny the Bear*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

71. ‡**Wetmore, Jameson**. 2010. *Religion*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

72. ‡**Wetmore, Jameson**. 2010. *Society, Religion and Technology Project, Church of Scotland*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

73. ‡**Wetmore, Jameson.** 2010. *Series of Five Posters on the Social Implications of Nanotechnology (with other Collaborators)*. Distributed by the Nanoscale Informal Science Education Network to Museums across the Country for Nanodays and Other Programs.

74. ‡**Wetmore, Jameson.** 2010. *Series of Five Informational Sheets on the Social Implications of Nanotechnology (with other Collaborators)*. Distributed by the Nanoscale Informal Science Education Network to Museums Across the Country for Nanodays and Other Programs.

75. ‡**Wetmore, Jameson**. 2006. *Nanotalk: Conversations with Scientists and Engineers about Ethics, Meaning, and Belief in the Development of Nanotechnology*. Science and Engineering Ethics, 12(3): 583.

76. **Wetmore, Jameson**, **Ira Bennett**, William H. Hooke and Tim Miller. 2009. *Correspondence: Scientists: Listen Up! - Letter*. Science, 324: 334.

77. **Wiek, Arnim** and **Cynthia Selin**. 2009. *The Future of Phoenix - Crafting Sustainable Development Strategies for Phoenix.* ASU School of Sustainability.

78. ‡**Wolbring, Gregor**. 2010. *Abel-Ism*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

79. ‡**Wolbring, Gregor**. 2010. *Cancer Treatment, Nano Enabled*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

80. ‡**Wolbring, Gregor**. 2010. *Design and Construction*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

81. ‡**Wolbring, Gregor**. 2010. *Disability and Nanoscience*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

82. ‡**Wolbring, Gregor**. 2010. *International Risk Governance Council*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

83. ‡**Wolbring, Gregor**. 2010. *Nano Hazard Symbol Contest*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

84. ‡**Wolbring, Gregor**. 2010. *Nanoparticle Occupational Safety and Health Consortium*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

85. ‡**Wolbring, Gregor**. 2010. *Nano-Photovoltaics*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

86. ‡**Wolbring, Gregor**. 2010. *Zinc Oxide*. Encyclopedia of Nanoscience and Society, ed. David H. Guston. Thousand Oaks, CA: Sage Publications.

87. **Youtie, Jan**, **Alan L. Porter**, **Kevin Boyack**, **Jose Lobo**, **Richard Klavan**, **Ismael Rafols**, et al. 2012. *Using Large-scale Databases to Understand the Trajectories of Emerging Technologies*. Society for the Study of Nanoscience and Emerging Technologies (S.NET) Proceedings.

88. ‡**Youtie, Jan** and **Philip Shapira**. 2009. *Metropolitan Development of Nanotechnology: Concentration or Dispersion*.

89. ‡Zhuang, Wei. 2008. *The Impact of State R&D Investment on Nanotechnology: A Review of Nanotechnology Initiatives at the State Level*. Master of Science in Public Policy (MSPP), Professional Research Paper, School of Public Policy, Georgia Institute of Technology, Atlanta, GA.

Search and Mapping Tools and Thesauri

1. Carley, S. (September, 2009) GeoMap Tool Macro for VantagePoint and Google Earth.

2. Carley, S. (October, 2009). Citation Counter Macro for Vantage Point and Web of Science.

3. Carley, S. (January, 2010,). Citation Extractor Macro for Vantage Point and Web of Science.

4. Kay, L. (January, 2009). Pajek Network, Vector, and Partition Macros for VantagePoint.

5. Kay, L. (January, 2009). Catenate Macro for VantagePoint.

6. Kay, L. (November, 2009). Random selection Macro for VantagePoint.

7. Kay, L. (November, 2009). Macro for estimating number of internal and external collaborators for VantagePoint.

8. Kay, L. (July, 2009). Thesauri for patent record classification based on kind codes, patent authorities, publication dates, and publication number for VantagePoint and Patstat.

9. Kay, L. (March, 2009). Thesauri for global affiliation name clean up and organizational type classification.

10. Tang, L**.** and **Walsh J.** (2009, May). Name disambiguation algorithm.

11. Tang, L. (January, 2009). Chinese affiliation thesaurus for Vantage Point.

12. Tang, L. (January, 2009). Chinese researchers thesaurus for Vantage Point.

13. Wang, J. (2010, January). Funding agency thesaurus for Vantage Point and Web of Science.

Press

1. **Allenby, Braden**. October 15, 2009. Organization Analyzes How New War Weapons will Impact Society. Arizona State University News. http://asunews.asu.edu/20091015_consortium

    a) October 15, 2009 – Physorg. http://www.physorg.com/print174841213.html

2. Arizona State University Insight News. October 9, 2009. InnovationSpace takes on New Challenges. Page 6. http://asunews.asu.edu/files/20091009.pdf

3. Arizona State University News. March 1, 2010. ASU faculty, students present at world's largest science meeting. http://asunews.asu.edu/20100305_AAASroundup

4. Arizona State University News. October 19, 2010. ASU awarded $6.5 million to study nanotechnology in society. http://asunews.asu.edu/20101015_cnsrenewal

    a) October 12, 2010 – NSF. http://nsf.gov/news/news_summ.jsp?cntn_id=117862&org=NSF&from=news
    b) October 13, 2010 – EurekAlert. http://www.eurekalert.org/pub_releases/2010-10/asu-asu101310.php
    c) October 13, 2010 – First Science. http://www.firstscience.com/home/news/science-business/arizona-state-university-awarded-6-5-million-to-study-nanotechnology-and-society_93553.html

d) October 14, 2010 – R&D. http://www.rdmag.com/News/Feeds/2010/10/policy-arizona-state-university-awarded-65-million-to-st/
e) October 14, 2010 – Phoenix Business Journal. http://www.bizjournals.com/phoenix/stories/2010/10/11/daily54.html
f) October 14, 2010 – Safe Nano. http://www.safenano.org/SingleNews.aspx?NewsId=1095
g) October 14, 2010 – Molecular Station. http://www.molecularstation.com/science-news/2010/10/arizona-state-university-awarded-6-5-million-to-study-nanotechnology-and-society/
h) October 14, 2010 – Physorg. http://www.physorg.com/wire-news/48509977/arizona-state-university-awarded-65-million-to-study-nanotechnol.html
i) October 14, 2010 – Bio-Medicine. http://72.167.81.51/biology-technology-1/Arizona-State-University-awarded--246-5-million-to-study-nanotechnology-and-society-17617-1/
j) October 14, 2010 – Nanowerk. http://www.nanowerk.com/news/newsid=18510.php
k) October 15, 2010 – Scientific Computing. http://www.scientificcomputing.com/WelcomeBack.aspx
l) October 15, 2010 – Nano Science News. http://www.nanonews.tv/documents/sciencepressreleases.html
m) October 15, 2010 – AzoNano. http://www.azonano.com/news.asp?newsID=20020
n) October 19, 2010 – Nanotechnology Development. http://www.nanotechnologydevelopment.com/investment/nsf-award-of-65-million-to-arizona-state-university-to-study-nanotechnology-and-society.html
o) October 20, 2010 – ElectroIQ. http://www.electroiq.com/index/display/nanotech-wire-news/1283651372.html

5. Arizona State University, Research Magazine. Spring 2009. Nano is now! Pages 12-17. http://researchstories.asu.edu/files/past_issues/2009_spring.pdf

6. **Allenby, Braden.** April 16, 2012. Exemplary faculty named President's Professors. ASU News. https://asunews.asu.edu/20120418_presidents_professors

7. **Barrientos Rastrojo, Jose**. 2009. Review: CNS Yearbook of Nanotechnology in Society Vol. 1. Argumentos de Razon Technica. http://cns.asu.edu/files/home_Yearbook-of-Nanotechnology-Vol1-translation.pdf

8. **Benn, Troy**. July 30, 2010. Feeding your Research into the Policy Debate. Science Careers. http://sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/2010_07_30/caredit.a1000074

9. **Bennett, Ira.** May 17, 2012. Transforming and Repositioning the American Science Museum: New Tools for Engaging the Public. Talk.

10. **Boradkar, Prasad**. September 13, 2010. Culture of objects is focus of professor's new book. Arizona State University News. http://asunews.asu.edu/20100910_Boradkar_Things

11. **Boradkar, Prasad**. November 2, 2010. InnovationSpace: Bringing water to rural Arizona. Arizona State University News. http://asunews.asu.edu/video_20101029_InnovationSpace

12. **Brossard, Dominique.** February 1, 2013. Preserving Science News in an online World. Science Friday. http://sciencefriday.com/segment/02/01/2013/preserving-science-news-in-an-online-world.html

    a) February 1, 2013 – NPR. http://www.npr.org/2013/02/01/170855378/preserving-science-news-in-an-online-world
    b) February 1, 2013 – North Country Public Radio. http://www.northcountrypublicradio.org/news/npr/170855378/preserving-science-news-in-an-online-world

13. **Brossard, Dominique** and **Scheufele, Dietram A.** March 2, 2013. This Story Stinks. The New York Times. http://www.nytimes.com/2013/03/03/opinion/sunday/this-story-stinks.html

14. Cacciatore, Michael A., **Dietram A. Scheufele**, and **Elizabeth A. Corley**. May 2011. From enabling technology to applications: The evolution of risk perceptions about nanotechnology. Public Understanding of Science. 20:3. http://pus.sagepub.com/content/20/3/385.abstract?etoc

    a) May 2011 – Science Index. http://scienceindex.com/stories/1655760/From_enabling_technology_to_applications_The_evolution_of_risk_perceptions_about_nanotechnology.html

15. **Center for Nanotechnology in Society** and **Selin, Cynthia.** April 11, 2012. Redesigning the future with Emerge. ASU Art Museum. http://asuartmuseum.wordpress.com/2012/04/11/redesigning-the-future-with-emerge/

16. **Center for Nanotechnology in Society Science Café.** April 20, 2012. Science Café: Redesigning the Future: Where is science taking us? Is that where we want to go? Arizona Science Center. http://sustainability.asu.edu/docs/gios/events/other-events/2012/redesigning-future-cafe/redesigning-future-cafe.pdf

17. **Center for Nanotechnology in Society.** May 1, 2012. Kids invited to design the future at ASU Art Museum. Easy Valley Tribune. http://eastvalleytribune.com/get_out/article_1a1fd71a-9304-11e1-b674-001a4bcf887a.html

18. **Center for Nanotechnology in Society.** June 7, 2012. Niño Futures. Public Understanding of Science. http://pus-journal.blogspot.com/2012/06/nano-futures.html

19. **Center for Nanotechnology in Society**. November 20, 2012. Nanotechnology in Arizona: Market Report. AZO Niño. http://www.azonano.com/article.aspx?articleID=3132

20. **Center for Nanotechnology in Society.** December 10, 2012. Futures cape City Tour educates public on nanotechnology in Phoenix. Downtown Devil. http://downtowndevil.com/2012/12/10/36475/futurescape-city-tour-nanotechnology/

21. **Center for Nanotechnology in Society Science Café.** February 15, 2013. Science Café: Evolving in the Niño City. Arizona SciTech Festival.

22. **Center for Nanotechnology in Society Science Café.** March 15, 2013. Science Café: Power in the Niño City. Arizona SciTech Festival.

23. **Corley, Elizabeth A.** July 19, 2011. National Nanotechnology Initiative releases 4 workshop reports from the nanoEHS Series. National Nanotechnology Initiative. http://www.nano.gov/node/648

    a) July 20, 2011 – EurekAlert. http://www.eurekalert.org/pub_releases/2011-07/nnco-nrf072011.php
    b) July 21, 2011 – Bio-Medicine. http://www.bio-medicine.orgwww.bio-medicine.org/medicine-news-1/NNI-releases-4-workshop-reports-from-the-nanoEHS-Series-83825-1/
    c) July 21, 2011 – Nanotechnology Now. http://www.nanotech-now.com/news.cgi?story_id=43020
    d) July 21, 2011 – Nanowerk. http://www.nanowerk.com/news/newsid=22183.php
    e) July 21, 2011 – R&D. http://www.rdmag.com/News/Feeds/2011/07/materials-nni-releases-4-workshop-reports-from-the-nanoehs-s/
    f) July 26, 2011 – InterNano. http://www.internano.org/content/view/555/251/
    g) August 21, 2011 – Meridian Institute. http://www.merid.org/Content/News_Services/Nanotechnology_and_Development_News/Articles/2011/Jul/21/new_papers.aspx
    h) October 21, 2011 – NanoEthics Bank. http://ethics.iit.edu/NanoEthicsBank/node/2635

24. **Corley, Elizabeth A.**, and **Dietram A. Scheufele.** January 2010. Outreach Going Wrong? When we talk nano to the public, we are leaving behind key audiences. The Scientist. 24:22.

    a) January 2010 – Docstoc. http://www.docstoc.com/docs/45489662/OUTREACH-GOING-WRONG--When-we-talk-nano-to-the-public--we-are

25. **Corley, Elizabeth A.** and **Dietram A. Scheufele.** January 21, 2011. Study finds flaw in surveying public opinion about science. Arizona State University News. http://asunews.asu.edu/20110119_puosstudy

    a) January 13, 2011 – North Carolina State University News. http://news.ncsu.edu/releases/wmsbindersurveys/
    b) January 13, 2011 – RxPG News. http://www.rxpgnews.com/research/Study-highlights-flaw-in-common-approach-of-public-opinion-surveys-about-science_465206.shtml
    c) January 13, 2011 – E! Science News. http://esciencenews.com/articles/2011/01/13/study.highlights.flaw.common.approach.public.opinion.surveys.about.science
    d) January 13, 2011 – News Guide US. http://newsguide.us/education/science/Study-highlights-flaw-in-common-approach-of-public-opinion-surveys-about-science/
    e) January 13, 2011 – Physorg. http://www.physorg.com/news/2011-01-highlights-flaw-common-approach-opinion.html
    f) January 13, 2011 – EurekAlert. http://www.eurekalert.org/pub_releases/2011-01/ncsu-shf011311.php
    g) January 13, 2011 – University of Wisconsin College of Agricultural and Life Sciences News. http://news.cals.wisc.edu/communities/2011/01/13/study-highlights-flaw-in-common-approach-of-public-opinion-surveys-about-science/

h) January 14, 2011 – Science Daily. http://www.sciencedaily.com/releases/2011/01/110113101709.htm
i) January 18, 2011 – US News: Science. http://www.usnews.com/science/articles/2011/01/18/study-highlights-flaw-in-common-approach-of-public-opinion-surveys-about-science
j) January 19, 2011 – Media Newswire. http://media-newswire.com/release_1139378.html
k) January 20, 2011 – AZoNano. http://www.azonano.com/news.asp?NewsID=21286

26. **Cozzens, Susan E.** and **Jameson M. Wetmore**. November 18, 2010. Nanotechnology, equity issues explored in new book. Arizona State University News. http://asunews.asu.edu/20101118_cnsyearbook2

a) November 18, 2010 – Nanotechnology Now. http://www.nanotech-now.com/news.cgi?story_id=40859
b) November 18, 2010 – Nanowerk. http://www.nanowerk.com/news/newsid=19074.php
c) November 18, 2010 – First Science. http://www.firstscience.com/home/news/science-business/nanotechnology-and-equity-issues-explored-in-new-book-page-1-1_95836.html
d) November 18, 2010 – EurekAlert. http://www.eurekalert.org/pub_releases/2010-11/asu-nae111810.php
e) November 18, 2010 – Nanotech. http://nanotech.sujanani.com/news/?p=33001242
f) November 18, 2010 – R&D. http://www.rdmag.com/News/Feeds/2010/11/materials-nanotechnology-and-equity-issues-explored-in-new-b/
g) November 18, 2010 – Scientific Computing. http://www.scientificcomputing.com/news-nanotechnology-and-equity-issues-explored-in-new-b-111810.aspx
h) November 19, 2010 – AzoNano. http://www.azonano.com/news.asp?newsID=20609
i) November 20, 2010 – ElectroIQ. http://www.electroiq.com/index/display/nanotech-wire-news/1307302203.html
j) December 12, 2010 – Nanotechnology Today. http://nanotechnologytoday.blogspot.com/2010/12/nanotechnology-and-equity-issues.html

27. Davies, Sarah. 30 November 2010. Hedonistic Travel: The Pleasures of Carlessness. Blooming Rock. http://bloomingrock.com/?p=1423

28. **Debone, Jason A.**, Ashley A. Anderson, **Daniel Lee Klein man**, **Motile Colin**, and **Maria Powell**. May 2011. Virtual deliberation? Prospects and challenges for integrating the Internet in consensus conferences. Public Understanding of Science. 20:3. http://pus.sagepub.com/content/20/3/367.abstract?etoc

a. May 2011 – Mendeleyev. http://www.mendeley.com/research/virtual-deliberation-prospects-challenges-integrating-internet-consensus-conferences-2/

29. **Dirks, Gary**. April 22, 2011. ASU's Gary Dirks chases the sun. Arizona State University News. http://asunews.asu.edu/20110422_GaryDirks

a. April 22, 2011 – Academic Keys. http://humanities.academickeys.com/all/news.php?dothis=display&news[IDX]=1905

b. April 22, 2011 – Arizona Solar Center. http://www.azsolarcenter.org/news-highlights/541-asus-gary-dirks-chases-the-sun.html
c. April 22, 2011 – Planet Forward. http://planetforward.org/productions/gary-dirks/

30. Euroresidentes. January 23, 2009. Call for Experts in Nanotechnology. http://translate.google.com/translate?hl=en&sl=pt&tl=en&u=http%3A%2F%2Fwww.euroresidentes.com%2FBlogs%2Fnanotecnologia%2F2009_01_01_archive.html

a) January 20, 2009 – Nanowerk. http://www.nanowerk.com/news/newsid=8957.php

31. **Fisher, Erik** and Michael Lightner. December 2009. Entering the Social Experiment: A Case for the Informed Consent of Graduate Engineering Students. Informaworld. http://www.informaworld.com/smpp/section?content=a918038010&fulltext=713240928

32. **Fisher, Erik**. Spring 2011. STIR Workshop 2: International Network for Responsible Innovation. Center for Nanotechnology in Society. http://cns.asu.edu/stir/workshops.php?ws=4

a) Spring 2011 – Genome British Columbia. http://www.genomebc.ca/portfolio/genomics-and-society/genomics-and-society-newsletter/

33. **Fisher, Erik**. May 16, 2011. Responsible Research and Innovation Workshop. European Commission. http://ec.europa.eu/research/science-society/document_library/pdf_06/responsible-research-and-innovation-workshop-newsletter_en.pdf

34. **Fisher, Erik**. June 15, 2011. Franco-British Workshop on Responsible Innovation: Responsible Innovation R&D-The U.S. Experience. French Embassy. http://www.ambafrance-uk.org/Videos-and-presentations-from-the

a. July 6, 2011 – Daily Motion. http://www.dailymotion.com/video/xj5nh1_talk-06-15-erik-fisher-franco-british-workshop-on-responsible-innovation_tech

35. **Fisher, Erik.** Causing a STIR. Center for Science and Technology Policy Research. http://sciencepolicy.colorado.edu/news/fisher.pdf

36. Frodeman, Robert. November 23, 2010. Experiments in Field Philosophy. Opinionator – The New York Times. http://opinionator.blogs.nytimes.com/2010/11/23/experiments-in-field-philosophy/

37. Frow, Emma. November 16, 2010. Clear Skies, Cacti and Collaborations. Genotype. http://esrcgenomicsforum.blogspot.com/2010/11/clear-skies-cacti-and-collaborations.html

38. Galileo: Journal of Science and Global Issues. December 9, 2008. If the Assessment is Moral. http://translate.google.com/translate?hl=en&sl=it&tl=en&u=http%3A%2F%2Fwww.galileonet.it%2Fprimo-piano%2F10909%2Fse-il-giudizio-e-morale%3Fprint%3D1

39. **Garreau, Joel**. January 12, 2010. Technology and Enhancement. Coast to Coast AM Radio Show with George Noory. http://www.coasttocoastam.com/show/2010/01/12

40. **Gust, Devens**. April 30, 2009. DOE Funds Bio-Inspired Solar Fuel Center at ASU. Arizona State University News. http://asunews.asu.edu/20090430_EFRC

    a) May 6, 2009 – SolarServer. http://www.solarserver.com/solar-magazine/solar-news/current/us-department-of-energy-funds-solar-fuel-center-at-arizona-state-university.html

41. **Guston, David H.** March 30, 2010. Public Engagement with Nanotechnology. 2020 Science. http://2020science.org/2010/03/30/public-engagement-with-nanotechnology

    a) March 30, 2010 – NanoCEO. http://www.nanoceo.net/nanonews_03_30_10

42. **Guston, David H.** July 4, 2010. A 'nano' overdose? Science and Development Network. http://scidevnet.wordpress.com/2010/07/04/a-%E2%80%98nano%E2%80%99-overdose/

43. **Guston, David H.** July 16, 2010. Focus: Preventative Governance. Fondazione Giannino Bassetti. http://www.fondazionebassetti.org/en/focus/2010/07/preventative_governance.html

44. **Guston, David H.** July 17, 2010. Reinventing Technology Assessment for the 21st Century. Science Debate. http://www.sciencedebate.org/www/index/php?id=77

    a) April 28, 2010 – Arizona State University News. http://asunews.asu.edu/20100428_cspoecast
    b) April 29, 2010 – R&D. http://www.rdmag.com/White-Papers/2010/04/Policy-and-Industry-Reinventing-technology-assessment-for-the-21st-century/

45. **Guston, David H.** August 9, 2010. Curious about nanoscience? Encyclopedia has answers. Arizona State University News. http://asunews.asu.edu/20100805_nanoencyclopedia

    a) August 5, 2010 – EurekAlert. http://www.eurekalert.org/pub_releases/2010-08/asu-nre080510.php
    b) August 5, 2010 – AzoNano. http://www.azonano.com/news.asp?newsID=18920
    c) August 5, 2010 – Nanowerk. http://www.nanowerk.com/news/newsid=17537.php
    d) August 6, 2010 – Bioscience Technology. http://www.biosciencetechnology.com/News/Feeds/2010/08/industries-new-resource-examines-questions-about-the-role-of-/
    e) August 6, 2010 – News Blaze. http://newsblaze.com/story/20100806123036zzzz.nb/topstory.html
    f) August 6, 2010 – R&D. http://www.rdmag.com/News/Feeds/2010/08/materials-new-resource-examines-questions-about-the-role-of-/
    g) August 6, 2010 – Physorg. http://www.physorg.com/wire-news/42548277/new-resource-examines-questions-about-the-role-of-nanoscience.html
    h) August 6, 2010 – Nanotechnology Now. http://www.nanotech-now.com/news.cgi?story_id=39495
    i) August 7, 2010 – Nanovip. http://www.nanovip.com/new-resource-examines-questions-about-the-role-of-nanoscience.html
    j) August 8, 2010 – Red orbit. http://www.redorbit.com/news/science/1901941/revolution_on_a_nano_scale/index.html

k) August 9, 2010 – Medical News Today. http://www.medicalnewstoday.com/articles/197205.php
l) August 9, 2010 – Emedist. http://emedist.com/pathology/questions-about-the-role-of-nanoscience-examined-in-encyclopedia-of-nanoscience-and-society/
m) August 9, 2010 – Nanite News. http://www.nanitenews.com/research/New_resource_examines_questions_about_the_role_of_nanoscience.asp?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+NaniteNews+%28Nanotechnology+News+And+Research%29

46. **Guston, David H.** August 17, 2010. Georgia Tech researchers highlight implications of nanotechnology in new Encyclopedia of Nanoscience and Society. http://spp.gatech.edu/aboutus/newsarchive

a) October 14, 2010 – Georgia Tech News. http://www.gatech.edu/newsroom/release.html?nid=62178
b) October 23, 2010 – Nano Techwire. http://www.nanotechwire.com/news.asp?nid=10854

47. **Guston, David H.** October 1, 2010. Reference Reviews. Library Journal. http://www.libraryjournal.com/lj/ljinprintcurrentissue/886705-403/reference_reviews_october_1_2010.html.csp

a) October 1, 2010 – The Free Library. http://www.thefreelibrary.com/Encyclopedia+of+nanoscience+and+society%3b+2v.-a0236325480

48. **Guston, David H.** October 5, 2010. Societal and Ethical Issues in Nanotechnology. Harvard University Center for Nanoscale Systems. www.cns.harvard.edu/nnin/sei.php

49. **Guston, David H.** October 26, 2012. The Much-Needed and Sane Congressional Office That Gingrich Killed Off and We Need Back. The Atlantic. http://www.theatlantic.com/technology/archive/2012/10/the-much-needed-and-sane-congressional-offfice-that-gingrich-killed-off-and-we-need-back/264160/

50. **Guston, David H.** November 30, 2010. Anticipatory Governance of Emerging Technologies. Scientists and Engineers for America. http://us1.campaign-archive1.com/?u=b3cf515e44b296da2a0004fc0&id=7d9d89bf34

a) November 30, 2010 – Slideshare. http://www.slideshare.net/seforaDOTorg/sea-virtual-seminar-david-guston-nov-30-700-pm-et

51. **Guston, David H.** December 15, 2010. Cluster One Highlights: Toward the Regulation of Nanomaterials Conference. Youtube. http://www.youtube.com/watch?v=LzdQT4rFDNA&feature=player_embedded#

52. **Guston, David H.** January 6, 2011. Most-Cited Articles as of January 1, 2011. Sage Journals Online – Social Studies of Science. http://sss.sagepub.com/reports/most-cited

53. **Guston, David H.** January 7, 2011. 2010 – That was the year that was. Fondazione Giannino Bassetti. http://www.fondazionebassetti.org/en/focus/2011/01/2010_-_that_was_the_year_that.html

54. **Guston, David H.** February 21, 2011. Are We Alone? Make Contact with Science: Nano Nano. SETI Institute. http://radio.seti.org/episodes/Nano_Nano

    a) February 23, 2011 – Arizona State University News. http://asunews.asu.edu/20110223_nanonanoshow

55. **Guston, David H.** June 15, 2011. Chuck Roger: Programming Scientists to Perform Social Engineering. The Dakota Beacon. http://dakotabeacon.com/entry/chuck_roger_programming_scientists_to_perform_social_engineering/

    a. June 13, 2011 – National Association of Scholars. http://www.nas.org/articles/Programming_Scientists_to_Perform_Social_Engineering
    b. June 14, 2011 – Clear Thinking. http://www.chuckroger.com/2011/06/14/programming-scientists-to-perform-social-engineering/

56. **Guston, David H.** and Douglas Sylvester. 2009. Sizing Up the Nanotech Situation: How Technology Will Be Used Poses Ethical, Moral and Environmental Questions. Tech Connect, The Nano Issue. http://www.techconnect-digital.com/techconnect/2009fall?pg=25&search_term=guston&search_term=guston#pg25

57. **Guston, David H.** July 2, 2012. Big Picture Science – Nano Nano: David Guston. Blog Picture Science. http://radio.seti.org/blog/2012/07/big-picture-science-nano-nano-david-guston/

58. **Guston, David H.** and **Sanborn, Regina.** January 13, 2012. Students operate on nanoscale. The State Press.

59. Hall, Hollie. September 17, 2010. Science Outside the Lab. Integrative Graduate Education and Research Internship. http://www.igert.org/stories/44

60. **Haq, Cynthia.** June 19, 2012. Doctor, plant biologist among those named to Wisconson Academy. Milwaukee Journal Sentinel. http://www.jsonline.com/blogs/news/159508675.html

61. Harsh, Matthew. May 12, 2011. Careful design is key to success of development prizes. Science and Development Network. http://www.scidev.net/en/opinions/careful-design-is-key-to-success-of-development-prizes-1.html

62. Hays, Sean. April 19, 2011. Can "Do-It-Yourself" Biology handle Our Biggest health Challenges? Arizona State University. http://asu.edu/president/email/dcinvitation.html

63. Hendrickson, Kristen and **Scott Lefler**. November 19, 2010. Science Café: You are What You Eat – America's Relationship with Food. East Valley Tribune. http://www.eastvalleytribune.com/calendar/get_out_calendar/event_bb9fe588-d6cc-5a30-a7d1-897df49f67fd.html

a) August 20, 2010 – Phoenix Science Café. http://phoenixsciencecafe.wordpress.com/2010/08/30/you-are-what-you-eat-americas-relationship-with-food/
b) November 18, 2010 – College Times. http://media.www.ecollegetimes.com/media/storage/paper991/news/2010/11/18/Calendar/16.Things.To.Do.This.Week-3959902.shtml
c) November 19, 2010 – Eventful. http://eventful.com/phoenix/events/science-cafe-you-you-eat-americas-relationship-/E0-001-035239672-0
d) November 19, 2010 – Facebook. http://www.facebook.com/event.php?eid=105425882860281
e) November 19, 2010 – Showup. http://phoenix.showup.com/event/detail/440953956/Science_Cafe_You_Are_What_You_Eat_Americas_Relationship_with_Food

64. Jornal do Brazil – The First Brazilian Internet Newspaper. June 7, 2009. New Border Regulation. http://translate.google.com/translate?hl=en&sl=pt&u=http://jbonline.terra.com.br/leiajb/noticias/2009/06/07/ciencia/nova_fronteira_da_regulacao.asp&ei=7HKqS5CPK4ywsgPntMC9Bg&sa=X&oi=translate&ct=result&resnum=1&ved=0CAoQ7gEwAA&prev=/search%3Fq%3Dnova%2Bfronteira%2Bda%2Bregulacao%26hl%3Den

65. **Lindsay, Stuart**. August 30, 2010. Lindsay receives White House honors for 'Recovery Act' research. Arizona State University News. http://asunews.asu.edu/20100826_lindsaywhitehousehonors

66. **Marchant, Gary**. October 29, 2010. ASU faculty receive federal nanotech renewal grant. Arizona State University News. http://asunews.asu.edu/20101029_nanogrant?utm_source=Arkayne.com&utm_medium=Plugin&utm_campaign=ASU%20News

a) October 29, 2010 – AzoNano. http://www.azonano.com/news.asp?newsID=20260
b) October 30, 2010 – ElectroIQ. http://www.electroiq.com/index/display/nanotech-wire-news/1293323157.html
c) October 30, 2010 – Nanowerk. http://www.nanowerk.com/news/newsid=18743.php
d) October 31, 2010 – Nanotechnology Now. http://www.nanotech-now.com/news.cgi?story_id=40598
e) October 31, 2010 – Nano Techwire. http://www.nanotechwire.com/news.asp?nid=10904
f) November 1, 2010 – Eureka Alert. http://www.eurekalert.org/pub_releases/2010-11/asu-fnr110110.php
g) November 1, 2010 – First Science. http://www.firstscience.com/home/news/chemistry-physics-and-materials-sciences/federal-nanotechnology-renewal-grant-awarded-to-asu-faculty_94670.html
h) November 2, 2010 – R&D. http://www.rdmag.com/News/Feeds/2010/11/policy-federal-nanotechnology-renewal-grant-awarded-to-as/

67. **Marchant, Gary**, **David Guston** and **Jane Maienshein**. May 2011. Rapid Revolution: ASU faculty explore how to manage technology's advance. ASU Magazine. http://trendmag2.trendoffset.com/publication/?i=70000

68. **Marchant, Gary**, **Kenneth Abbott** and **Douglas Sylvester**. December 2, 2009. LST Builds First Global Nanotech Regulation Database. Arizona State University News. http://asunews.asu.edu/2009122_LSTNanotechnology

    a) December 2, 2009 – Physorg. http://www.physorg.com/news178997767.html
    b) December 2, 2009 – Flinn Foundation. http://www.flinn.org/bio-briefs/2122
    c) December 3, 2009 – Institute of Nanotechnology. http://www.nano.org.uk/news/290/
    d) December 7, 2009 – Nanoforum. http://www.nanoforum.org/nf06~modul~showmore~folder~99999~scc~news~scid~4038~.html?action=longview
    e) December 8, 2009 – InterNano. http://www.internano.org/content/view/325/95/
    f) January 5, 2010 – Nanodialog. http://nanodialog.eu/index.php?option=com_content&task=view&id=85&Itemid=38

69. **Miller, Clark A.** July25, 2010. Viewpoints: Coverage of massive problems leaves the public feeling helpless. The Sacramento Bee. http://www.sacbee.com/2010/07/25/2911646/coverage-ofmassive-problems-eaves.html#ixzz0uuFqqXkq

70. **Miller, Clark A.** October 26, 2010. Why Nano Matters: Saving the World. NISE Network. http://www.nisenet.org/blogs/real_world_nano/why_nano_matters_saving_world

71. Phoenix Business Journal. April 3, 2009. E-mail, Instant Messaging and Internet Use are Rampant, but Do They Make Us More Productive? http://www.bizjournals.com/phoenix/stories/2009/04/06/focus1.html

72. Phoenix Business Journal. October 17, 2010. Nanotechnology Could Spur Medical Breakthroughs. http://www.bizjournals.com/phoenix/stories/2010/10/18/focus1.html

73. Phoenix Business Journal. October 17, 2010. 5 Questions: About Nanoscience. http://www.bizjournals.com/phoenix/stories/2010/10/18/focus2.html

74. Pirtle, Zachary. January 4, 2011. Bridging Technological and Philosophical Worlds. Arizona State University News – Ira A. Fulton Schools of Engineering. http://engineering.asu.edu/news/8215

    a) January 4, 2011 – Arizona State University News. http://asunews.asu.edu/node/17462

75. **Porter, Alan L.** and **Jan Youtie**. September, 2009. Where Does Nanotechnology Belong in the Map of Science. *Nature Nanotechnology*, 4: 534-536. http://www.nature.com/nnano/journal/v4/n9/full/nnano.2009.207.html

    a) September 7, 2009 - Georgia Tech Research News. http://gtresearchnews.gatech.edu/mapping-nanotechnology/
    b) September 7, 2009 – EurekAlert. http://www.eurekalert.org/pub_releases/2009-09/giot-act090409.php
    c) September 7, 2009 – AZoNano. http://www.azonano.com/news.asp?newsID=13504
    d) September 7, 2009 – ScienceDaily. http://www.sciencedaily.com/releases/2009/09/090907141912.htm

e) September 7, 2009 – e! Science News. http://esciencenews.com/articles/2009/09/07/analysis.confirms.nano.related.research.has.strong.multidisciplinary.roots
f) September 7, 2009 – R&D. http://www.rdmag.com/News/Feeds/2009/09/life-sciences-analysis-confirms-that-nano-related-research-has-s/
g) September 7, 2009 – Physorg. http://www.physorg.com/news171521941.html
h) September 7, 2009 – NewsGuide. http://newsguide.us/index.php?path=/education/science/Analysis-confirms-that-nano-related-research-has-strong-multidisciplinary-roots/&date=2009-09-07
i) September 7, 2009 – First Science. http://www.firstscience.com/home/news/breaking-news-all-topics/analysis-confirms-that-nano-related-research-has-strong-multidisciplinary-roots_70063.html
j) September 9, 2009 – Flinn Foundation. http://foundation.flinn.org/bio-briefs/1843
k) September 9, 2009 – newswise. http://www.newswise.com/articles/nano-research-has-strong-multidisciplinary-roots
l) September 9, 2009 – innovations report. http://www.innovations-report.com/html/reports/studies/analysis_confirms_nano_related_research_strong_139335.html
m) October 23, 2009 – Nanotechnology Today. http://nanotechnologytoday.blogspot.com/2009/10/analysis-confirms-that-nano-related.html

76. **Posner, Jonathan**. March 3, 2010. Exploring the Implications of Nanotechnology. Arizona State University News. http://asunews.asu.edu/20100226_posnernanotechnology

a) February 27, 2010 – Nanowerk. http://www.nanowerk.com/news/newsid=15076.php
b) March 3, 2010 – Physorg. http://www.physorg.com/wire-news/29076975/exploring-the-implications-of-nanotechnology.html

77. **Posner, Jonathan**. April 30, 2010. Nanotechnology Promises Water Resource Gains But Raises Concerns. Arizona Water Resource – Spring 2010. http://ag.arizona.edu/azwater/awr/awr-Spring-2010.html

78. **Posner, Jonathan**. May 2010. Too Small to Ignore. Arizona State University Magazine. http://trendmag2.trendoffset.com/publication/index.php?i=37797&m=&l=&p=4&pre=&ver=swf

79. **Robert, Jason**. November 23, 2010. Professors Study Repercussions of Living Longer. State Press. http://www.statepress.com/2010/11/23/professors-study-repercussions-of-living-longer/

80. **Sarewitz, Daniel** and **Jameson Wetmore**. August 27, 2010. Blogging from France: science and public debate. Arizona State University News. http://asunews.asu.edu/20100824_eurosummerschool

81. **Sarewitz, Daniel**, **Lee Gutkind**, **David Guston**, and **Jameson Wetmore**. May 26, 2011. New faculty books: From nanotechnology to creative nonfiction. Arizona State University News. https://asunews.asu.edu/20110526_newfacultybooks

82. **Scheufele, Dietram A.** and **Elizabeth A. Corley**. June 19, 2009. Scientists and Public Differ on Views about Nanotechnology Regulation. University of Wisconsin-Madison News. http://www.news.wisc.edu/16840

    a) June 19, 2009 – Physorg. http://www.physorg.com/news164642077.html
    b) June 19, 2009 – Nano Techwire. http://nanotechwire.com/news.asp?nid=8103
    c) June 19, 2009 – AzoNano. http://www.azonano.com/news.asp?newsID=12164
    d) June 19, 2009 – Nanowerk. http://www.nanowerk.com/news/newsid=11272.php
    e) June 22, 2009 – Nanotechnology Now. http://nanotech-now.com/news.cgi?story_id=33616
    f) June 24, 2009 – Arizona State University News. http://asunews.asu.edu/20090622_nanotechnologystudy

83. **Scheufele, Dietram A.** and **Elizabeth A. Corley**. January 12, 2010. U.S. Faces Widening Information Gap on Nanotechnology. University of Wisconsin-Madison News. http://www.news.wisc.edu/17527

    a) January 1, 2010 – The Scientist. http://www.the-scientist.com/2010/1/1/22/1/
    b) January 11, 2010 – Nanotechnology Now. http://nanotech-now.com/news.cgi?story_id=36214
    c) January 12, 2010 – Safe Nano. http://www.safenano.org/SingleNews.aspx?NewsID=948
    d) January 12, 2010 – Arizona State University News. http://asunews.asu.edu/20100111_nanotechreport
    e) January 12, 2010 – Wisconsin Technology Network News. http://wistechnology.com/articles/6985/
    f) January 12, 2010 – Physorg. http://www.physorg.com/print182534558.html
    g) January 13, 2010 – Nanotechnology Now. http://www.nanotech-now.com/news.cgi?story_id=36243
    h) January 13, 2010 – Nano Techwire. http://www.nanotechwire.com/news.asp?nid=9282

84. **Scheufele, Dietram A.**, **Dominique Brossard**, **Sharon Dunwoody**, **Elizabeth A. Corley**, **David H. Guston** and Hans Peter Peters. August 4, 2009. Are Scientists Really Out of Touch? The Scientist. http://www.the-scientist.com/news/display/55875/

85. **Scheufele, Dietram A.** August 1, 2012. Flavors of Uncertainty: The Difference between Denial and Debate. Environmental Health Perspectives.
    a) August 1, 2012 – Medscape Today. http://www.medscape.com/viewarticle/768722

86. **Scheufele, Dietram A.** November 8, 2012. UW contingent among Kavli Frontiers of Science fellows. University of Wisconsin Madison News. http://www.news.wisc.edu/21250

87. **Scheufele, Dietram A.** March 8, 2013. A brave new (online) world: Emerging technologies at the intersection of science, policy, and rapidly changing media environments. Talk.

88. **Seager, Thomas P.** July 16, 2012. Are smartphone apps influencing our humanity?. Arizona State University News. https://asunews.asu.edu/20120716_inthenews_apps

89. **Selin, Cynthia** and **Wiek, Arnim**. December 17, 2012. Sustainability & Nanotechnology: Generating Excitement in Emerging Sciences. The Tomorrow Project. http://us.tomorrow-projects.com/2012/12/sustainability-nano-technology-generating-excitement-in-emerging-sciences/

90. **Selin, Cynthia**. December 2012. Future Forward. ASU Magazine.

91. **Shapira, Phillip** and Jue Wang. December 11, 2010. Nanotechnology Research: Study Finds Web of International Collaboration in $8.6 Billion Worldwide Research Activity. Georgia Tech Research News. http://gtresearchnews.gatech.edu/nanotech-international-collaboration/

    a) December 9, 2010 – Physorg. http://www.physorg.com/news/2010-12-web-international-collaboration-boosts-worldwide.html
    b) December 9, 2010 – Science Blog. http://scienceblog.com/40957/web-of-international-collaboration-boosts-worldwide-nanotechnology-research/
    c) December 11, 2010 – Nanotechnology Now. http://www.nanotech-now.com/news.cgi?story_id=41109
    d) December 11, 2010 – Infogreen Global. http://infogreenglobal.com/international-collaboration-boosts-nanotechnology-research/
    e) December 12, 2010 – Nano Techwire. http://nanotechwire.com/news.asp?nid=11255
    f) December 12, 2010 – Interesting Tech. http://interesting.rk.net.nz/?p=9906
    g) December 16, 2010 – Scientific Computing. http://www.scientificcomputing.com/PrinterFriendly.aspx?id=35816&url=http%3A%2F%2Fwww.scientificcomputing.com%2Fnews-study-finds-international-collaboration-in-nanotec-121710.aspx
    h) January 5, 2011 – Arizona State University News. http://asunews.asu.edu/20110105_nanotech_research
    i) January 6, 2011 – Nanowerk. http://www.nanowerk.com/news/newsid=19599.php
    j) January 6, 2011 – AzoNano. http://www.azonano.com/news.asp?NewsID=21122

92. Technische Universität Darmstadt. 2010. Second Annual Conference of the Society for the Study of Nanoscience and Emerging Technologies. http://www.philosophie.tu-darmstadt.de/nanobuero/snet2010/welcome.de.jsp

93. **Tillery, Stephen Helms** and **Robert, Jason.** May 2012. Thinking with the mind's eye. ASU Magazine

94. **van der Leeuw, Sander.** June 4, 2012. UN names ASU sustainability dean a 'Champion of the Earth'. Arizona State University News. https://asunews.asu.edu/20120604_UNchampionlaureate
    a) June 4, 2012 – Eureka Alert!. http://www.eurekalert.org/pub_releases/2012-06/asu-uns060412.php
    b) June 4, 2012 – News Wise. http://www.newswise.com/articles/view/590018/
    c) September 2012 – ASU Magazine

95. **van der Leeuw, Sander.** October 4, 2012. Future Tense: anticipating implications of emerging technologies. Arizona State University News. https://asunews.asu.edu/20121004_futuretense

96. **Wetmore, Jameson** April 20, 2010. ASU expert discusses 'why cars move men.' Arizona State University News. http://asunews.asu.edu/20100420_cars_wetmore

    a) April 19, 2010 – Men's Health. http://www.menshealth.com/best-life/men-and-cars

97. **Wetmore, Jameson** and Mary Jane Parmentier. December 20, 2010. Blogging from Dubai. Arizona State University News. http://asunews.asu.edu/node/17370

98. **Wetmore, Jameson**, **Elizabeth A. Corley** and Neal Woodbury. October 15, 2010. Nano Focus. Phoenix Business Journal.

99. Xenos, Michael A., Amy B. Becker, Ashley A. Anderson, **Dominique Brossard**, and **Dietram A. Scheufele**. Stimulating upstream engagement: An experimental study of nanotechnology information seeking. Social Science quarterly. 92:5. http://onlinelibrary.wiley.com/doi/10.1111/j.1540-6237.2011.00814.x/abstract

100. **Youtie, Jan** and **Phillip Shapira**. October 13, 2010. Beyond the Nobel Prize, what's next for graphene? Arizona State University News. http://asunews.asu.edu/20101012_cnsgraphenestudy

    a) October 12, 2010 – EurekAlert. http://www.eurekalert.org/pub_releases/2010-10/asu-btn101210.php
    b) October 12, 2010 – Softpedia. http://news.softpedia.com/news/Conducting-Graphene-Studies-Beyond-the-Nobel-160689.shtml
    c) October 13, 2010 – Scientific Computing. http://www.scientificcomputing.com/news-DS-Beyond-the-Nobel-Prize-Whats-Next-for-Graphene-101810.aspx#
    d) October 13, 2010 – Nanotechnology Now. http://www.nanotech-now.com/news.cgi?story_id=40392
    e) October 13, 2010 – Product Sourcing. http://www.jihsin.com/manufacturers/information-technology/beyond-the-nobel-prize-whats-next-for-graphene.html
    f) October 13, 2010 – Electronic Component News. http://www.ecnmag.com/News/2010/10/Beyond-the-Nobel-Prize,-what-s-next-for-graphene-/
    g) October 13, 2010 – ChemInsider. http://www.chem.info/News/Feeds/2010/10/topics-plant-operations-beyond-the-nobel-prize-whats-next-for-graphene-/
    h) October 13, 2010 – Bio-Medicine. http://www.bio-medicine.org/biology-technology-1/Beyond-the-Nobel-Prize--whats-next-for-graphene-3F-17600-1/
    i) October 13, 2010 – Physorg. http://www.physorg.com/news/2010-10-nobel-prize-big-graphene.html
    j) October 13, 2010 – Nanowerk. http://www.nanowerk.com/news/newsid=18468.php
    k) October 13, 2010 – R&D. http://www.rdmag.com/News/2010/10/Materials-Nanotechnology-Beyond-the-Nobel-Prize-whats-next-for-graphene/
    l) October 18, 2010 – Georgia Tech News. http://ww.gatech.edu/newsroom/release.html?nid=62364

101. **Youtie, Jan** and **Philip Shapira**. May 19, 2011. Miracle Material: Two-dimensional grapheme may lead to faster electronics, stronger spacecraft and much more. National Science Foundation. http://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=119493&WT.mc_id=USNSF_1

    a) May 19, 2011 – Nanotechnology Now. http://www.nanotech-now.com/news.cgi?story_id=42492
    b) May 19, 2011 – NanoTechwire. http://nanotechwire.com/news.asp?nid=12081
    c) May 19, 2011 – Nanowerk. http://www.nanowerk.com/news/newsid=21413.php

102. Youtie, Jan. February 19, 2013. Time to reassess the promise of nanotechnology? An analysis of research, developments and commercialization. Talk.

Invention Disclosure

1. Scio: A Nano-enhanced, Convenient, Portable Cancer Biomarker Testing Device. (2008, April).
2. Flux: A Cast with Adjustable Rigidity that Allows for Faster Recovery. (2008, April).
3. Explore: A Mobile Haptic Text to Braille Translator. (2008, April).
4. Nome: An Energy-producing Shelter for Natural Disaster Victims. (2009, April).
5. Everwell: A Device for Rural Users that Converts Air Humidity into Potable Water. (2009, April).
6. Tangent: A Solar-powered Individualized Urban Transportation. (2009, April).

16. Biosketches

New investigators for this grant year include the following:

1. Renata Hejduk – faculty in Design Studio
2. William Heyward – faculty in Design Studio
3. Darren Petrucci – faculty in Design Studio
4. Kelly Rawlings – co-team leader for RTTA 3

Please note that their biosketches follow in this section.

17. Honors and Awards

Allenby, Braden. Named President's Professor at Arizona State University. Allenby is a faculty member of the School of Sustainable Engineering and the Built Environment in the Ira A. Fulton Schools of Engineering. April 2012.

Brossard, Dominique. Elected as Kavli Frontiers of Science fellow of the Kavli Foundation. Was member of Science Communication session of Kavli Foundation's Frontiers of Science symposium. November 2012.

Cozzens, Susan. Promoted to Vice Provost, Graduate Education and Faculty Affairs at the Georgia Institute of Technology. May 2012.

Foley, Rider. Awarded second place in the category of social sciences in the AAAS student poster competition for his poster, "Comparing Cultures of Technological Innovation: Risk Versus Reward." February 2013.

Foley, Rider. Awarded second prize, along with Braden Kay and Richard Rushforth, in the student paper competition at the IEEE-International Symposium on Sustainable Systems and Technology. May 2012.

Dirks, Gary. Appointed Director of ASU's Global Institute of Sustainability. Dirks is the Director of ASU's Lightworks Initiative and a Professor of Practice. March 2013.

Horsley, Travis. Won Start Up Atlanta's $10,000 Entrepreneur Video Competition. October 2012.

Horsley, Travis. Won Ivan Allen Jr. Legacy Award. March 2013.

Miller, Clark. Invited to be visiting professor in the Future Studies program at RWTH-Aachen University. June 2012.

Scheufele, Dietram. Elected Fellow of the Wisconsin Academy of Sciences, Arts and Letters. June 2012.

Scheufele, Dietram**.** Elected Fellow of the American Association for the Advancement of Science (AAAS). November 2012.

Scheufele, Dietram. Elected as Kavli Frontiers of Science fellow of the Kavli Foundation. Chaired Science Communication session of Kavli Foundation's Frontiers of Science symposium. November 2012.

Shapira, Philip. Chaired panel of the Committee on 21st Century Manufacturing: The Role of the Manufacturing Extension Partnership Program of the National Institute of Standards and Technology for the National Academies. October 2012.

Taylor, Evan. Awarded $20,000 by the National Collegiate Inventors and Innovators Alliance (NCIIA) for phase two of his research project, "reNature Industrial Bio-Reactor Pilot Project" under the direction of George Basile. March 2013.

van der Leeuw, Sander. Won the 2012 United Nations Champions of the Earth award recognizing his research in human-environmental relations and the scientific study of innovation as a societal process. van der Leeuw, dean of the School of Sustainability at Arizona State University, is the co-team leader for the CNS-ASU research project, TRC 2: Urban Design, Materials, and the Built Environment. June 2012.

Wetmore, Jameson. Promoted to Associate Professor in the School of Human Evolution and Social Change. Wetmore is the co-team leader for TRC 1: Equity, Equality, and Responsibility. July 2012.

18. Fiscal Sections

a. Statement of Unobligated Funds

In accordance with budget projections, CNS-ASU will have expended the Year 3 allocation of $1,301,400 in grant funds by August 31, 2013, the end of the CNS-ASU grant year for NSF Grant Award #0937591, so there will be no unobligated funds.

b. Grant Budgets

There are several budget reports and associated budget justifications reported in this section as follows:

i. Actual budget expenses from September 1, 2012 through March 31, 2013.

ii. Projected budget expenses from April 1, 2013 through August 31, 2013.

Projected budget expenses from September 1, 2013 to August 31, 2014.

19. Cost-Sharing

There are several budget reports and associated budget justifications included in this section as follows:

a. Cost-sharing budget of actual expenses incurred from September 1, 2012 through March 31, 2013.

b. Cost-sharing budget projections from April 1, 2013 through August 31, 2013.

c. Cost-sharing budget projections from September 1, 2013 through August 31, 2014.

Other financial commitments to CNS-ASU come from the ASU Biodesign Institute, the College of Liberal Arts and Sciences, the Ira A. Fulton Schools of Engineering, the School of Human Evolution and Social Change, the School of Sustainability, the W.P. Carey School of Business, the College of Public Programs, the Herberger Institute of Design and the Arts, and the School of Social Transformation, which provide funds for faculty, graduate students, and undergraduate students to work with CNS-ASU on its research projects. These commitments are reflected in Table 2 and Table 5 of this report.

Also, included in this section is a statement from the ASU Office of Sponsored Projects and Research Administration (ORSPA) certifying the cost-sharing account amounts.

Regina Sanborn

From: Sarah Kern
Sent: Thursday, April 04, 2013 9:15 AM
To: Regina Sanborn
Subject: FW: Cost Sharing Equal To or Greater Than $500,000/SES/1675/0937591/Guston/

Hello Regina,

The annual cost-share report has been submitted.

Thanks!

Sarah

Sarah Kern (Grafakos) | Grant & Contract Officer
Office of Research & Sponsored Projects Administration| Award Management
Arizona State University | Office for Knowledge Enterprise Development | Operations
t 480-965-0029| f 480-965-2455
sarah.kern@asu.edu | http://researchadmin.asu.edu
Customer Service is our priority. Please click here to let me know how I'm doing.

From: fastlane@nsf.gov [mailto:fastlane@nsf.gov]
Sent: Thursday, April 04, 2013 9:06 AM
To: flmail@nsf.gov; Sarah Kern
Subject: Cost Sharing Equal To or Greater Than $500,000/SES/1675/0937591/Guston/

Original Addresse: flmail@nsf.gov;Sarah.Kern@asu.edu

This is SRO's copy

Cost Sharing Equal To or Greater Than $500,000 was submitted via FastLane on April 4, 2013 12:04:08 PM by:

Sponsored Projects Officer (SPO) First Name: Sarah
Sponsored Projects Officer (SPO) Last Name: Kern
SPO E-Mail address: Sarah.Kern@asu.edu

PI First Name: David
PI Last Name: Guston
PI E-Mail address: david.guston@asu.edu

Notification Details :
Notification Type: Cost Sharing Equal To or Greater Than $500,000
Start Date: 03/16/2012
End Date: 03/15/2013
Cost Sharing Amount for the reporting Period: 304795.40
Cumulative Cost Sharing Amount reported to date: 717156.15
Cost Sharing Notification Type: Annual Cost Sharing Notification
Explanation: null

1

This e-mail was sent from an address that cannot accept incoming e-mail therefore please DO NOT REPLY TO THIS MESSAGE.

20. Leverage

The Center for Nanotechnology in Society at Arizona State University (CNS-ASU) has developed relationships/partnerships with two hundred forty-four (244) academic partnering institutions and one hundred ninety-three (193) non-academic partnering institutions, both domestic and international. The partners are listed in Table 5, at the end of this section.

Arizona State University (ASU) provides salary support for most of the faculty who work on CNS-ASU projects. Table 5 shows the amount of financial support CNS-ASU will receive from ASU and its subawards (Georgia Institute of Technology and University of Wisconsin, Madison) between September 1, 2012 and August 31, 2013

Some successful partnerships include:

1. Consortium for Science, Policy and Outcomes (CSPO) – the Center for Nanotechnology in Society at Arizona State University (CNS-ASU) receives support from the Consortium for Science, Policy and Outcomes (CSPO), which includes office space, desktop computers for all CNS-ASU faculty, staff, post-doctoral associates, and students, as well as access to servers, laptop computers, printers, copiers, scanners, projectors, fax machine, telephones, and a conference room with videoconferencing capability.

2. Emerge 2013Conference: The Future of Truth – was a special event held on February 28-March 2, 2013, uniting artists, engineers, bio-scientists, social scientists, storytellers, and designers to build, draw, write, and rethink the future of the human species and the environments that we share. Together, participants created provocative and evocative stories, games, performances, and objects from which a vision of our future emerges.

   The developers of *Emerge* were Joel Garreau (Lincoln Professor of Law, Culture and Values at the Sandra Day O'Connor College of Law; Director, "The Prevail Project: Wise Governance for Challenging Futures"), Ed Finn (Assistant Professor, School of Arts, Media and Engineering, and the Director of the Center for Science and the Imagination), Daniel Sarewitz (Professor, School of Life Sciences, and Co-Director of the Consortium for Science, Policy and Outcomes), and Braden Allenby (President's Professor and Lincoln Professor of Engineering and Ethics, and School of Sustainable Engineering and the Built Environment).

   Global leaders from industry and creative practice joined distinguished ASU faculty and talented students for hands-on workshops, as well as the Digital Culture Festival, which included exhibits, interactive shows, and live presentations. *Emerge* presented a line-up of world class speakers for the conference-closing keynote sessions, including noted writers, designers, and futurists such as Betty Sue Flowers, greatest living thinker about myth, and how it continues to shape our business, personal, and national political affairs today; Buzz Bissinger, Pulitzer Prize winning author of the best selling "Friday Night Lights," and "Shattered Glass;" Bruce Sterling, author of best-selling and award-winning science fiction from "Holy Fire" to "Taklamakan;" Natalie Jeremjenko, artist and engineer whose work explores the interface between society, the environment and technology; and Paul Davies, physicist, cosmologist, astrobiologist, and best-selling author who focuses on the "Big Questions;" and Michael M. Crow, President of Arizona State University and knowledge enterprise architect, among others.

3. Innovation Space -- an entrepreneurial joint venture among the Herberger Institute for Design and the Arts, the Ira A. Fulton Schools of Engineering, and the W.P. Carey School of Business at Arizona State University. The goal of this transdisciplinary education and research lab is to teach students how to develop products that create market value, while serving real societal needs and minimizing impacts on the environment. Students learn to create products that are progressive, possible, and profitable, which also have a meaningful impact on the daily lives of ordinary people.

   Innovation Space utilizes two fundamental strategies for creating sustainable innovation: a model of new product development known as Integrated Innovation and the emerging field of biomimicry. CNS-ASU contributes $30,000 annually to this endeavor.

4. Biodesign Institute -- plays a critical role in advancing the research mission of Arizona State University to conduct use-inspired research, fuse intellectual disciplines, and value entrepreneurship.

   Encompassing 350,000 square-feet of award-winning, state-of-the-art, LEED-certified buildings, the Biodesign Institute represents the State of Arizona's largest research infrastructure investment in bioscience-related research. ASU is the first university in the U.S. to create an interdisciplinary research institute entirely devoted to bio-inspired innovation principles, representing a vast expansion of ASU's state-of-the-art research capacity, and also serving a core mission to engage the talents of its multidisciplinary scientists to find solutions to some of society's largest challenges. The three major areas in which the Biodesign Institute is working to make a difference are: biomedicine & health outcomes, sustainability, and security. This framework allows the Institute to address these critical global challenges by creating "use-inspired," as well as "bio-inspired" solutions.

   CNS-ASU and the Biodesign Institute offer fellowships to two graduate students. The purpose of this program is to train students to work in cross-functional teams toward real-world outcomes. Since all research has implications beyond the laboratory, CNS-ASU invests in graduate students to study some of these outcomes by paying a percentage of their salary, employee related expenses, and tuition. CNS-BDI Fellows participate in CNS-ASU sponsored curricular and co-curricular activities, including special courses, seminars, lectures, science cafes, and other opportunities, in addition to adding a "societal implications" chapter to their dissertation, the "PhD plus" component, which discusses the societal context of their research.

5. Ira A. Fulton Schools of Engineering – plays a pivotal role in producing engineers and innovations to address the changing needs of society. FSE emphasizes problem-solving, innovation, entrepreneurship, multi-disciplinary interactions, societal context and connections.

   The Ira A. Fulton Schools of Engineering rank in the top 50 engineering schools in the United States, and offer 15 degree programs. It also is one of the largest engineering schools, with more than 200 faculty, more than 7,700 students, and more than $78 million in externally funded research.

   CNS-ASU and the Ira A. Fulton Schools of Engineering offer fellowships to two graduate students. The purpose of this program is to train students to work in cross-functional teams toward real-world outcomes. Since all research has implications beyond the laboratory, CNS-ASU invest in graduate students to study some of these outcomes by paying a percentage of their

salary, employee related expenses, and tuition. CNS-FSE Fellows participate in CNS-ASU sponsored curricular and co-curricular activities, including special courses, seminars, lectures, science cafes, and other opportunities, in addition to adding a "societal implications" chapter to their dissertation, the "PhD plus" component, which discusses the societal context of their research.

6. Barrett Honors College - Barrett students have the unique advantage of experiencing a small, intellectually, and socially vibrant environment, while having access to the vast resources of the major research university at ASU. Barrett students simultaneously benefit from being with others of the same intellectual preparation and commitment, and enjoy the advantages of a university environment actively engaged in exploring all areas of human interest and concern.

   All students who enter ASU through Barrett, The Honors College, also enroll in a disciplinary college, and pursue one or more of the 275+ available disciplinary majors and concentrations. Their education is the result of the integration of all colleges at ASU, including Barrett, that cultivate the talents and interests of Barrett students and endeavor to meet their changing needs as they develop academically and socially. Barrett students, hired as CNS-ASU student interns, participate in the CNS-ASU poster session at the All Hands Meeting and the site visit from the National Science Foundation.

7. Project Humanities – is a university-wide initiative involving all four campuses (Tempe, West, Polytechnic, and Downtown Phoenix), which has an express goal to show the interactions among humanities and other areas of scholarship and human endeavor. CNS-ASU and Project Humanities partnered this year to host eight (8) Science Cafes at the Arizona Science Center. The Science Cafes were held on the third Friday of every month, and averaged forty (40) attendees at each. Photographs and video of each Science Café was taken and is available on the CNS-ASU web site.

8. Center for Science and the Imagination – brings writers, artists, and other creative thinkers into collaboration with scientists, engineers, and technologists to reignite humanity's grand ambitions for innovation and discovery. CNS-ASU partnered with CSI to present a Science Café in September 2012 on "Envisioning the Nano City."

9. University of Notre Dame – and CNS-ASU will host a collaborative research workshop on the "Anticipatory Governance of Complex Engineered Nanomaterials," including advanced generation nanosystems. The workshop will be a joint effort of the Centers for Environmental Implications of Nanotechnology, the Centers for Nanotechnology in Society, the Center for Nano Science and Technology, and other relevant groups. The workshop will generate new knowledge about the prospective governance challenges of CENMs, and will take full advantage of the dissemination abilities of the centers and/or groups involved.

10. Nanoscience and Emerging Technologies in Society: Sharing Research and Learning Tools (NETS) project – investigates digital resources to advance the collection, dissemination, and preservation of this body of research, addressing the challenge of marshaling resources, academic collaborators, appropriately skilled data managers, and digital repository services for large-scale, multi-institutional and disciplinary research projects. The central activity of this project involves a workshop that will gather key researchers in the field and digital librarians together to plan the development of a disciplinary repository of data, curricula, and methodological tools. Partners include CNS-ASU, CNS-UCSB, University of Michigan's Inter-University Consortium for Political and Social Research, and the University of Massachusetts, Amherst Libraries.

Table 6: Partnering Institutions (cumulative)											
		Name of Institution	Receives Financial Support from Center	Contributes financial support to the center	Minority Serving Institution Partner	Female Serving Institution Partner	National Lab/other govt. Partner	Industry Partner	Museum Partner	International Partner	Other
I.a. Academic Partnering Institutions (ASU)											
		Applied Learning Technologies Institute	x								
		Arizona Institute for Nano-Electronics (AINE)									x
		Arizona Technology Enterprises (AzTE)									x
		Axon Technologies									x
		Barrett, The Honors College									x
		Biodesign Institute	x	x							
		Center for Biology & Society									x
		CRESMET									x
		Center for the Study of Religion and Conflict									x
		Center for Law, Science and Innovation	x								
		Center for Science and the Imagination									x
		Center for Solid State Electronics Research	x								
		Center for Study of Institutional Diversity	x								
		College of Liberal Arts and Sciences		x							
		College of Public Programs	x								
		College of Technology & Innovation	x								
		Complex Adaptive Systems Initiative (CASI)									x
		Consortium for Science, Policy and Outcomes		x							
		Decision Theater for a Desert City									x
		Foundation, ASU									x
		Global Institute of Sustainability									x
		Graduate College	x								
		Hayden Library									x
		Health Services									x
		Herberger Institute for Design and the Arts	x								
		Hispanic Research Center			x						
		Institute for Human Origin									x
		Ira A. Fulton Schools of Engineering	x	x							
		Learning Sciences Institute									x
		LightWorks	x								
		Mary Lou Fulton School of Education	x								
		New Interdisciplinary Arts & Sciences									x
		Office of China Initiatives and Strategy									x
		Office of Knowledge and Enterprise Development (OKED)		x							
		Office of Public Affairs									x
		Office of the President		x							x
		Office of Vice President and Provost									x
		Office of University Initiatives									x
		Occupational Health and Safety									x
		Phoenix Urban Research Laboratory	x								
		SOLS-Responsible Conduct of Research Program	x								x
		Sandra Day O'Connor School of Law	x								
		School of Earth & Space Exploration									x
		School of Government, Politics, and Global Studies	x	x							
		School of Human Evolution and Social Change	x	x							
		School of International Languages and Cultures	x								
		School of Letters and Sciences	x								
		School of Life Sciences	x								
		School of Mathematical and Statistical Sciences									x
		School of Philosophical, Historical, and Religious Studies									x
		School of Social Transformation									x
		School of Sustainability	x								
		Science Policy Assessment and Research on Climate (SPARC)									x
		Stardust Center	x								
		Technology Based Learning Research							x		x
		University Art Museum									x
		University Public Schools									x
		W.P. Carey School of Business	x								
		Walter Cronkite School of Journalism and Mass Communication									x
I.b. Academic Partnering Institutions											
		Aarhus University, Denmark								x	
		Ansal Institute of Denmark								x	
		Antwerp University								x	
		Austrian Academy of Science								x	
		Baylor College of Medicine									x
		Beijing Institute of Technology, China	x							x	
		Bioscience High School									x
		Boise State University									x
		Bowling Green State University									x
		Brown University	x								

		California State University, Sacramento								x
		Cardiff University	x							
		Carnegie Mellon University							x	
		Case Western Reserve University								x
		Chandler Gilbert Community College								x
		Chinese Academy of Sciences								
		Claremont Graduate University								x
		Clark University								x
		Collins College								x
		Colorado School of Mines	x							
		Columbia University								x
		Copenhagen Business School, Denmark	x						x	
		Corinthian College								x
		Cornell University								x
		Dalian University of Technology, China	x						x	
		Delft Technical University, the Netherlands							x	
		DeVry University								x
		Dublin City University							x	
		Durham University, United Kingdom							x	
		Ecoles des Mines, France							x	
		ETH Zurich							x	
		Eugene Lang College the New School for Liberal Arts								x
		Ewha Women's University				x			x	
		Federal University of Parana, Brazil	x						x	
		Federal University Santa Catarina, Brazil	x						x	
		Flemish Institute of Science & Technology							x	
		Florida International University								x
		George Mason University								x
		George Washington University								x
		Georgetown University								x
		Georgia Institute of Technology	x							
		Glendale Community College								x
		Grenoble Institute of Technology	x						x	
		Grove City College								x
		Harvard University								x
		Howard University								x
		Illinois Institute of Technology								x
		Indiana University	x							
		Institute of International Sociology of Gorizia	x						x	
		Institut d'Etudes Politiques de Grenoble, France	x						x	
		Iowa State University								x
		James Martin Institute for Science and Civilization, Oxford, UK							x	
		Karlsruhe Institute of Technology, Germany	x						x	
		Korea Institute of Science and Technology, Seoul, Korea							x	
		Lancaster University							x	
		Leeds University Business School, UK	x						x	
		Lehigh University								x
		Litchfield Elementary School District								x
		Long Island University								x
		Manchester Business School	x						x	
		Maricopa Community Colleges								x
		McGill University								x
		Mesa Biotech Academy								x
		Mesa Community College								x
		Mesa High School								x
		Michigan State University								x
		MIT SENSEable City Lab								x
		Nagoya University, Japan	x						x	
		National Academy of the Sciences								x
		National University of Singapore & Asia							x	
		New York University	x							
		North Carolina State University	x							
		Northeastern University								x
		Northwestern University								x
		Norwegian University of Science & Technology, Norway							x	
		NSEC/CNS-University of California, Santa Barbara (UCSB)								x
		Ohio State University								
		Osaka University, Japan							x	
		Pennsylvania State University								x
		Plymouth University								x
		Portland State University								x
		Purdue University	x							
		Queens University							x	
		Radboud University							x	
		Rensselaer Polytechnic Institute	x							
		Rhode Island School of Design	x							x
		Rice University								x
		Rice University/ICON		x						
		Rochester Institute of Technology								x
		Rutgers, The State University of New Jersey	x							

		Said Business School, Oxford								x	
		Sapieza University of Rome									x
		Scottsdale Community College									x
		Simon Fraser University, British Columbia								x	
		S.I.W.S. N.R. Swamy College, India	x							x	
		South Mountain Community College									x
		Stanford University	x								x
		State University of Campinas									x
		Technical University of Delft								x	
		Technical University of Denmark								x	
		Technical University of Darmstadt								x	
		Tennessee State University									x
		Texas State University, San Marcos	x								
		The Center for International Development, Harvard University									x
		Tokyo University	x							x	
		Tsinghua University, China								x	x
		UCLA/Harvard/NBER: Collaborative Research; Personnel Exchanges									x
		UMC St. Radboud									x
		Unicamp University, Brazil								x	
		University de Zacatecas, Mexico	x							x	
		Universidad del Pais Vasco, Spain								x	
		University College London									x
		University at Albany									x
		University of Antwerp, Belgium	x							x	
		University of Arizona								x	
		University of Basel								x	x
		University of Basque Country									x
		University of Bergen, Norway	x							x	
		University of Bielefeld, Germany	x							x	
		University of British Columbia								x	
		University of Calgary, Canada	x							x	
		University of California, Berkeley	x								
		University of California, Davis									x
		University of California, Irvine									x
		University of California, Los Angeles									x
		University of California, San Diego	x								
		University of California, Santa Barbara									x
		University of Cape Town									x
		University of Chicago									x
		University of Colorado, Boulder	x								
		University of Colorado, Denver	x								
		University of Copenhagen								x	x
		University of Denver									x
		University of Edinburgh	x							x	
		University of Exeter, United Kingdom								x	x
		University of Florida									x
		University of Georgia	x								
		University of Gothenburg, Sweden								x	
		University of Groningen, the Netherlands								x	
		University of Illinois, Chicago									x
		University of Illinois, Springfield									x
		University of Illinois, Urbana-Champaign									x
		University of Iowa									x
		University of Jiangsu, China								x	
		University of Lausanne, Switzerland								x	
		University of Leeds	x							x	
		University of Liege, Belgium	x							x	
		University of Manchester, United Kingdom	x								
		University of Maryland									x
		University of Massachusetts, Amherst									x
		University of Melborne, Australia								x	
		University of Michigan									x
		University of Minnesota									x
		University of Montana									x
		University of Nebraske, Lincoln	x								
		University of Nevada, Las Vegas									x
		University of New Hampshire	x								
		University of North Carolina, Charlotte									x
		University of Notre Dame									x
		Univesity of Nottingham								x	
		University of Padua								x	
		University of Seville, Spain	x							x	
		University of South Carolina									x
		University of South Florida									x
		University of Southern California									x
		University of Southern Indiana									x
		University of Sussex, United Kingdom								x	
		University of Tennessee, Knoxville									x
		University of Texas, Austin									x
		University of Trieste, Italy								x	

		University of Twente, the Netherlands	x						x	
		University of Turku								x
		University of Utah								x
		University of Victoria	x						x	
		University of Vienna							x	
		University of Virginia								x
		University of Washington								x
		University of Wisconsin, Madison	x							
		UT-Battelle								x
		Utrecht University							x	
		Vanderbilt University								x
		Virginia Tech University								x
		VU University of Amsterdam							x	
		Washington University, Saint Louis								x
		West Chester University of Pennsylvania								x
		Western Michigan University								x
		Yale University								x
344	Total Number Academic Partners									
II.	Non-academic Partnering Institutions									
		Agilent Technologies	x							
		Airplayn								x
		ALD Nano Solutions						x		
		Alsek Research								x
		American Association for the Advancement of Science (AAAS)		x						x
		American Bar Foundation								x
		Apriva ISS								x
		Arizona BioIndustry Organization						x		
		Arizona Commerce Authority						x		
		Arizona Corporation Commission						x		
		Arizona Department of Education						x		
		Arizona Department of Health Services						x		
		Arizona Nanotechnology Cluster						x		
		Arizona Public Service (APS)						x		x
		Arizona Research Institute for Solar Energy						x		x
		Arizona Science Center							x	
		Arizona Technology Council						x		
		Army Military Command								x
		Australian Government						x	x	
		Bank of America								x
		Bassetti Foundation							x	x
		BioIndustry Organization of Southern Arizona						x		
		Boudreaux and Associates								x
		BrasEq						x	x	
		Brilliant Concepts, LLC.								x
		British Embassy					x		x	
		Buckeye Express								x
		Cambridge Public Health Department	x							
		Carnegie Mellon								x
		CB Richard Ellis								x
		CEA-Saclay								x
		Cell Publishing		x					x	
		Center for Business Models in Health Care								x
		Center for Responsible Nanotechnology								x
		Changeist, LLC								x
		Chemical Heritage Foundation							x	
		City of Apache Junction								x
		City of Phoenix								x
		City of Scottsdale								x
		Complex Global Risks								x
		Corgan Associates								x
		Council of Scientific and Industrial Research								x
		Danish Board of Technology							x	
		David Crowley Gallery								x
		Decker Yeadon LLC								x
		Department of Energy (DOE)						x		
		Department of the Treasury						x		
		Department of Transporation						x		
		Digital Thinking Network								x
		Downtown Phoenix Journal								x
		Ecological Society of America								x
		EKLATEK Engineering								x
		Emerging Leaders in Science & Society (ELISS)								x
		Engineering & Physical Sciences Research Council (EPSRC)								x
		Environmental Protection Agency (EPA)						x		
		Equus Development Corporation						x		
		European Commission							x	
		Exploratorium, San Francisco								

		Federal Aviation Administration Office of Environment & Energy						x			
		FBI Weapons of Mass Destruction					x				
		Food and Drug Administration (FDA)					x				
		Gallagher and Kennedy									x
		General Dynamics						x			
		Genok Centre for Biosafety								x	x
		Genome British Columbia								x	x
		German Parliament								x	
		Global Business Network						x			
		Gould Evans									x
		Gordon Research Conferences (GRC)		x							
		Greenwall Foundation		x							
		Hafen City University									x
		HDR Architecture									
		Heatsync Labs					x				
		Heliae									x
		Home Depot						x			
		Iconic Architecture									x
		INSERM									x
		Institute for Agriculture and Trade Policy									x
		Institute for Ecological Economy Research, Germany								x	
		Institute for the Future	x								
		Institute of Technical Assessment & Systems Analysis									x
		Intel						x			
		Intelligent Information Services Corporation (IISC)						x			
		International Nanotechnology in Society Network (INSN)								x	
		International Research Center								x	
		Ira Domsky Environmental									x
		Italian National Research Council. Turin, Italy								x	
		ITel									x
		Ivy Consulting, Inc.									x
		Jennings, Strouss and Salmon PLC		x							
		Kristine Wilcox Consulting									x
		Las Vegas-Clark County Library District									x
		Lasertel, Inc.									x
		Lawrence Livermore Lab					x				
		Leathers Milligan & Associates									x
		Loka Institute									x
		London Science Museum							x	x	
		Luxe Ventures						x			
		Mabelson Law Group									x
		Max Chandler Robot Art									x
		Mayo Clinic-Scottsdale						x			
		Meridian Institute	x								
		Metacurrency Project									x
		Microchip						x			
		MJS Designs, Inc.									x
		Modern Insights									x
		Museum of Life & Science, North Carolina							x		
		Museum of Science, Boston							x		
		Nanoscale Informal Science Education Network (NISE Net)							x		
		National Academy of Engineering	x								
		National Advisory Committee on Aeronautics (NASA)					x				
		National Business Museum							x		
		National Geographic Society									x
		National Institute of Standards and Technology (NIST)									x
		National Insitutes of Health (NIH)									x
		National Nanomanufacturing Network (NNN)									x
		National Nanotechnology Coordinating Office									x
		National Nanotechnology Infrastructure Network									x
		National Research Council									x
		National Science Foundation					x				
		Nature.com									x
		Nature Publishing Group		x						x	
		New Haven Independent									x
		Norweigian Institute					x			x	
		Nothing but NET									x
		Nuclear Waste Review Board					x				
		Office of Naval Research					x				
		Oregon Museum of Science & Industry							x		x
		PACeHR									x
		Penman PR	x								
		Pennsylvania Bio Nano Systems	x								
		Phoenix Zoo									x
		Physician Services Group									x
		PING Inc.						x			
		Planetary ONE	x								x
		Practical Action									x
		Presidential Commission for the Study of Bioethical Issues					x				
		QuantTera									x

		Rathenau Institute								x	
		RCI Surveys, Inc.									x
		Research Council of Norway	x							x	x
		Research Councils U.K. (RCUK) in the U.S.									x
		Re/Max Fine Propoerties									x
		Research Media Ltd.									x
		Richard + Bauer Architecture									x
		Rockefeller Foundation		x							
		Rutgers and Posch									x
		Ryley Carlock & Applewhite	x								
		Salt River Project						x			
		Sandia National Laboratory					x				
		Savage Film									x
		Science & Technology Policy Institute	x								
		Sciencecenter, New York						x			
		Science Foundation of Arizona									x
		Science Museum of Minnesota						x			x
		SciTech Strategies, Inc.									x
		Scottsdale League for the Arts									x
		Search Technology									x
		Semi-Conductor Research Corporation	x								
		SETI Institute									x
		SmithGroup									x
		Snell and Wilmer Law									x
		Sokolov, Sokolov, Burgess Solutions (SSB)									x
		Spirit of the Senses Salon									x
		Springer Publishing		x							
		SRI Institute	x								
		Strategic Advantage, Inc.									x
		Sundt Construction, Inc.									x
		Synthetic Biology Engineering Research Center (SynBERC)					x				
		Targeted Genetics Corporation (TGen)									x
		Teach America									x
		Tempe Festival of the Arts									x
		Televerde									x
		Testani Design Trouple, Inc.									x
		The Eluminati, LLC									x
		The Embryo Project									x
		The Energy and Resources Institute (TERI)								x	
		The Foresight Institute									x
		The Galaxy Organization									x
		The Rockefeller Foundation	x								
		The Royal Society									x
		The Washington Post									x
		Translational Genomics Research Institute (TGEN)									x
		TraskBritt Intellectual									x
		Underwood Bros., Inc.									x
		Unicorn Media, Inc.									x
		U.S. Government Accountability Office (U.S. GAO)					x				
		U.S. Department of Agriculture									x
		U.S. Department of Homeland Security					x				
		U.S. DOE/Center for Integrated Nanotechnology (CINT)					x				
		Venezuelan Institute for Scientific Research									x
		Will Bruder & Partners Ltd.									x
		Winnipeg Art Gallery									x
		Woodrow Wilson International Center for Scholars									x
193	Total Number Non-academic Partners:										

21. Current and Pending Support

Following are the Current and Pending Support documents for the PI and all thrust leaders:

1. Ira Bennett – Assistant Director, Education
2. Elizabeth A. Corley – co-PI; RTTA 2 co-team leader
3. Susan Cozzens – TRC 1 co-team leader
4. Erik Fisher – RTTA 4 team leader; Associate Director, Integration
5. David H. Guston – PI and Center Director
6. Merlyna Lim – RTTA 3 co-team leader
7. Jose Lobo – RTTA 1 co-team leader
8. Clark Miller – co-PI; Center Associate Director
9. Kelly Rawlings – RTTA 3 co-team leader
10. Dietram Scheufele – co-PI; RTTA 2 co-team leader
11. Cynthia Selin – RTTA 3 co-team leader; Associate Director, Anticipation
12. Philip Shapira – RTTA 1 co-team leader
13. Sander E. van der Leeuw – TRC 2 co-team leader
14. Jameson M. Wetmore – TRC 1 co-team leader; Associate Director, Engagement
15. Arnim Wiek – TRC 2 co-team leader
16. Jan Youtie – co-PI; RTTA 1 co-team leader

Following are the Current and Pending Support documents for the faculty leading the Design Studio:

1. Renata Hejduk
2. William Heyward
3. Darren Petrucci