The Center for Nanotechnology in Society at Arizona State University

NSF #0937591  September 1, 2010 – August 31, 2016

PI: David H. Guston, Arizona State University

Co-PIs: Elizabeth Corley, 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, 2015 to August 31, 2016

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

   Project Summary ....................................................................................................................... 4
   List of Center Participants, Advisory Boards, and Participating Institutions ....................... 5
   Mission, Significant Advances, and Broader Impacts ............................................................. 46
   Highlights ................................................................................................................................ 62
   Strategic Research Plan ........................................................................................................... 71
   Research Program, Accomplishments, and Plans ................................................................. 74
      a. RTTA 1
      b. RTTA 3
      c. RTTA 4
      d. TRC 1
      e. TRC 2
   Center Diversity – Progress and Plans .................................................................................. 102
   Education ............................................................................................................................... 106
   Outreach and Knowledge Transfer ......................................................................................... 125
   Shared and Other Experimental Facilities ............................................................................ 134
   Personnel ............................................................................................................................... 136
   Publications and Patents ........................................................................................................ 140
   Biographical Information ...................................................................................................... 289
   Honors and Awards ............................................................................................................... 290
   Fiscal Sections ....................................................................................................................... 291
   Cost-Sharing .......................................................................................................................... 304
   Leverage ............................................................................................................................... 305
(2. Table of Contents continued)

Tables

Table 1 ..................................................................................................................................... 45
Table 2 ................................................................................................................................... 101
Table 3A ................................................................................................................................ 123
Table 3B ................................................................................................................................ 124
Table 4A ................................................................................................................................ 138
Table 4B ................................................................................................................................ 139
Table 5 ................................................................................................................................... 308
Table 6 ................................................................................................................................... 309
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 futuring 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 and other Center participants. 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 achievements have been validating anticipatory governance as a richly generative strategic vision and advancing the related agenda of responsible innovation. 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 to create novel insights in studies of nanotechnology and the brain, equity and nanotechnology, and nanotechnology and urban sustainability; 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: extending bibliometric perspectives to other emerging technologies; mounting a third study of public opinion regarding nano and other emerging technologies; conducting a new round of scenario development workshops with ASU science and engineering colleagues; continuing to expand STIR into Eastern Europe; completed evaluation of workshops to train scientists and engineers to engage with the developing world; expanding NICE Database and exploring its use for synthetic biology.

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 leading the creation of a new journal, organizing community-defining conferences, producing community-defining sources of knowledge, serving as an international hub for scores 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:

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ASU</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elizabeth Adams</td>
<td>Faculty Associate</td>
<td>Engin. Academic &amp; Student Affairs</td>
</tr>
<tr>
<td>Braden Allenby</td>
<td>Professor</td>
<td>Civil &amp; Environmental Engineering</td>
</tr>
<tr>
<td>Jean Andino</td>
<td>Associate Professor</td>
<td>Engineering Matter, Transport &amp; Energy</td>
</tr>
<tr>
<td>Moshe Apelis</td>
<td>Associate Professor</td>
<td>Engineering Computer Science</td>
</tr>
<tr>
<td>Andrew Asklund</td>
<td>Director</td>
<td>Center for Law, Science &amp; Innovation</td>
</tr>
<tr>
<td>Denise Baker</td>
<td>Faculty Associate</td>
<td>Social &amp; Behavioral Sciences</td>
</tr>
<tr>
<td>George Basile</td>
<td>Executive Director</td>
<td>Decision Theatre for a Desert City</td>
</tr>
<tr>
<td>Ira Bennett</td>
<td>Assistant Research Professor</td>
<td>School for the Future of Innov. in Society</td>
</tr>
<tr>
<td>Philip Bernick</td>
<td>Assistant Professor</td>
<td>English</td>
</tr>
<tr>
<td>Mimmo Bonanni</td>
<td>Associate Librarian</td>
<td>Cyberinfrastructure Services</td>
</tr>
<tr>
<td>Christopher Boone</td>
<td>Professor</td>
<td>Human Evolution &amp; Social Change</td>
</tr>
<tr>
<td>Prasad Boradkar</td>
<td>Associate Professor</td>
<td>Architecture &amp; Landscape Architecture</td>
</tr>
<tr>
<td>Katja Brundiers</td>
<td>Academic Associate</td>
<td>Global Institute of Sustainability</td>
</tr>
<tr>
<td>Harvey Bryan</td>
<td>Professor</td>
<td>Architecture &amp; Landscape Architecture</td>
</tr>
<tr>
<td>Marilyn P. Carlson</td>
<td>Professor</td>
<td>Mathematics &amp; Statistics</td>
</tr>
<tr>
<td>Darlene Cavalier</td>
<td>Adjunct Professor</td>
<td>School for the Future of Innov. in Society</td>
</tr>
<tr>
<td>Matthew Chew</td>
<td>Faculty Associate</td>
<td>Global Institute of Sustainability</td>
</tr>
<tr>
<td>Nalini Chhetri</td>
<td>Lecturer</td>
<td>School for the Future of Innov. in Society</td>
</tr>
<tr>
<td>Netra Chhetri</td>
<td>Assistant Professor</td>
<td>School for the Future of Innov. in Society</td>
</tr>
<tr>
<td><strong>Jim Collins</strong></td>
<td>Professor</td>
<td>School of Life Sciences</td>
</tr>
<tr>
<td>David Conz</td>
<td>Lecturer</td>
<td>Letters &amp; Sciences</td>
</tr>
<tr>
<td>Elizabeth Corley</td>
<td>Associate Professor</td>
<td>Public Affairs</td>
</tr>
<tr>
<td>Kevin Corley</td>
<td>Assistant Professor</td>
<td>Management</td>
</tr>
<tr>
<td>Kurt Creager</td>
<td>Executive Director</td>
<td>Stardust Center</td>
</tr>
<tr>
<td>Peter Crozier</td>
<td>Professor</td>
<td>Engineering Matter, Transport &amp; Energy</td>
</tr>
<tr>
<td>Sandwip Dey</td>
<td>Professor</td>
<td>Engineering</td>
</tr>
<tr>
<td>Rodolfo Diaz</td>
<td>Professor</td>
<td>Electrical Engineering</td>
</tr>
<tr>
<td>Chris Diehnelt</td>
<td>Assistant Research Professor</td>
<td>Biodesign Institute</td>
</tr>
<tr>
<td>Gary Dirks</td>
<td>Director</td>
<td>LightWorks</td>
</tr>
<tr>
<td>Travis Doom</td>
<td>Program Specialist</td>
<td>Consort. for Science, Policy &amp; Outcomes</td>
</tr>
<tr>
<td>Thomas Duening</td>
<td>Director</td>
<td>Entrepreneurial Programs</td>
</tr>
<tr>
<td><strong>Mary Anne Duggan</strong></td>
<td>Assistant Research Professor</td>
<td>Sanford Sch. of Social &amp; Family Dynamics</td>
</tr>
<tr>
<td>Terrie Lee Ekin</td>
<td>Director</td>
<td>CLAS Research Administration</td>
</tr>
<tr>
<td><strong>Karin Ellison</strong></td>
<td>Associate Director</td>
<td>Biology &amp; Society</td>
</tr>
<tr>
<td>James Elser</td>
<td>Regents’ Professor</td>
<td>Life Sciences</td>
</tr>
<tr>
<td>Scott Endslay</td>
<td>Vice President</td>
<td>System Design for Quality Improvement</td>
</tr>
<tr>
<td>Sandy Epstein</td>
<td>Sr. Mgr. Strategic Bus. Dev.</td>
<td>Decision Theatre</td>
</tr>
<tr>
<td><strong>Joseph Eschrich</strong></td>
<td>Coordinator Sr., Res. &amp; Ops.</td>
<td>Center for Science &amp; the Imagination</td>
</tr>
<tr>
<td>Timothy Eschrich</td>
<td>Process Engrg. Manager</td>
<td>Ctr. for Solid State Electronics Research</td>
</tr>
<tr>
<td>Mahmud Farooque</td>
<td>Associate Director</td>
<td>School for the Future of Innov. in Society</td>
</tr>
<tr>
<td>Tricia Farwell</td>
<td>Professor</td>
<td>Journalism &amp; Mass Communication</td>
</tr>
<tr>
<td>Edward Finn</td>
<td>Director/Assistant Professor</td>
<td>Arts, Media and Engineering</td>
</tr>
<tr>
<td>Adelheid Fischer</td>
<td>Staff</td>
<td>Innovation Space</td>
</tr>
<tr>
<td>Erik Fisher</td>
<td>Assistant Professor</td>
<td>School for the Future of Innov. in Society</td>
</tr>
<tr>
<td>Name</td>
<td>Position</td>
<td>Department/Field</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-----------------------------------------------</td>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>Matthew Fraser</td>
<td>Associate Professor</td>
<td>Sustainable Engrg. &amp; Built Environment</td>
</tr>
<tr>
<td>Emma Frow</td>
<td>Assistant Professor</td>
<td>School of Biological &amp; Health Systems</td>
</tr>
<tr>
<td>Sylvain Gallais</td>
<td>Clinical Professor</td>
<td>Languages &amp; Cultures</td>
</tr>
<tr>
<td>Joel Garreau</td>
<td>Lincoln Professor of Law</td>
<td>Law</td>
</tr>
<tr>
<td>Alexandra Gino</td>
<td>Faculty Associate</td>
<td>Consort. for Science, Policy &amp; Outcomes</td>
</tr>
<tr>
<td>Jay Golden</td>
<td>Assistant Professor</td>
<td>Global Institute of Sustainability</td>
</tr>
<tr>
<td>Aaron Golub</td>
<td>Assistant Professor</td>
<td>Geographical Sciences &amp; Urban Planning</td>
</tr>
<tr>
<td>Deborah Gonzalez</td>
<td>Chief Academic Officer</td>
<td>University Public Schools</td>
</tr>
<tr>
<td>Stephen Goodnick</td>
<td>Professor</td>
<td>Electrical Engineering</td>
</tr>
<tr>
<td>Gisela Grant</td>
<td>Internship Coordinator</td>
<td>Politics &amp; Global Studies</td>
</tr>
<tr>
<td>Kimberly Grout</td>
<td>Coordinator Senior</td>
<td>Global institute of Sustainability</td>
</tr>
<tr>
<td>Subhro Guhathakurta</td>
<td>Professor</td>
<td>Geographical Sciences &amp; Urban Planning</td>
</tr>
<tr>
<td>Devens Gust</td>
<td>Professor</td>
<td>Chemistry &amp; Biochemistry</td>
</tr>
<tr>
<td>David H. Guston</td>
<td>Professor</td>
<td>School for the Future of Innov. in Society</td>
</tr>
<tr>
<td>Ed Hackett</td>
<td>Professor</td>
<td>Human Evolution &amp; Social Change</td>
</tr>
<tr>
<td>Rolf Halden</td>
<td>Professor</td>
<td>Biodesign Institute</td>
</tr>
<tr>
<td>Dehelia Hannah</td>
<td>Assistant Research Professor</td>
<td>School of Arts, Media &amp; Engineering</td>
</tr>
<tr>
<td>Mark Hannah</td>
<td>Assistant Professor</td>
<td>English</td>
</tr>
<tr>
<td>Jiping He</td>
<td>Professor</td>
<td>Bioengineering</td>
</tr>
<tr>
<td>Renata Hejduk</td>
<td>Associate Professor</td>
<td>Architecture &amp; Landscape Architecture</td>
</tr>
<tr>
<td>Stephen Helms Tillery</td>
<td>Assistant Professor</td>
<td>Bioengineering</td>
</tr>
<tr>
<td>Mark Henderson</td>
<td>Professor</td>
<td>Engineering</td>
</tr>
<tr>
<td>Kirsten Hendrickson</td>
<td>Lecturer</td>
<td>Chemistry &amp; Biochemistry</td>
</tr>
<tr>
<td>Joseph Herkert</td>
<td>Lincoln Associate Professor</td>
<td>Humanities &amp; Arts</td>
</tr>
<tr>
<td>James Hershauer</td>
<td>Professor</td>
<td>Management</td>
</tr>
<tr>
<td>William Heywood</td>
<td>Assistant Clinical Professor</td>
<td>Design</td>
</tr>
<tr>
<td>Lori Hidinger</td>
<td>Managing Director</td>
<td>School for the Future of Innov. in Society</td>
</tr>
<tr>
<td>Keith Hjelmstad</td>
<td>Professor</td>
<td>Sustainable Engrg. &amp; Built Environment</td>
</tr>
<tr>
<td>Chong Ho Yu</td>
<td>Systems Analysis</td>
<td>ALTI Research &amp; Outreach</td>
</tr>
<tr>
<td>Kiril Hristovski</td>
<td>Assistant Professor</td>
<td>Technology &amp; Innovation</td>
</tr>
<tr>
<td>Ben Hurlbut</td>
<td>Lecturer</td>
<td>Life Sciences</td>
</tr>
<tr>
<td>Mary Ingram-Water</td>
<td>Clinical Associate Professor</td>
<td>Barrett Honors College</td>
</tr>
<tr>
<td>Minu Ipe</td>
<td>Associate Professor</td>
<td>WPC Management</td>
</tr>
<tr>
<td>Marco Janssen</td>
<td>Emeritus Professor</td>
<td>Ctr. for Study of Institutional Diversity</td>
</tr>
<tr>
<td>John Johnson</td>
<td>Dean</td>
<td>Social Transformation</td>
</tr>
<tr>
<td>Paul Johnson</td>
<td>Assistant Professor</td>
<td>Engineering</td>
</tr>
<tr>
<td>Erik Johnston</td>
<td>Professor</td>
<td>Public Affairs</td>
</tr>
<tr>
<td>Stephen Johnston</td>
<td>Assistant Professor</td>
<td>Biodesign Institute</td>
</tr>
<tr>
<td>Christopher Jones</td>
<td>Associate Professor</td>
<td>History</td>
</tr>
<tr>
<td>Kamil Kaloush</td>
<td>Associate Professor</td>
<td>Sustainable Engrg. &amp; Built Environment</td>
</tr>
<tr>
<td>Sayfe Kiaie</td>
<td>Associate Dean</td>
<td>Engineering</td>
</tr>
<tr>
<td>Yushkim Kim</td>
<td>Assistant Professor</td>
<td>Public Affairs</td>
</tr>
<tr>
<td>William Kimbel</td>
<td>Virginia M. Ullman Professor</td>
<td>Human Evolution &amp; Social Change</td>
</tr>
<tr>
<td>Gordon Knox</td>
<td>Director</td>
<td>University Art Museum</td>
</tr>
<tr>
<td>Anatoli Korkin</td>
<td>Director</td>
<td>Research &amp; Economic Affairs</td>
</tr>
<tr>
<td>Joseph Kullman</td>
<td>Sr. Media Relations Officer</td>
<td>FSE Marketing &amp; Public Affairs</td>
</tr>
<tr>
<td>Timothy Lant</td>
<td>Assistant Research Professor</td>
<td>Decision Theatre for a Desert City</td>
</tr>
<tr>
<td>Karen Leong</td>
<td>Associate Professor</td>
<td>Social Transformation</td>
</tr>
<tr>
<td>Nancy Levinson</td>
<td>Director</td>
<td>Design</td>
</tr>
<tr>
<td>Rachel Levinson</td>
<td>Indus. &amp; Gov. Rel. Liaison</td>
<td>Research &amp; Economic Affairs</td>
</tr>
<tr>
<td>Merlyna Lim</td>
<td>Assistant Professor</td>
<td>Consort. for Science, Policy &amp; Outcomes</td>
</tr>
<tr>
<td>Name</td>
<td>Position</td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Mary Laura Lind</td>
<td>Assistant Professor</td>
<td></td>
</tr>
<tr>
<td>Stuart Lindsay</td>
<td>Regents’ Professor</td>
<td></td>
</tr>
<tr>
<td><strong>Jason Lloyd</strong></td>
<td>Project Coordinator</td>
<td></td>
</tr>
<tr>
<td><strong>Jose Lobo</strong></td>
<td>Associate Professor</td>
<td></td>
</tr>
<tr>
<td>George Maracas</td>
<td>Research Professor</td>
<td></td>
</tr>
<tr>
<td><strong>Gary Marchant</strong></td>
<td>Lincoln Professor of Law</td>
<td></td>
</tr>
<tr>
<td>Joan McGregor</td>
<td>Professor</td>
<td></td>
</tr>
<tr>
<td>Chad McAllister</td>
<td>Staff</td>
<td></td>
</tr>
<tr>
<td>Michael Mehaffy</td>
<td>Faculty Associate</td>
<td></td>
</tr>
<tr>
<td>Jeri Meeks</td>
<td>Bus. Operations Manager Sr.</td>
<td></td>
</tr>
<tr>
<td>Kostalena Michelaki</td>
<td>Associate Professor</td>
<td></td>
</tr>
<tr>
<td><strong>Clark A. Miller</strong></td>
<td>Professor</td>
<td></td>
</tr>
<tr>
<td>Tom Moore</td>
<td>Assistant Professor</td>
<td></td>
</tr>
<tr>
<td>Torin Monahan</td>
<td>Clinical Assistant Professor</td>
<td></td>
</tr>
<tr>
<td><strong>Loren Olson</strong></td>
<td>Lecturer &amp; Director</td>
<td></td>
</tr>
<tr>
<td>Dan O’Neill</td>
<td>Administrator &amp; Librarian</td>
<td></td>
</tr>
<tr>
<td>Scott Muir</td>
<td>Director</td>
<td></td>
</tr>
<tr>
<td>Alan Nelson</td>
<td>Associate Director</td>
<td></td>
</tr>
<tr>
<td>Robert Ott</td>
<td>Assistant Research Professor</td>
<td></td>
</tr>
<tr>
<td>Robert Pahle</td>
<td>Senior Lecturer</td>
<td></td>
</tr>
<tr>
<td>Mary Jane Parmentier</td>
<td>Professor</td>
<td></td>
</tr>
<tr>
<td><strong>Darren Petrucci</strong></td>
<td>Professor</td>
<td></td>
</tr>
<tr>
<td>Patrick Phelan</td>
<td>Professor</td>
<td></td>
</tr>
<tr>
<td>Rhonda Phillips</td>
<td>Professor</td>
<td></td>
</tr>
<tr>
<td>S. Thomas Pieraux</td>
<td>Professor</td>
<td></td>
</tr>
<tr>
<td>Kenneth Polasko</td>
<td>VP Business Development</td>
<td></td>
</tr>
<tr>
<td>Jonathan Posner</td>
<td>Assistant Professor</td>
<td></td>
</tr>
<tr>
<td>George Poste</td>
<td>Chief Scientist</td>
<td></td>
</tr>
<tr>
<td>Paul Privateer</td>
<td>Associate Professor</td>
<td></td>
</tr>
<tr>
<td><strong>Subramanian Rajan</strong></td>
<td>Professor</td>
<td></td>
</tr>
<tr>
<td>B. Ramakrishna</td>
<td>Director</td>
<td></td>
</tr>
<tr>
<td>Charles Redman</td>
<td>Faculty</td>
<td></td>
</tr>
<tr>
<td><strong>Kristine Reich</strong></td>
<td>Assistant Professor</td>
<td></td>
</tr>
<tr>
<td><strong>Jennifer Richter</strong></td>
<td>Professor</td>
<td></td>
</tr>
<tr>
<td>Barry Ritchie</td>
<td>Regents’ Professor</td>
<td></td>
</tr>
<tr>
<td>Bruce Rittman</td>
<td>Associate Professor</td>
<td></td>
</tr>
<tr>
<td><strong>Jason S. Robert</strong></td>
<td>Assistant Professor</td>
<td></td>
</tr>
<tr>
<td>Ariel Rodriguez</td>
<td>Assistant Professor</td>
<td></td>
</tr>
<tr>
<td>Aaron Rothman</td>
<td>Specialist</td>
<td></td>
</tr>
<tr>
<td>Mark Ryan</td>
<td>Adjunct Professor</td>
<td></td>
</tr>
<tr>
<td>Carlo Sammarco</td>
<td>Professor</td>
<td></td>
</tr>
<tr>
<td>Hava Samuelson</td>
<td>Professor</td>
<td></td>
</tr>
<tr>
<td><strong>Daniel R. Sarewitz</strong></td>
<td>Professor</td>
<td></td>
</tr>
<tr>
<td>Anne Schneider</td>
<td>Professor</td>
<td></td>
</tr>
<tr>
<td>Dawn Schwenke</td>
<td>Research Professor</td>
<td></td>
</tr>
<tr>
<td>Kimberly Scott</td>
<td>Associate Professor</td>
<td></td>
</tr>
<tr>
<td><strong>Thomas Seager</strong></td>
<td>Associate Professor</td>
<td></td>
</tr>
<tr>
<td><strong>Cynthia Selin</strong></td>
<td>Assistant Professor</td>
<td></td>
</tr>
<tr>
<td><strong>Nancy Selover</strong></td>
<td>Academic Associate</td>
<td></td>
</tr>
<tr>
<td>Don Seo</td>
<td>Associate Professor</td>
<td></td>
</tr>
<tr>
<td>RF (Rick) Shangraw</td>
<td>President</td>
<td></td>
</tr>
<tr>
<td><strong>Engineering Matter, Transport &amp; Energy</strong></td>
<td>Biodesign Institute</td>
<td></td>
</tr>
<tr>
<td><strong>School for the Future of Innov. in Society</strong></td>
<td>Global Institute of Sustainability</td>
<td></td>
</tr>
<tr>
<td><strong>Law</strong></td>
<td>Philosophy</td>
<td></td>
</tr>
<tr>
<td><strong>Political Science</strong></td>
<td>Chemistry &amp; Biochemistry</td>
<td></td>
</tr>
<tr>
<td><strong>Architecture &amp; Landscape Architecture</strong></td>
<td>Engineering Matter, Transport &amp; Energy</td>
<td></td>
</tr>
<tr>
<td><strong>Sustainable Engrg. &amp; Built Environment</strong></td>
<td>Community Resources/Development</td>
<td></td>
</tr>
<tr>
<td><strong>Materials</strong></td>
<td>AZ Technology Enterprises</td>
<td></td>
</tr>
<tr>
<td><strong>Complex Adaptive Systems Initiative</strong></td>
<td>Mechanical &amp; Aerospace Engineering</td>
<td></td>
</tr>
<tr>
<td><strong>Film &amp; Media Studies</strong></td>
<td>Decision Theatre for a Desert City</td>
<td></td>
</tr>
<tr>
<td><strong>Letters &amp; Sciences</strong></td>
<td>Library Downtown</td>
<td></td>
</tr>
<tr>
<td><strong>Biodesign Institute</strong></td>
<td>Occupational Health &amp; Safety</td>
<td></td>
</tr>
<tr>
<td><strong>School for the Future of Innov. in Society</strong></td>
<td>Decision Theatre for a Desert City</td>
<td></td>
</tr>
<tr>
<td><strong>Physics</strong></td>
<td>Biodesign Institute</td>
<td></td>
</tr>
<tr>
<td><strong>Life Sciences</strong></td>
<td>JEAD Technology Enterprises</td>
<td></td>
</tr>
<tr>
<td><strong>Design</strong></td>
<td>Complex Adaptive Systems Initiative</td>
<td></td>
</tr>
<tr>
<td><strong>School for the Future of Innov. in Society</strong></td>
<td>Decision Theatre for a Desert City</td>
<td></td>
</tr>
<tr>
<td><strong>Jewish Studies</strong></td>
<td>Community Resources/Development</td>
<td></td>
</tr>
<tr>
<td><strong>School for the Future of Innov. in Society</strong></td>
<td>Decision Theatre for a Desert City</td>
<td></td>
</tr>
<tr>
<td><strong>ASU Foundation</strong></td>
<td>Phoenix Urban Research Laboratory</td>
<td></td>
</tr>
<tr>
<td><strong>Global Institute of Sustainability</strong></td>
<td>Design</td>
<td></td>
</tr>
<tr>
<td><strong>Chemistry &amp; Biochemistry</strong></td>
<td>FabLab</td>
<td></td>
</tr>
<tr>
<td><strong>Human Evolution &amp; Social Change</strong></td>
<td>Jewish Studies</td>
<td></td>
</tr>
<tr>
<td><strong>School for the Future of Innov. in Society</strong></td>
<td>Decision Theatre for a Desert City</td>
<td></td>
</tr>
<tr>
<td><strong>Global Institute of Sustainability</strong></td>
<td>Decision Theatre for a Desert City</td>
<td></td>
</tr>
<tr>
<td><strong>Chemistry &amp; Biochemistry</strong></td>
<td>ASU Foundation</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Title</td>
<td>Institution</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>--------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Nisha Sherma</td>
<td>Research Technician</td>
<td>Biodesign Institute</td>
</tr>
<tr>
<td>Michael Sullivan</td>
<td></td>
<td>Hispanic Research Center</td>
</tr>
<tr>
<td><strong>Leandra Swanner</strong></td>
<td>Lecturer</td>
<td>Hispanic Research Center</td>
</tr>
<tr>
<td>Emily Talen</td>
<td></td>
<td>Geographical Sciences &amp; Urban Planning</td>
</tr>
<tr>
<td>Colin Tetreault</td>
<td></td>
<td>Biodesign Institute</td>
</tr>
<tr>
<td><strong>Jekan Thanga</strong></td>
<td>Assistant Professor</td>
<td>Global Institute of Sustainability</td>
</tr>
<tr>
<td>Trevor Thornton</td>
<td>Professor</td>
<td>Earth &amp; Space Exploration</td>
</tr>
<tr>
<td><strong>David Tinapple</strong></td>
<td>Assistant Professor</td>
<td>Electrical, Computer, &amp; Energy Engineering</td>
</tr>
<tr>
<td>Cesar Torres</td>
<td>Assistant Professor</td>
<td>Arts Media &amp; Engineering</td>
</tr>
<tr>
<td>Michael Tracy</td>
<td>Director</td>
<td>Engineering Matter, Transport &amp; Energy</td>
</tr>
<tr>
<td><strong>Sander van der Leeuw</strong></td>
<td>Dean and Professor</td>
<td>Center for Cancer Research</td>
</tr>
<tr>
<td>Warren Van Egmond</td>
<td>Adjunct Faculty</td>
<td>Sustainability/Human Evol. &amp; Soc. Change</td>
</tr>
<tr>
<td>Steven VanGinkel</td>
<td>Assistant Research Scientist</td>
<td>Mathematics</td>
</tr>
<tr>
<td>Wim Vermass</td>
<td>Professor</td>
<td>Environmental Biotechnology</td>
</tr>
<tr>
<td>Myla Vicenti Carpio</td>
<td>Assistant Professor</td>
<td>School of Life Sciences</td>
</tr>
<tr>
<td>Ajay Vinze</td>
<td>Professor</td>
<td>American Indian Studies</td>
</tr>
<tr>
<td>Qiangbin Wang</td>
<td>Professor</td>
<td>WPC Information Systems</td>
</tr>
<tr>
<td>Xiao Wang</td>
<td>Assistant Professor</td>
<td>Biodesign Institute</td>
</tr>
<tr>
<td><strong>Andrew Webber</strong></td>
<td>Vice Provost &amp; Professor</td>
<td>Biomedical Engineering</td>
</tr>
<tr>
<td>Paul Westerhoff</td>
<td>Professor</td>
<td>Graduate Education</td>
</tr>
<tr>
<td><strong>Jameson M. Wetmore</strong></td>
<td>Associate Professor</td>
<td>Sustainable Engrg. &amp; Built Environment</td>
</tr>
<tr>
<td>Roxanne Wheelock</td>
<td>Web Administrator</td>
<td>Human Evolution &amp; Social Change</td>
</tr>
<tr>
<td><strong>Philip White</strong></td>
<td>Professor</td>
<td>International Languages &amp; Cultures</td>
</tr>
<tr>
<td>Arnim Wiek</td>
<td>Assistant Professor</td>
<td>Industrial Design</td>
</tr>
<tr>
<td>Joann Williams</td>
<td>Research Professor</td>
<td>Global Institute of Sustainability</td>
</tr>
<tr>
<td><strong>Neal Woodbury</strong></td>
<td>Professor</td>
<td>Chemistry &amp; Biochemistry</td>
</tr>
<tr>
<td>Chong Yu</td>
<td>Systems Analyst Principle</td>
<td>Chemistry &amp; Biochemistry</td>
</tr>
<tr>
<td>Gregg Zachary</td>
<td>Professor</td>
<td>ALTI Research &amp; Outreach</td>
</tr>
<tr>
<td>Frederick Zenhausern</td>
<td>Professor</td>
<td>School for the Future of Innov. in Society</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biodesign Institute</td>
</tr>
<tr>
<td><strong>Collaborators</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wendoly Abrego</td>
<td>Sust. Communities Prog. Mgr.</td>
<td>Phoenix Revitalization Corporation</td>
</tr>
<tr>
<td>Jessica Adamick</td>
<td>InterNano Project Mgr.</td>
<td>National Nanomanufacturing Network</td>
</tr>
<tr>
<td>Greg Adamson</td>
<td>Honorary Fellow</td>
<td>University of Melbourne</td>
</tr>
<tr>
<td>Perry Allen</td>
<td>Teacher</td>
<td>Arizona School for the Arts</td>
</tr>
<tr>
<td>Roger Angel</td>
<td>Univ. of AZ, Regents’ Prof.</td>
<td>Astronomy</td>
</tr>
<tr>
<td>Richard Applebaum</td>
<td>Univ. of California, Berkeley</td>
<td>Global &amp; International Studies</td>
</tr>
<tr>
<td>Stathis Arapostathis</td>
<td>Lecturer</td>
<td>University of Athens</td>
</tr>
<tr>
<td>Simone Arnaldi</td>
<td>University of Padua</td>
<td>CIGA</td>
</tr>
<tr>
<td>Peter Asaro</td>
<td>Rutgers, Assistant Professor</td>
<td>Philosophy</td>
</tr>
<tr>
<td>Geri Augusto</td>
<td>Brown University</td>
<td>Public Policy</td>
</tr>
<tr>
<td>Davis Baird</td>
<td>Clark University</td>
<td>Academic Affairs</td>
</tr>
<tr>
<td>Shawn Barcelona</td>
<td>Univ. of California, Berkeley</td>
<td>Center for Nanotechnology in Society</td>
</tr>
<tr>
<td><strong>Richard Barke</strong></td>
<td>Associate Professor</td>
<td>Georgia Institute of Technology</td>
</tr>
<tr>
<td>Ardeth Barnhart</td>
<td>Univ. of AZ, Co-Director</td>
<td>AZ Research Institute for Solar Energy</td>
</tr>
<tr>
<td>Indrani Barpujari</td>
<td>The Energy &amp; Resources Inst.</td>
<td>Science and Technology</td>
</tr>
<tr>
<td>Rob Barnett</td>
<td>Dir. of Envir. Systems</td>
<td>PING Inc.</td>
</tr>
<tr>
<td>Deborah Bassett</td>
<td>Univ. of WA, Dir Social Stud.</td>
<td>Workforce Development</td>
</tr>
<tr>
<td>Ottavia Bassetti</td>
<td>Board Member</td>
<td>The Bassetti Foundation</td>
</tr>
<tr>
<td>Rebecca Bates</td>
<td>AAAS Sci. &amp; Tech Pol Fellow</td>
<td>National Science Foundation</td>
</tr>
<tr>
<td>Shawn Beckman</td>
<td>Sr. V.P. Market. &amp; Strategy</td>
<td>SDC Materials</td>
</tr>
</tbody>
</table>

**Award #0937591**

Sept. 1, 2015 - Aug. 31, 2016
<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Larry Bell</td>
<td>Sr. V.P. Strategic Initiatives</td>
<td>Museum of Science</td>
</tr>
<tr>
<td>Michael Bennett</td>
<td>Professor, Law</td>
<td>Northeastern University</td>
</tr>
<tr>
<td>Frazier Benya</td>
<td>Natl. Acad. Engin., Prog. Offc.</td>
<td>Engineering, Ethics, &amp; Society</td>
</tr>
<tr>
<td>Kavita Berger</td>
<td>AAAS, Project Director</td>
<td>Science, Technology &amp; Security Policy</td>
</tr>
<tr>
<td>Robby Berloznik</td>
<td>Director</td>
<td>Flemish Institute Society &amp; Technology</td>
</tr>
<tr>
<td>Andrew R. Binder</td>
<td>NC State Univ., Asst. Prof.</td>
<td>Communication</td>
</tr>
<tr>
<td>David Bjornstad</td>
<td>UT Battelle</td>
<td>Environmental Sciences</td>
</tr>
<tr>
<td>Regina Blakey</td>
<td>Instructional Designer</td>
<td>Regina Blakey Consulting</td>
</tr>
<tr>
<td>John Bobalek</td>
<td>Dept. of Treasury, Prog. Mgr.</td>
<td>Bureau of Engraving &amp; Printing</td>
</tr>
<tr>
<td>Larry Bock</td>
<td>Chairman</td>
<td>Luxe Ventures</td>
</tr>
<tr>
<td>Jason Boehm</td>
<td>Director, Prog. Coord. Offc.</td>
<td>Natl. Inst. of Standards &amp; Technology</td>
</tr>
<tr>
<td>Marianne Boenink</td>
<td>Univ. of Twente, Lecturer</td>
<td>Philosophy</td>
</tr>
<tr>
<td>Cathy Boggs</td>
<td>Cal., Santa Barbara, Dir. Ed.</td>
<td>Center for Nanotechnology in Society</td>
</tr>
<tr>
<td>Greg Book</td>
<td>Georgia Tech, Asst. Dir.</td>
<td>Nanotechnology Research Center</td>
</tr>
<tr>
<td>Valerie Bonham</td>
<td>Executive Director</td>
<td>Pres. Comm. for Study of Bioethical Issues</td>
</tr>
<tr>
<td>Line Bonneau</td>
<td>Said Bus. School, Res. Fellow</td>
<td>Science, Innovation and Society</td>
</tr>
<tr>
<td>Jason Borenstein</td>
<td>Georgia Tech, Professor</td>
<td>Graduate Research Ethics Program</td>
</tr>
<tr>
<td>Chris Bosso</td>
<td>Northeastern University</td>
<td>Public Policy and Urban Affairs</td>
</tr>
<tr>
<td>Ann Bosstrom</td>
<td>University of Washington</td>
<td>Public Affairs</td>
</tr>
<tr>
<td>Daryl Boudreaux</td>
<td>President</td>
<td>Boudreaux and Associates</td>
</tr>
<tr>
<td>Robert Bowman</td>
<td>Queens Univ. Belfast, Dir.</td>
<td>Center for Nanostructured Media</td>
</tr>
<tr>
<td>Kevin Boyack</td>
<td>President</td>
<td>SciTech Strategies, Inc.</td>
</tr>
<tr>
<td>Timothy Boyd</td>
<td>Teacher</td>
<td>Bioscience High School</td>
</tr>
<tr>
<td>Barry Bozeman</td>
<td>Georgia, Professor</td>
<td>Public Administration &amp; Policy</td>
</tr>
<tr>
<td>Suzanne Brainard</td>
<td>Univ. of Washington, Ex. Dir.</td>
<td>Center for Workforce Development</td>
</tr>
<tr>
<td>Donald Braman</td>
<td>George Washington, Prof.</td>
<td>Law</td>
</tr>
<tr>
<td>Russell Brandon</td>
<td>Participant</td>
<td>University of Twente</td>
</tr>
<tr>
<td>Philip Brey</td>
<td>Department Chair/Professor</td>
<td>Ryley, Carlock &amp; Applewhite Attorneys</td>
</tr>
<tr>
<td>Susan Brienza</td>
<td>Shareholder</td>
<td>Physics</td>
</tr>
<tr>
<td>Sage Briggs</td>
<td>Cal.-Santa Barbara, Fin. An.</td>
<td>Sociology</td>
</tr>
<tr>
<td>Simone Browne</td>
<td>Texas-Austin, Asst. Prof.</td>
<td>Will Bruder &amp; Partners Ltd.</td>
</tr>
<tr>
<td>Will Bruder</td>
<td>President</td>
<td>Sociology and Women’s Studies</td>
</tr>
<tr>
<td>Karl Bryant</td>
<td>Cal., Santa Barbara, Asst. Pr.</td>
<td>Environmental Studies</td>
</tr>
<tr>
<td>Ava Buchanan</td>
<td>Macalester College, Teach Ast.</td>
<td>Community &amp; Economic Development</td>
</tr>
<tr>
<td>Jill Buschbacher</td>
<td>City of Phoenix, Proj. Mgr.</td>
<td>MIT SENSEable City Lab</td>
</tr>
<tr>
<td>Francesco Calabrese</td>
<td>Advisory Research</td>
<td>Odysee of the Mind</td>
</tr>
<tr>
<td>Brian Calaway</td>
<td>Program Director</td>
<td>Social &amp; Political Science</td>
</tr>
<tr>
<td>Jane Calvert</td>
<td>Edinburgh, Academic Fellow</td>
<td>Arizona Science Center</td>
</tr>
<tr>
<td>Jennifer Rei Cameron</td>
<td>Sr. Content Specialist</td>
<td>University of New Mexico</td>
</tr>
<tr>
<td>Austin Campbell Myer</td>
<td>Participant</td>
<td>Communication</td>
</tr>
<tr>
<td>Luis Campos</td>
<td>Associate Professor</td>
<td>Kolbe Corp.</td>
</tr>
<tr>
<td>Heather Canary</td>
<td>University of Utah, Asst. Prof.</td>
<td>Law</td>
</tr>
<tr>
<td>Stephanie Cantu</td>
<td>Project Coordinator</td>
<td>Organizational Performance &amp; Change</td>
</tr>
<tr>
<td>David Caudill</td>
<td>Villanova Univ., Prof. of Law</td>
<td>Molecular &amp; Cellular Biosciences</td>
</tr>
<tr>
<td>Thomas Chermack</td>
<td>Colorado, Asst. Professor</td>
<td>Planning &amp; Public Policy</td>
</tr>
<tr>
<td>Parag Chitnis</td>
<td>NSF, Deputy Div. Director</td>
<td>Political Science</td>
</tr>
<tr>
<td>Michael Chorost</td>
<td>Author</td>
<td>Arizona Science Center</td>
</tr>
<tr>
<td>Jennifer Cleary</td>
<td>Rutgers, Sr. Project Mgr.</td>
<td>Karlsruhe Institute of Technology</td>
</tr>
<tr>
<td>Michael D. Cobb</td>
<td>NCSU, Associate Professor</td>
<td></td>
</tr>
<tr>
<td>Mary Beth Cochran</td>
<td>Education Services Coord.</td>
<td></td>
</tr>
<tr>
<td>Christopher Coenen</td>
<td>Scientific Staff</td>
<td></td>
</tr>
</tbody>
</table>

Award #0937591  
Sept. 1, 2015 - Aug. 31, 2016
<table>
<thead>
<tr>
<th>Name</th>
<th>Title/Position</th>
<th>Organization/Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sarah Cohn</td>
<td>Evaluation &amp; Research Mgr.</td>
<td>Science Museum of Minnesota</td>
</tr>
<tr>
<td>Harry Collins</td>
<td>Cardiff University, Professor</td>
<td>Social Sciences</td>
</tr>
<tr>
<td>Napier Collyns</td>
<td>Co-Founder</td>
<td>Global Business Network</td>
</tr>
<tr>
<td>Joseph Conti</td>
<td>Wisconsin-Madison, Prof.</td>
<td>Sociology and Law</td>
</tr>
<tr>
<td>Craig Cormick</td>
<td>Australian Gov., Manger</td>
<td>Department of Innovation</td>
</tr>
<tr>
<td>Kevin Costa</td>
<td>Administrative Director</td>
<td>Synthetic Biology Engineering Research Ctr.</td>
</tr>
<tr>
<td>Bridget Costello</td>
<td>Children’s Museum of Phoenix, Director</td>
<td>Director of Development</td>
</tr>
<tr>
<td>Susan Cozzens</td>
<td>Georgia Tech, Asst. Dean</td>
<td>Public Policy</td>
</tr>
<tr>
<td>Kurt Creager</td>
<td>President &amp; CEO</td>
<td>Urbanist Solutions</td>
</tr>
<tr>
<td>Wendy C. Crone</td>
<td>Wisconsin, Professor</td>
<td>Engineering Physics</td>
</tr>
<tr>
<td>Stephen Crowley</td>
<td>Boise State Univ., Assoc. Prof.</td>
<td>Philosophy</td>
</tr>
<tr>
<td>Angelica Cruz</td>
<td>Co-Founder &amp; COO</td>
<td>SySTEM Schools, Inc.</td>
</tr>
<tr>
<td>Edward Cupoli</td>
<td>Chief Economist</td>
<td>SEMATECH</td>
</tr>
<tr>
<td>Sari Custer</td>
<td>Sr. Mgr. Guest Experience</td>
<td>Arizona Science Center</td>
</tr>
<tr>
<td>Michael Dahlstrom</td>
<td>Iowa State Univ., Asst. Prof.</td>
<td>Greenlee School of Journalism &amp; Comm.</td>
</tr>
<tr>
<td>Dorothy Dankel</td>
<td>Bergen, Researcher</td>
<td>Center for Study of Sciences &amp; Humanities</td>
</tr>
<tr>
<td>Marian Deblonde</td>
<td>Antwerp, Researcher</td>
<td>Environment &amp; Sustainable Development</td>
</tr>
<tr>
<td>Jason Delborne</td>
<td>Associate Professor</td>
<td>North Carolina State University</td>
</tr>
<tr>
<td>Bruna De Marchi</td>
<td>Bergen, Guest Researcher</td>
<td>Sciences &amp; the Humanities</td>
</tr>
<tr>
<td>Peter deLeon</td>
<td>Colorado, Denver, Professor</td>
<td>Public Affairs</td>
</tr>
<tr>
<td>Jeff Desroches</td>
<td>Bus. Development Manager</td>
<td>ATMI, Inc.</td>
</tr>
<tr>
<td>Terry Devitt</td>
<td>Wisconsin, Science Writer</td>
<td>Science &amp; Technology</td>
</tr>
<tr>
<td>Ricardo Dominguez</td>
<td>Calif., San Diego, Assoc. Prof.</td>
<td>Visual Arts</td>
</tr>
<tr>
<td>Heather Douglas</td>
<td>Univ. of Waterloo, Assoc. Prof.</td>
<td>Philosophy</td>
</tr>
<tr>
<td>Robin Downey</td>
<td>Genomics &amp; Society Advisor</td>
<td>Genome British Columbia</td>
</tr>
<tr>
<td>Fanie Duvenhughe</td>
<td>Manager</td>
<td>Microchip</td>
</tr>
<tr>
<td>Jake Dunagan</td>
<td>Research Director</td>
<td>Institute for the Future</td>
</tr>
<tr>
<td>Sharon Dunwoodsy</td>
<td>Wisconsin, Professor</td>
<td>Journalism &amp; Mass Communication</td>
</tr>
<tr>
<td>Darrin Durant</td>
<td>York University, Asst. Prof.</td>
<td>Science and Technology Studies</td>
</tr>
<tr>
<td>Kevin Dwyer</td>
<td>Sundt Construction, Inc.</td>
<td>Senior Paralegal</td>
</tr>
<tr>
<td>Kathleen Eggleson</td>
<td>Notre Dame, Res. Scientist</td>
<td>Science &amp; Technology</td>
</tr>
<tr>
<td>Ken Eklund</td>
<td>Serious Game Designer</td>
<td>Game Designer</td>
</tr>
<tr>
<td>Shirin Elahi</td>
<td>Scenario Architect</td>
<td>Complex Global Risks</td>
</tr>
<tr>
<td>Kirsten Ellenbogen</td>
<td>Sr. Dir. Lifelong Learning</td>
<td>Science Museum of Minnesota</td>
</tr>
<tr>
<td>Kevin Elliott</td>
<td>South Carolina, Assoc. Prof.</td>
<td>Philosophy</td>
</tr>
<tr>
<td>Robert Evans</td>
<td>Cardiff Univ., Reader</td>
<td>Social Sciences</td>
</tr>
<tr>
<td>Jose Faria</td>
<td>Unicamp, Professor</td>
<td>Medicine</td>
</tr>
<tr>
<td>Elizabeth Farrell</td>
<td>New Hampshire, Coord.</td>
<td>Culture &amp; Sustainability, Food &amp; Society</td>
</tr>
<tr>
<td>Leili Fatehi</td>
<td>Minnestoa, Adj. Assoc. Prof.</td>
<td>Law</td>
</tr>
<tr>
<td>James Faubion</td>
<td>Rice, Professor</td>
<td>Anthropology</td>
</tr>
<tr>
<td>Art Felsinger</td>
<td>Independent Professional</td>
<td>Social Studies of Science</td>
</tr>
<tr>
<td>Ulrike Felt</td>
<td>Univ. of Vienna, Professor</td>
<td>University of Calgary</td>
</tr>
<tr>
<td>Patrick Feng</td>
<td>Assistant Professor</td>
<td>Public Policy</td>
</tr>
<tr>
<td>A. Fernandez-Ribas</td>
<td>Georgia Tech</td>
<td>Research &amp; Evaluation</td>
</tr>
<tr>
<td>Aaron Fichtner</td>
<td>Rutgers, Director</td>
<td>Institute of Technology Assessment</td>
</tr>
<tr>
<td>Ulrich Fiedeler</td>
<td>Austrian Academy of Science</td>
<td>Nanotechnology</td>
</tr>
<tr>
<td>Guillermo Foladori</td>
<td>Universidad de Zacatecas</td>
<td>Karlsruhe Institute of Technology</td>
</tr>
<tr>
<td>Torsten Fleischer</td>
<td>Deputy Head of Research</td>
<td>Nanotechnology</td>
</tr>
<tr>
<td>Guillermo Foladori</td>
<td>Universidad de Zacatecas</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Position</td>
<td>Institution</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------------------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>Rider Foley</td>
<td>Assistant Professor</td>
<td>University of Virginia</td>
</tr>
<tr>
<td>John Fortner</td>
<td></td>
<td>Engineering</td>
</tr>
<tr>
<td>Sharon Friedman</td>
<td></td>
<td>Journalism &amp; Communication</td>
</tr>
<tr>
<td>Roberto Frietz</td>
<td>Participant</td>
<td>ESRC Genomics Forum</td>
</tr>
<tr>
<td>Emma Frow</td>
<td></td>
<td>Earth Science Division, Applied Science Prog.</td>
</tr>
<tr>
<td>Teresa Fryberger</td>
<td></td>
<td>Protection &amp; Security of the Citizen</td>
</tr>
<tr>
<td>Silvio Funtowicz</td>
<td></td>
<td>Sociology</td>
</tr>
<tr>
<td>Joan Fujimura</td>
<td></td>
<td>Psychology</td>
</tr>
<tr>
<td>Wayne Fuqua</td>
<td></td>
<td>Science and Technology Institute</td>
</tr>
<tr>
<td>Jason Gallo</td>
<td>Researcher</td>
<td>Technical University of Darmstadt</td>
</tr>
<tr>
<td>Stefan Gammel</td>
<td></td>
<td>Exploratorium</td>
</tr>
<tr>
<td>Veronica Garcia Luis</td>
<td>Research Associate</td>
<td>Sociology</td>
</tr>
<tr>
<td>Hans Glimell</td>
<td>Gothenburg, Professor</td>
<td>Millieu &amp; Technologieman</td>
</tr>
<tr>
<td>Jean Goodwin</td>
<td>Iowa State Univ., Assoc. Prof.</td>
<td>Science, Technology and Society</td>
</tr>
<tr>
<td>Lieve Goorden</td>
<td>Antwerpen, Professor</td>
<td>Reilly Center</td>
</tr>
<tr>
<td>Michael Gorman</td>
<td>Virginia, Professor</td>
<td>Management</td>
</tr>
<tr>
<td>Melinda Gormley</td>
<td>Notre Dame, Asst. Dir. Res.</td>
<td>Political &amp; Social Research</td>
</tr>
<tr>
<td>Stuart Graham</td>
<td>Georgia Tech, Professor</td>
<td>Politics &amp; Global Studies</td>
</tr>
<tr>
<td>Peter Granda</td>
<td>Univ. of Michigan, Asst. Dir.</td>
<td>Practical Action</td>
</tr>
<tr>
<td>Gisela Grant</td>
<td>Internship Coordinator</td>
<td>LARSIM Laboratory</td>
</tr>
<tr>
<td>David Grimshaw</td>
<td>Head of International Prog.</td>
<td>Engineering Professional Development</td>
</tr>
<tr>
<td>Alexei Grinbaum</td>
<td>CEA-Saclay, Researcher</td>
<td>Sociology &amp; Political Science</td>
</tr>
<tr>
<td>Laura Grossenbacher</td>
<td>Wisconsin, Assoc. Professor</td>
<td>Adjunct Professor</td>
</tr>
<tr>
<td>Julia Guivant</td>
<td>Fed. Santa Catarina, Prof.</td>
<td>Human Ecology</td>
</tr>
<tr>
<td>William Guschwan</td>
<td>Columbia College Chicago</td>
<td>Science, Technology &amp; Society</td>
</tr>
<tr>
<td>William Hallman</td>
<td>Rutgers, Professor/Chair</td>
<td>Science Museum of Minnesota</td>
</tr>
<tr>
<td>Patrick Hamlett</td>
<td>NCSU, Associate Professor</td>
<td>Management, Politics and Philosophy</td>
</tr>
<tr>
<td>Shari Hartshorn</td>
<td>Program Manager</td>
<td>Research Council of Norway</td>
</tr>
<tr>
<td>Birgitte G. Hansen</td>
<td>Copenhagen Business School</td>
<td>Research Inst. For Sustainability Science</td>
</tr>
<tr>
<td>Anders Hanssen</td>
<td>Executive Officer</td>
<td></td>
</tr>
<tr>
<td>Keishiro Hara</td>
<td>Osaka, Assoc. Professor</td>
<td></td>
</tr>
<tr>
<td>Elizabeth Harper</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Krista Harper</td>
<td>UMass Amherst, Assoc. Prof.</td>
<td>Anthropology and Public Policy</td>
</tr>
<tr>
<td>Gary Harris</td>
<td>Howard Univ., Professor</td>
<td>Electrical &amp; Computer Engineering</td>
</tr>
<tr>
<td>Jim Harris</td>
<td>Vice President Bus. Develop.</td>
<td>Translational Genomics Research Institute</td>
</tr>
<tr>
<td>Matthew Harsh</td>
<td></td>
<td>Concordia University</td>
</tr>
<tr>
<td>Barbara Harthorn</td>
<td></td>
<td>Director, CNS-UCSB</td>
</tr>
<tr>
<td>David Hartmorn</td>
<td></td>
<td>Sociology</td>
</tr>
<tr>
<td>Michael Hawksworth</td>
<td></td>
<td>Mesa Community College</td>
</tr>
<tr>
<td>Paul Hickey</td>
<td>Systems Administrator</td>
<td>Public Policy</td>
</tr>
<tr>
<td>Diana Hicks</td>
<td>Georgia Tech, Professor</td>
<td>Science &amp; Technology Studies</td>
</tr>
<tr>
<td>Stephen Hilgartner</td>
<td>Cornell University, Professor</td>
<td>Describe, LLC.</td>
</tr>
<tr>
<td>Sharon Hill</td>
<td>Founder</td>
<td>Medical History &amp; Bioethics</td>
</tr>
<tr>
<td>Linda Hogle</td>
<td>Wisconsin, Associate Professor</td>
<td>Philosophy</td>
</tr>
<tr>
<td>Britt Holbrook</td>
<td>Univ. North Texas, Asst. Prof.</td>
<td>Office of the Under Secretary for Science</td>
</tr>
<tr>
<td>Michael Holland</td>
<td>DOE, Sr. Advis. &amp; Staff Dir.</td>
<td>National Academy of Engineering</td>
</tr>
<tr>
<td>Rachelle Hollander</td>
<td>Executive Director</td>
<td>Policy &amp; Philosophy</td>
</tr>
<tr>
<td>Maja Horst</td>
<td>University of Copenhagen</td>
<td>Science Museum of Minnesota</td>
</tr>
<tr>
<td>Leigha Horton</td>
<td>Presenter</td>
<td>Economics</td>
</tr>
<tr>
<td>Maurizio Iacopetta</td>
<td>Georgia Tech, Assistant Prof.</td>
<td>Planning, Policy, and Design</td>
</tr>
<tr>
<td>Helen Ingram</td>
<td>California-Irvine, Professor</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Position/Role</td>
<td>Institution/Sector</td>
</tr>
<tr>
<td>---------------------------</td>
<td>--------------------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>Jennifer Iriye</td>
<td>Guest Exper. Prog. Interpret.</td>
<td>Arizona Science Center</td>
</tr>
<tr>
<td>Alan Irwin</td>
<td>Program Manager, ERC</td>
<td>Research</td>
</tr>
<tr>
<td>Deborah Jackson</td>
<td>Harvard University, Professor</td>
<td>Prog. National Science Foundation</td>
</tr>
<tr>
<td>Mitchell Joachim</td>
<td>Co-Founder</td>
<td>Science &amp; Technologies Studies</td>
</tr>
<tr>
<td>Mikael Johansson</td>
<td>Gothenburg Univ., Lecturer</td>
<td>Planetary ONE</td>
</tr>
<tr>
<td>Deborah Johnson</td>
<td>Virginia, Professor</td>
<td>Global Studies</td>
</tr>
<tr>
<td>Marilyn Johnson</td>
<td>Oregon Mus. Sci. &amp; Industry</td>
<td>Science, Technology &amp; Society</td>
</tr>
<tr>
<td>Travis Johnson</td>
<td>Scientist</td>
<td>Science Director</td>
</tr>
<tr>
<td><strong>Kevin Jones</strong></td>
<td><strong>Research Fellow</strong></td>
<td><strong>Resource Economics/Environ. Sociology</strong></td>
</tr>
<tr>
<td>Arlena Jung</td>
<td><strong>Research Fellow</strong></td>
<td><strong>Research Center Berlin</strong></td>
</tr>
<tr>
<td>Michele Kadnar</td>
<td>Research Fellow</td>
<td>National Institutes of Health</td>
</tr>
<tr>
<td>Dan M. Kahan</td>
<td>Yale, Professor</td>
<td>Law</td>
</tr>
<tr>
<td>Seth Kahn</td>
<td>Associate Professor, English</td>
<td>West Chester Pennsylvania</td>
</tr>
<tr>
<td>Michael Kalichman</td>
<td>Cal., San Diego, Director</td>
<td>Ethics &amp; Science in Technology</td>
</tr>
<tr>
<td>Amy Kaminski</td>
<td>NASA, Senior Policy Advisor</td>
<td>Officer of the Chief Scientist</td>
</tr>
<tr>
<td><strong>Chernor Kantora</strong></td>
<td><strong>Participant</strong></td>
<td></td>
</tr>
<tr>
<td>Brad Keelor</td>
<td>Sr. Sci. &amp; Inn. Policy Advisor</td>
<td>British Embassy</td>
</tr>
<tr>
<td>Thomas Kelly</td>
<td>New Hampshire, Professor</td>
<td>Office of Sustainability</td>
</tr>
<tr>
<td>Denis Kera</td>
<td>Assistant Professor</td>
<td>National University of Singapore</td>
</tr>
<tr>
<td>George Khusf</td>
<td>Univ. South Carolina, Dir.</td>
<td>Center for Bioethics</td>
</tr>
<tr>
<td>Matt Kim</td>
<td>Founder and President</td>
<td>QuantTera</td>
</tr>
<tr>
<td>Tammy Kinsey</td>
<td>Toledo, Associate Professor</td>
<td>Film</td>
</tr>
<tr>
<td>Kamilla Kjolberg</td>
<td>Bergen, Research Fellow</td>
<td>Study of the Sciences and Humanities</td>
</tr>
<tr>
<td>Frederick Klaessig</td>
<td>Manager</td>
<td>Pennsylvania Bio Nano Systems LLC.</td>
</tr>
<tr>
<td>Richard Klavans</td>
<td>President</td>
<td>SciTech Strategies Inc.</td>
</tr>
<tr>
<td>Daniel Kleinman</td>
<td>Wisconsin, Professor</td>
<td>Rural Sociology</td>
</tr>
<tr>
<td>Mark Knell</td>
<td>Norwegian Institute</td>
<td>Chemistry</td>
</tr>
<tr>
<td>Joan Koerber-Walker</td>
<td>Pres. &amp; Chief Exec. Officer</td>
<td>Arizona Bioindustry Association</td>
</tr>
<tr>
<td>Shinichi Kobayashi</td>
<td>Assistant Professor</td>
<td>Nagoya University</td>
</tr>
<tr>
<td><strong>Kathy Kolbe</strong></td>
<td><strong>Chairman, Chief Creative Ofc.</strong></td>
<td><strong>Kolbe Corp.</strong></td>
</tr>
<tr>
<td>Kornelia Konrad</td>
<td>Univ. of Twente, Asst. Prof.</td>
<td>Science, Technology, &amp; Policy Studies</td>
</tr>
<tr>
<td>Margaret Kosal</td>
<td>GA Tech, Asst. Professor</td>
<td>International Strategy, Technology &amp; Policy</td>
</tr>
<tr>
<td>Fred Kronz</td>
<td>Prog. Dir., Sci., Tech. &amp; Soc.</td>
<td>National Science Foundation</td>
</tr>
<tr>
<td>Kristen Kulinowski</td>
<td>Research Staff Member</td>
<td>Science &amp; Technology Policy Institute</td>
</tr>
<tr>
<td>Elizabeth K. Kullman</td>
<td>Sen. Res. &amp; Eval. Associate</td>
<td>Museum of Science, Boston</td>
</tr>
<tr>
<td>Ray Kurzweil</td>
<td>Author</td>
<td>Science</td>
</tr>
<tr>
<td>Frank Kusiak</td>
<td>California-Berkeley</td>
<td><strong>Public Affairs</strong></td>
</tr>
<tr>
<td><strong>Jennifer Kuzma</strong></td>
<td><strong>Minnesota, Assoc. Professor</strong></td>
<td>Cancer Research &amp; Molecular Medicine</td>
</tr>
<tr>
<td>Astrid Lagreid</td>
<td>Norwegian Univ. Sci. &amp; Tech.</td>
<td><strong>International Studies</strong></td>
</tr>
<tr>
<td>Frank Laird</td>
<td>Colorado, Professor</td>
<td><strong>Law</strong></td>
</tr>
<tr>
<td>Lewis Laska</td>
<td>Tenn. State Univ., Professor</td>
<td><strong>Research Councils UK</strong></td>
</tr>
<tr>
<td>Ruth Lee</td>
<td>Director</td>
<td>Oak Ridge National Laboratory</td>
</tr>
<tr>
<td>Christopher Lenhardt</td>
<td>UT-Battelle, DAAC Sci. Lead</td>
<td>Cambridge Public Health Department</td>
</tr>
<tr>
<td>Sam Lipson</td>
<td>Director of Envr. Health</td>
<td>Natl. Inst. of Standards &amp; Technology</td>
</tr>
<tr>
<td>Laurie Locascio</td>
<td>Chief, Biochemical Sci. Div.</td>
<td><strong>Science Museum of Minnesota</strong></td>
</tr>
<tr>
<td><strong>Stephanie Long</strong></td>
<td><strong>Mgr., Public Prog. &amp; Science</strong></td>
<td>Electrical &amp; Computer Engineering</td>
</tr>
<tr>
<td>Michael Loui</td>
<td>Illinois, Urb.-Cham., Prof.</td>
<td>Electrical Engineering &amp; Computer Science</td>
</tr>
<tr>
<td>Michael Lynch</td>
<td>Cornell, Professor</td>
<td>Chandler City Government</td>
</tr>
<tr>
<td>Christine MacKay</td>
<td>Dir. of Economic Develop.</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Institution</td>
<td>Department</td>
</tr>
<tr>
<td>-----------------------</td>
<td>----------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Phil Macnaghten</td>
<td>Durham University</td>
<td>Geography</td>
</tr>
<tr>
<td>Roop Mahajan</td>
<td>Virginia Tech</td>
<td>Critical Technology &amp; Applied Science</td>
</tr>
<tr>
<td>Farzad Mahootian</td>
<td>New York Univ.</td>
<td>Global Liberal Studies</td>
</tr>
<tr>
<td>Jim Malone</td>
<td>University</td>
<td>Private Practice</td>
</tr>
<tr>
<td>Mike Manasco</td>
<td>Project Manager</td>
<td>Heliae</td>
</tr>
<tr>
<td>William Mansfield</td>
<td>Penn State, Dir. of Operations</td>
<td>NNIN Materials Research Institute</td>
</tr>
<tr>
<td>Paul Martin</td>
<td>Sr. V.P. Science Learning</td>
<td>Science Museum of Minnesota</td>
</tr>
<tr>
<td>Christina Matta</td>
<td>Wisconsin, Asst. Fac. Assoc.</td>
<td>Engineering Professional Development</td>
</tr>
<tr>
<td>Andrew Maynard</td>
<td>Univ. of Michigan, Director</td>
<td>Risk Science Center</td>
</tr>
<tr>
<td>Catherine McCarthy</td>
<td>Project Leader</td>
<td>Science Museum of Minnesota</td>
</tr>
<tr>
<td>Heather Mayfield</td>
<td>Deputy Director</td>
<td>London Science Museum</td>
</tr>
<tr>
<td>Catherine McCarthy</td>
<td>Project Leader</td>
<td>Science Museum of Minnesota</td>
</tr>
<tr>
<td>Katherine McComas</td>
<td>Cornell, Associate Professor</td>
<td>Communication</td>
</tr>
<tr>
<td>David McConville</td>
<td>Director, Noospheric Res.</td>
<td>The Elumenati, LLC.</td>
</tr>
<tr>
<td>Patrick McCray</td>
<td>UC Santa Barbara, Professor</td>
<td>History</td>
</tr>
<tr>
<td>Jamie McEvoy</td>
<td>Montana State, Asst. Prof.</td>
<td>Geography</td>
</tr>
<tr>
<td>Robert McGinn</td>
<td>Stanford, Professor</td>
<td>Science, Technology, &amp; Society</td>
</tr>
<tr>
<td>Alan McGowan</td>
<td>Eugene Lang, Adjunct. Fac.</td>
<td>New School for Liberal Arts</td>
</tr>
<tr>
<td>Sheila McNamee</td>
<td>New Hampshire, Professor</td>
<td>Communication</td>
</tr>
<tr>
<td>James McShea</td>
<td>Osher Lifelong Learning</td>
<td>Semi-Conductor Research Corporation</td>
</tr>
<tr>
<td>Celia Merzbacher</td>
<td>Vice President</td>
<td>Semi-Conductor Research Corporation</td>
</tr>
<tr>
<td>Robert Melikian</td>
<td>Author</td>
<td>Genome British Columbia</td>
</tr>
<tr>
<td>Celia Merzbacher</td>
<td>Vice President</td>
<td>New York University</td>
</tr>
<tr>
<td>Pierre Meuliern</td>
<td>President and CEO</td>
<td>English and Science &amp; Technology Studies</td>
</tr>
<tr>
<td>Evan Michelson</td>
<td>Senior Research Associate</td>
<td>Urban Studies &amp; Planning</td>
</tr>
<tr>
<td>Colin Milburn</td>
<td>Cal.-Davis., Assoc. Professor</td>
<td>Physician Services Group</td>
</tr>
<tr>
<td>Thaddeus Miller</td>
<td>Portland State Univ, Asst Prof.</td>
<td>Liberal Arts &amp; International Studies</td>
</tr>
<tr>
<td>Robert J. Milligan</td>
<td>Physician</td>
<td>History</td>
</tr>
<tr>
<td>Carl Mitcham</td>
<td>CO School of Mines, Prof.</td>
<td>University of Nottingham</td>
</tr>
<tr>
<td>Cyrus Mody</td>
<td>Rice University, Asst. Prof.</td>
<td>Woodrow Wilson Center</td>
</tr>
<tr>
<td>Alison Mohr</td>
<td>Senior Research Fellow</td>
<td>Architecture &amp; Planning</td>
</tr>
<tr>
<td>Julia A. Moore</td>
<td>Deputy Director</td>
<td>Arizona Science Center</td>
</tr>
<tr>
<td>Steven Moore</td>
<td>Texas at Austin, Professor</td>
<td>Nanotechnology Research Program</td>
</tr>
<tr>
<td>Sharon Montgomery</td>
<td>Osher Lifelong Learning</td>
<td>Port Discovery</td>
</tr>
<tr>
<td>Sarah Moratto</td>
<td>Gallery Interpreter</td>
<td>Senior Scientist, Dept. of Management</td>
</tr>
<tr>
<td>Jeffery Morris</td>
<td>EPA, Natl. Program Director</td>
<td>Intelligent Info. Services Group</td>
</tr>
<tr>
<td>Nora Moynihan</td>
<td>Comm. Partnerships Coord.</td>
<td>Center for Biosafety</td>
</tr>
<tr>
<td>Maj Munch-Andersen</td>
<td>Technical Univ. of Denmark</td>
<td></td>
</tr>
<tr>
<td>Webb Myers</td>
<td>STIP Associate</td>
<td></td>
</tr>
<tr>
<td>Anne I. Myhr</td>
<td>Genok, Scientist</td>
<td></td>
</tr>
<tr>
<td>Dan Nagle</td>
<td>Participant</td>
<td></td>
</tr>
<tr>
<td>Sari Nagle</td>
<td>Participant</td>
<td></td>
</tr>
<tr>
<td>Kenneth Nealson</td>
<td>Southern California, Prof.</td>
<td>Environmental Studies</td>
</tr>
<tr>
<td>Alan Nelson</td>
<td>Director</td>
<td>Biodesign Institute</td>
</tr>
<tr>
<td>Richard Nelson</td>
<td>Columbia University, Professor</td>
<td>Economics</td>
</tr>
<tr>
<td>Chris Newfield</td>
<td>Cal., Santa Barbara, Prof.</td>
<td>English</td>
</tr>
<tr>
<td>Dean Nieusma</td>
<td>Rensselaer Poly. Inst., Prof.</td>
<td>Science &amp; Technology Studies</td>
</tr>
<tr>
<td>Alfred Nordmann</td>
<td>Darmstadt Tech. Univ., Prof.</td>
<td>Philosophy</td>
</tr>
<tr>
<td>Rune Nydal</td>
<td>Norwegian Univ., Associate</td>
<td>Science &amp; Technology</td>
</tr>
<tr>
<td>Eva Olivas</td>
<td>CEO</td>
<td>Phoenix Revitalization Corporation</td>
</tr>
<tr>
<td>Rosemary Ommer</td>
<td>Adjunct Professor</td>
<td>University of Victoria</td>
</tr>
<tr>
<td>Name</td>
<td>Position</td>
<td>Institution</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------------------------------------</td>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>Rae Ostman</td>
<td>National Collab., Director</td>
<td>Sciencenter</td>
</tr>
<tr>
<td>Michael O’Rourke</td>
<td>Michigan State Univ., Prof.</td>
<td>Philosophy</td>
</tr>
<tr>
<td>Kelli O’Toole</td>
<td>Vice President of Operations</td>
<td>Children’s Museum of Phoenix</td>
</tr>
<tr>
<td>Gwen Ottinger</td>
<td>Assistant Professor</td>
<td>Drexel University</td>
</tr>
<tr>
<td>Richard Owen</td>
<td>University of Exeter, Prof.</td>
<td>Business</td>
</tr>
<tr>
<td>Lynn Palacios</td>
<td>Teacher</td>
<td>Bioscience High School</td>
</tr>
<tr>
<td>Krsto Pandza</td>
<td>Leeds Univ., Senior Lecturer Participant</td>
<td>Business</td>
</tr>
<tr>
<td>Michael O’Rourke</td>
<td>Michigan, Assistant Professor</td>
<td>Public Policy</td>
</tr>
<tr>
<td>Tanuja Parulekar</td>
<td>Professor</td>
<td>S.I.W.S. N.R. Swamy College</td>
</tr>
<tr>
<td>Scott Patison</td>
<td>Research &amp; Evaluation Assoc.</td>
<td>Oregon Museum of Science &amp; Industry</td>
</tr>
<tr>
<td>Eleonore Pauwels</td>
<td>Research Scholar</td>
<td>Woodrow Wilson Center</td>
</tr>
<tr>
<td>Alice Pawley</td>
<td>Assistant Professor</td>
<td>Purdue University</td>
</tr>
<tr>
<td>Tim Person</td>
<td>Chief Scientist</td>
<td>U.S. Gov. Accountability Office</td>
</tr>
<tr>
<td>James Petzel</td>
<td>Osher Lifelong Learning</td>
<td>Wisconsin, Madison</td>
</tr>
<tr>
<td>Sarah Pfatteicher</td>
<td>Assistant Dean</td>
<td>Inst. Tech. Assessment &amp; Sys. Analysis</td>
</tr>
<tr>
<td>Simon Pfersdorf</td>
<td>Karlsruhe, Researcher</td>
<td>Environmental Studies</td>
</tr>
<tr>
<td>Roopali Phadke</td>
<td>Macalester College, Assoc Prof</td>
<td>Research and Commercialization</td>
</tr>
<tr>
<td>Robin Phelps</td>
<td>University of Central Florida</td>
<td>Public Policy</td>
</tr>
<tr>
<td>Mark Philbrick</td>
<td>California-Berkeley</td>
<td>Psychology</td>
</tr>
<tr>
<td>Nicholas Pidgeon</td>
<td>Cardiff University, Professor</td>
<td>Environmental Studies</td>
</tr>
<tr>
<td>Roger Pielke, Jr.</td>
<td>Colorado, Professor</td>
<td>Snell &amp; Wilmer Law</td>
</tr>
<tr>
<td>Cynthia Pillote</td>
<td>Partner</td>
<td>Religious Studies</td>
</tr>
<tr>
<td>Kenneth Pimple</td>
<td>Indiana, Professor</td>
<td>Center for Knowledge Integration</td>
</tr>
<tr>
<td>Kathryn Plaisance</td>
<td>Univ. of Waterloo, Asst. Prof.</td>
<td>Medtronic</td>
</tr>
<tr>
<td>Sylvia Planer</td>
<td>Test Engineer</td>
<td>Natl. Inst. for Standards &amp; Technology</td>
</tr>
<tr>
<td>Anne Plant</td>
<td>Grp. Ldr., Biochem. Sci. Div.</td>
<td>ISYE &amp; Public Policy</td>
</tr>
<tr>
<td>Alan Porter</td>
<td>Participant</td>
<td>Law</td>
</tr>
<tr>
<td>Channel Powe</td>
<td>Participant</td>
<td>Communication</td>
</tr>
<tr>
<td>Scott Powell</td>
<td>Participant</td>
<td>Ethics &amp; Political Philosophy</td>
</tr>
<tr>
<td>Nicolette Priaulx</td>
<td>Cardiff University, Reader</td>
<td>Social Cultural Anthropology</td>
</tr>
<tr>
<td>Susanna Priest</td>
<td>George Mason Univ., Prof.</td>
<td>SETI Institute</td>
</tr>
<tr>
<td>R. Queralto Moreno</td>
<td>Univ. of Seville, Professor</td>
<td>Community Research Network</td>
</tr>
<tr>
<td>Paul Rabinow</td>
<td>California, Berkeley, Prof.</td>
<td>Meridian Institute</td>
</tr>
<tr>
<td>Margaret Race</td>
<td>Senior Research Scientist</td>
<td>Manchester Business School</td>
</tr>
<tr>
<td>Khan Rahi</td>
<td>Loka Institute, Staff</td>
<td></td>
</tr>
<tr>
<td>Rex Raimond</td>
<td>Sr. Mediator &amp; Prog. Mgr.</td>
<td></td>
</tr>
<tr>
<td>Sally Randles</td>
<td>Manchester, Sr. Res. Fellow</td>
<td></td>
</tr>
<tr>
<td>Carolyn Raper</td>
<td>Participant</td>
<td></td>
</tr>
<tr>
<td>Ted Raper</td>
<td>Participant</td>
<td></td>
</tr>
<tr>
<td>Kelly Rawlings</td>
<td>Univ. of South Calif, Asst Prof</td>
<td>Sol Price School of Public Policy</td>
</tr>
<tr>
<td>Steve Rayner</td>
<td>Said Bus. Sch., Dir. &amp; Prof.</td>
<td>Institute for Science, Innovation &amp; Society</td>
</tr>
<tr>
<td>Christine Reich</td>
<td>Assistant Director</td>
<td>Museum of Science</td>
</tr>
<tr>
<td>David Rejeski</td>
<td>Director, Sci. &amp; Tech. Inn.</td>
<td>Woodrow Wilson Center</td>
</tr>
<tr>
<td>Bob Reuss</td>
<td>Independent Consultant</td>
<td></td>
</tr>
<tr>
<td>Tracy Rexroat</td>
<td>State Sup. Engin./Manufact.</td>
<td>AZ Department of Education</td>
</tr>
<tr>
<td>Arie Rip</td>
<td>Univ. of Twente, Professor</td>
<td>Science &amp; Technology Studies</td>
</tr>
<tr>
<td>Melanie Roberts</td>
<td>Director</td>
<td>Emerging Leaders in Science &amp; Society</td>
</tr>
<tr>
<td>Mark Robinson</td>
<td>Assistant Professor</td>
<td>DePaul University</td>
</tr>
<tr>
<td>Name</td>
<td>Title</td>
<td>Organization</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>--------------------------------------------</td>
<td>---------------------------------------------------</td>
</tr>
<tr>
<td>Hannot Rodriguez</td>
<td>Assistant Professor</td>
<td>University of Basque Country</td>
</tr>
<tr>
<td>David Roessner</td>
<td>Associate Director</td>
<td>SRI International</td>
</tr>
<tr>
<td>Juan Rogers</td>
<td>Georgia Tech, Assoc. Prof.</td>
<td>Public Policy</td>
</tr>
<tr>
<td>J. Rogers-Brown</td>
<td>Long Island Univ., Asst. Prof.</td>
<td>Sociology &amp; Anthropology</td>
</tr>
<tr>
<td>Laura Rogers</td>
<td>Participant</td>
<td>Will Bruder &amp; Partners Ltd.</td>
</tr>
<tr>
<td>Louise Roman</td>
<td></td>
<td>Centre for Science</td>
</tr>
<tr>
<td>Kjetil Rommetveit</td>
<td>Assistant to President</td>
<td>International Futures</td>
</tr>
<tr>
<td>Dale Rothman</td>
<td>Uniu. of Bergen, Researcher</td>
<td>Georgetown Univ. Law Ctr.</td>
</tr>
<tr>
<td>Alan Rubel</td>
<td>Denver, Assoc. Prof.</td>
<td>CIGA</td>
</tr>
<tr>
<td>Daniele Ruggiu</td>
<td>Greenwall Fellow</td>
<td>Gallagher &amp; Kennedy</td>
</tr>
<tr>
<td>Chuck Runyan</td>
<td>Uniu. of Padua, Res. Fellow</td>
<td></td>
</tr>
<tr>
<td>Terry Ryan</td>
<td>Participant</td>
<td></td>
</tr>
<tr>
<td>Ana Salazar</td>
<td>Participant</td>
<td>SRI International</td>
</tr>
<tr>
<td>Tina Sanford</td>
<td>Educational Researcher</td>
<td>Life Sciences Communication</td>
</tr>
<tr>
<td>Dietram Scheufele</td>
<td>Wisconsin, Professor</td>
<td>Science, Technology &amp; Society</td>
</tr>
<tr>
<td>Erich Schienke</td>
<td>Penn State, Asst. Professor</td>
<td>Liberal Arts &amp; International Studies</td>
</tr>
<tr>
<td>Phil Schmidt</td>
<td>Participant</td>
<td>Arizona Technology Council</td>
</tr>
<tr>
<td>Jennifer Schneider</td>
<td>CO Schl. of Mines, Asst. Prof.</td>
<td>Inst. for Ecological Economy Research</td>
</tr>
<tr>
<td>Ronald J. Schott</td>
<td>Executive Emeritus</td>
<td>Arizona Technology Council</td>
</tr>
<tr>
<td>Gerd Scholl</td>
<td>Economist</td>
<td></td>
</tr>
<tr>
<td>Ronald J. Schott</td>
<td>Executive Emeritus</td>
<td></td>
</tr>
<tr>
<td>Daan Schuurbers</td>
<td>Radboud Univ., Project Mgr.</td>
<td>Center for Society &amp; Genomics</td>
</tr>
<tr>
<td>Astrid Schwarz</td>
<td>Univ. of Basel, Assoc. Res.</td>
<td>Science Research</td>
</tr>
<tr>
<td>Claudia Schwarz</td>
<td>Univ. of Vienna, Researcher</td>
<td>Social Studies of Science</td>
</tr>
<tr>
<td>Dan Scott</td>
<td>Montana, Director</td>
<td>Ethics &amp; Public Affairs</td>
</tr>
<tr>
<td>Franz Seifert</td>
<td>Univ. of Vienna, Professor</td>
<td>Anthropology</td>
</tr>
<tr>
<td>Stefanie Seitz</td>
<td>Karlsruhe, Research Fellow</td>
<td>Institut. Tech. Assessment &amp; Sys. Analysis</td>
</tr>
<tr>
<td>John Selsky</td>
<td>Univ. South Fl., Assoc. Prof.</td>
<td>Management</td>
</tr>
<tr>
<td>Meena Selvakumar</td>
<td>Director</td>
<td>Pacific Science Center</td>
</tr>
<tr>
<td>Chris Sequeira</td>
<td>FAA, Envr. Program Mgr.</td>
<td>Environment &amp; Energy</td>
</tr>
<tr>
<td>Philip Shapira</td>
<td>Georgia Tech, Professor</td>
<td>Public Policy</td>
</tr>
<tr>
<td>Mark Shapiro</td>
<td>Ctr for Investigative Journalism</td>
<td>New Haven Independent</td>
</tr>
<tr>
<td>Gwyneth Shaw</td>
<td>Writer</td>
<td>Life Sciences Communication</td>
</tr>
<tr>
<td>Bret Shaw</td>
<td>UW-Madison, Asst. Prof.</td>
<td>Arizona Science Center</td>
</tr>
<tr>
<td>Joshua Sheehan</td>
<td>Sr. Mgr. Guest Experience</td>
<td>Arizona Commerce Authority</td>
</tr>
<tr>
<td>Brian Sherman</td>
<td>Managing Dir./VP Bus. Dev.</td>
<td>BrasEq</td>
</tr>
<tr>
<td>Tania Shibata</td>
<td>Product Application Manager</td>
<td>Information Studies</td>
</tr>
<tr>
<td>Katherine Shilton</td>
<td>Maryland, Assistant Professor</td>
<td></td>
</tr>
<tr>
<td>Sharon Shindel</td>
<td>Participant</td>
<td></td>
</tr>
<tr>
<td>Veekas Shrivastava</td>
<td>University of Exeter, Lecturer</td>
<td></td>
</tr>
<tr>
<td>Elena Simakova</td>
<td>Program Manager, Forum</td>
<td></td>
</tr>
<tr>
<td>David Sittenfeld</td>
<td>Univ. of Bergen, Assoc. Prof.</td>
<td></td>
</tr>
<tr>
<td>Rasmus Slaatelid</td>
<td>Carnegie Mellon, Professor</td>
<td></td>
</tr>
<tr>
<td>Mitchell Small</td>
<td>Tech. Development Specialist</td>
<td></td>
</tr>
<tr>
<td>Alex Smith</td>
<td>Program Director</td>
<td></td>
</tr>
<tr>
<td>Laurel Smith-Doerr</td>
<td>Cert. Mgmt. Consul./Partner</td>
<td></td>
</tr>
<tr>
<td>James Soudriette</td>
<td>Principal &amp; Sr. Vice Pres.</td>
<td></td>
</tr>
<tr>
<td>Ahmad Soueid</td>
<td>Associate Director</td>
<td></td>
</tr>
<tr>
<td>Kayte Spector-Bagdady</td>
<td>Production Manager</td>
<td></td>
</tr>
<tr>
<td>Joe Spencer</td>
<td>Senior Switch Tech</td>
<td></td>
</tr>
<tr>
<td>James Stack</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Award #0937591
- Sept. 1, 2015 - Aug. 31, 2016

15
Tina Stanford, SRI Int'l, Educ. Researcher
Nicholas Steneck, Michigan, Professor
Karl Stephan, Texas State, Assoc. Professor
Jack Stilgoe, Univ. Exeter, Sr. Res. Fellow
Roger Stout, Senior Research Scientist
Roger Strand, Bergen, Professor
Michael Sullivan, Director
Arho Suominen, University Teacher
Steve Suppan, Senior Policy Analyst
John Sweeney, Envir. Health & Safety Offc.
Tsjalleen Swierstra, Twente, Professor
Albert Teich, George Wash., Res. Prof.
Frank Theys, Visual Artist and Filmmaker
Brian Thibeault, Project Scientist
Kamlynn Thomas, Manager Guest Experience
Paul Thompson, Manager Guest Experience
David Tomblin, Michigan State Univ., Prof.
Joanna Tornow, Office of the Director
Julia Trošman, Director
Elizabeth Tran, Associate Program Officer
Paul Turgeon, Georgia Tech, Proj. Coord.
Christina Tzavelas, Participant
Jeff Ubois, Archivist
Rinnie van Est, Rutgers, Professor
Carl Van Horn, Utrecht Univ., Assoc. Prof.
Harro Van Lente, Professor Emeritus
Rene Von Schomberg, Directorate General Research
Jonce Walker, Sustainability Manager
Julie Walker, Project Manager
Jue Wang, Florida Intl., Asst. Prof.
Stephanie Wang, UT-Battelle, Behavioral Res.
Vivian Weil, Illinois Inst. Tech., Prof./Dir.
Martin Weinel, Cardiff Univ., Research Assoc.
Peter Weingart, University of Bielefeld, Prof.
Jianying Wen, Professor
Kyle Powys Whyte, Assistant Professor, Philosophy
Fern Wickson, GenOk, Associate Professor
Matthias Wienroth, Edinburgh, Acad. Res. Fellow
Terence Wilkins, University of Leeds, Professor
James Wilson, Adjunct Instruct. of Law
Robert Wilson, California, Berkeley, Prof.
David Winickoff, Univ. of Calgary, Asst. Prof.
Gregor Wolbring, UT-Battelle, Group Leader
Amy Wolfe, Rensselaer Poly. Inst., Prof.
Edward Woodhouse, Massachusetts, Lowell, Prof.
John Wooding, West Chester, Assoc. Prof.
Joan Woolfrey, Center for Learning & Technology

Award #0937591
Sept. 1, 2015 - Aug. 31, 2016

16
<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
<th>Department/Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anthony Wrigley</td>
<td>Keele University, Lecturer</td>
<td>Centre for Professional Ethics</td>
</tr>
<tr>
<td>Michael Xenos</td>
<td>Wisconsin, Assoc. Professor</td>
<td>Communication Arts</td>
</tr>
<tr>
<td>Charyl Yarbrough</td>
<td>Rutgers, Project Director</td>
<td>Workforce Development</td>
</tr>
<tr>
<td>Go Yoshizawa</td>
<td>Project Lecturer</td>
<td>Tokyo University</td>
</tr>
<tr>
<td>Peter Yeadon</td>
<td>Associate Professor/Architect</td>
<td>RISD/Decker Yeadon LLC</td>
</tr>
<tr>
<td>Edward You</td>
<td>Supv. Special Agent</td>
<td>FBI Weapons of Mass Destruction</td>
</tr>
<tr>
<td>Paul Youngman</td>
<td>UNC-Charlotte, Assoc. Prof.</td>
<td>Humanities, Technology &amp; Science</td>
</tr>
<tr>
<td>Jan Youtie</td>
<td>Georgia Tech, Sr. Research.</td>
<td>Enterprise Innovation Institute</td>
</tr>
<tr>
<td>Basile Zimmermann</td>
<td>Univ. of Geneva, Asst. Prof.</td>
<td>Chinese Studies</td>
</tr>
<tr>
<td>Chakanaka Zinyemba</td>
<td>Mapping &amp; Planning Support</td>
<td>Social Geographer</td>
</tr>
<tr>
<td>Lee Zwanziger</td>
<td>Designated Federal Official</td>
<td>Food &amp; Drug Administration</td>
</tr>
<tr>
<td>Steven Zylstra</td>
<td>Pres. &amp; Chief Exec. Officer</td>
<td>Arizona Technology Council</td>
</tr>
</tbody>
</table>

**ASU**

**Post-Doctoral Scholars**

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Troy Benn</td>
<td>Post-doctoral Fellow</td>
<td>Civil &amp; Environmental Engineering</td>
</tr>
<tr>
<td>Doe Daughtrey</td>
<td>Post-doctoral Fellow</td>
<td>Religious Studies</td>
</tr>
<tr>
<td>Hsiang-Kai D. Dong</td>
<td>Post-doctoral Fellow</td>
<td>Organizational Research &amp; Design</td>
</tr>
<tr>
<td>Michael Fisher</td>
<td>Post-doctoral Fellow</td>
<td>Biodesign Institute</td>
</tr>
<tr>
<td>Rider Foley</td>
<td>Post-doctoral Fellow</td>
<td>Sustainability</td>
</tr>
<tr>
<td>Megan Haipern</td>
<td>Post-doctoral Scholar</td>
<td>Center for Nanotechnology in Society</td>
</tr>
<tr>
<td>Daniel Higgins</td>
<td>Post-doctoral Fellow</td>
<td>Center for Nanotechnology in Society</td>
</tr>
<tr>
<td>Punarvasu Joshi</td>
<td>Post-doctoral Fellow</td>
<td>Elect. Compr. &amp; Energy Engineering</td>
</tr>
<tr>
<td>Anastasios Panaretos</td>
<td>Post-doctoral Fellow</td>
<td>Electrical Engineering</td>
</tr>
<tr>
<td>Kiera Reifschneider</td>
<td>Post-doctoral Fellow</td>
<td>National Nano. Infrastructure Network</td>
</tr>
<tr>
<td>Michael Reinsborough</td>
<td>Post-doctoral Fellow</td>
<td>Center for Nanotechnology in Society</td>
</tr>
<tr>
<td>Cathy Slade</td>
<td>Post-doctoral Fellow</td>
<td>Public Policy</td>
</tr>
<tr>
<td>Olgica Trenchevska</td>
<td>Post-doctoral Fellow</td>
<td>Biodesign Institute</td>
</tr>
<tr>
<td>Walter Valdivia</td>
<td>Post-doctoral Fellow</td>
<td>Public Administration</td>
</tr>
<tr>
<td>Kathryn Vignonne</td>
<td>Post-doctoral Fellow</td>
<td>Center for Nanotechnology in Society</td>
</tr>
<tr>
<td>Berea Williams</td>
<td>Post-doctoral Fellow</td>
<td>Chemistry &amp; Biochemistry</td>
</tr>
</tbody>
</table>

**ASU**

**Graduate Researchers**

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alexis Abboud</td>
<td>Biology and Society</td>
<td>Social Justice</td>
</tr>
<tr>
<td>Dulce Perez Aguilera</td>
<td>Materials Science &amp; Engineering</td>
<td>Biodesign Institute</td>
</tr>
<tr>
<td>Parul Agrawal</td>
<td>Human and Social Dimen. of Sci. &amp; Tech.</td>
<td>Science &amp; Technology Policy</td>
</tr>
<tr>
<td>Rebecca Allen</td>
<td>Biology &amp; Society</td>
<td>Biology &amp; Society</td>
</tr>
<tr>
<td>Carlo Altamirano-Allende</td>
<td>Science and Technology Policy</td>
<td>Computer Science &amp; Engineering</td>
</tr>
<tr>
<td>Judd Anderman</td>
<td>Electrical Engineering</td>
<td>Electrical Engineering</td>
</tr>
<tr>
<td>Caroline Appleton</td>
<td>Biology &amp; Society</td>
<td>Electrical Engineering</td>
</tr>
<tr>
<td>Deron Ash</td>
<td>Sustainability</td>
<td>Human &amp; Social Dimen. of Sci. &amp; Tech.</td>
</tr>
<tr>
<td>Plyush Awasthi</td>
<td>Chemistry &amp; Biochemistry</td>
<td>Chemistry &amp; Biochemistry</td>
</tr>
<tr>
<td>Ebraheem Azhar</td>
<td>Chemistry &amp; Biochemistry</td>
<td>Chemistry &amp; Biochemistry</td>
</tr>
<tr>
<td>Marci Baranski</td>
<td>Chemistry &amp; Biochemistry</td>
<td>Chemistry &amp; Biochemistry</td>
</tr>
<tr>
<td>Ceyhan Beckham</td>
<td>Chemistry &amp; Biochemistry</td>
<td>Chemistry &amp; Biochemistry</td>
</tr>
<tr>
<td>Michael Bernstein</td>
<td>Chemistry &amp; Biochemistry</td>
<td>Chemistry &amp; Biochemistry</td>
</tr>
<tr>
<td>Monamie Bhadra</td>
<td>Chemistry &amp; Biochemistry</td>
<td>Chemistry &amp; Biochemistry</td>
</tr>
<tr>
<td>Shreya Bhattacharyya</td>
<td>Chemistry &amp; Biochemistry</td>
<td>Chemistry &amp; Biochemistry</td>
</tr>
<tr>
<td>Bradley Brennan</td>
<td>Chemistry &amp; Biochemistry</td>
<td>Chemistry &amp; Biochemistry</td>
</tr>
</tbody>
</table>

**Award #0937591**

**Sept. 1, 2015 - Aug. 31, 2016**

**17**
Douglas Huron  
**Sebastian Husein**  
**Energy**  
Christofooros Ioannidis  
Daniela Ivan  
Taylor Jackson  
**Karina Jacobs**  
Alizee Jenck  
**Jeffrey Jennings**  
Lijing Jiang  
Valerie Johnson  
Craig Jolley  
Tomasz Kalinowski  
**Michael Katic**  
**Cameron Keys**  
Andrew Kao  
Risto Karinen  
Lauren Keeler  
**Eric Kennedy**  
Julia Kerran  
Ashley Kibel  
**Youngjae Kim**  
Mindy Kimball  
**Josh Klein**  
Phani K. Kondapani  
Tim Kostyk  
**Dhara Kothaval**  
Christopher Kuzdas  
**Mun Lahpan**  
Jason Lappe  
Jonathan Lappen  
**Mehdi Leilaeioun**  
William Lepkowski  
**Symon Levenberg**  
Shannon Lidberg  
**Daniel Livingston**  
Jewel Loree  
**Yi Lai Christine Luk**  
Christopher Madden  
**Bogdana Manole**  
Kevin Margeson  
**Peyton McChesney**  
Blakely McConnell  
**Patrick McGurrin**  
John C. McKnight  
Chris Mercer  
**Jacob Messner**  
Emily Molfino  
Chad Monfreda  
**Tanmay Monga**  
Sharlissa Moore  
**Global Technology Development**  
**Engineering of Matter, Transport, and Philosophy**  
**English**  
**Biology & Society**  
**Science & Technology Policy**  
**BioDesign Institute**  
**Science & Technology Policy**  
Chemistry & Biochemistry  
**Design**  
**Biophysics**  
**Biological Design**  
**Applied Mathematics for Life Sciences**  
**PSM Nanoscience**  
**School of Public Affairs**  
**Political Science**  
**Sustainability**  
**Human & Social Dimen. of Sci. & Tech.**  
Urban & Environmental Planning  
**Physics**  
**Public Administration**  
**Sustainability**  
**NeuroScience**  
Nanoscience  
**Human & Social Dimen. of Sci. & Tech.**  
**Sustainability**  
**Sustainability**  
**Nanoscience**  
Chemistry and Biochemistry  
**Geography**  
**Electrical Engineering**  
**Chemistry & Biochemistry**  
**BioDesign Institute**  
**Human & Social Dimen. of Sci. & Tech.**  
**Nanoscience**  
Science & Technology Policy  
**Human & Social Dimen. of Sci. & Tech.**  
Chemistry & Biochemistry  
**Environmental Social Science**  
**Science & Technology Policy**  
**Nanoscience**  
Art  
**NeuroScience**  
**Human & Social Dimen. of Sci. & Tech.**  
**Sustainability**  
**Nanoscience**  
**Political Science**  
**Human & Social Dimen. of Sci. & Tech.**  
**Electrical Engineering**  
**Human & Social Dimen. of Sci. & Tech.**
Vicki Moore  Chemistry & Biochemistry  
Romarie Morales  Applied Mathematics  
Jeffrey Moran  Mechanical Engineering  
Rebecca Murans  Design  
Israel Murguia  Public Administration  
Anarina Murillo  Applied Mathematics for Life & SocSc  
Tanya Musgrave  Public Policy  
Tracy Niday  Chemistry & Biochemistry  
Jason O’Leary  Science & Technology Policy  
Dustin Padilla  Applied Mathematics for Life Sciences  
Azra Panjwani  Mathematics  
John Parsi  Political Science  
Valentina Prado  Sustainable Engineering & Built Envir.  
David Proffitt  Urban & Environmental Planning  
Alecia Radatz  Human & Social Dimen. of Sci. & Tech.  
Tim Reblitz  Elect. Comptr. & Energy Engineering  
Caroline Reid  Urban & Environmental Planning  
Stuart Rice  Educational Policy & Evaluation  
Alicia Rodgers  Science & Technology Policy  
Laura Rodriguez  Technology & Innovation  
Heather Ross  Human & Social Dimen. of Sci. & Tech.  
John Sadauskas  Educational Tech. (Arts, Media & Engin.)  
Jathan Sadowski  Science, Technology & Ethics  
Kehinde Salau  Mathematics & Statistics  
Cyndy Schwartz  Human & Social Dimen. of Sci. & Tech.  
Jaswinder Scharma  Biomedicine  
Lee Seabrooke  Human & Social Dimen. of Sci. & Tech.  
Ankur Shah  Biomedical Engineering  
Nisha Sherma  Chemistry  
Adrienne Smith  Molecular and Cell Biology  
Quinn Spadola  Physics  
Apoorva Srinivasa  Electrical Engineering  
Lucia Stavig  Justice Studies  
Abigail Sullivan  Environmental Social Science  
Yuri Sylvester  Political Science  
Trista Taylor  Public Administration  
Beth Tellman  Geographical Sciences  
Abraham Tidwell  Human and Social Dimen. of Sci. & Tech.  
Kevin Todd  Science and Technology Policy  
Justin Tosi  Political Science  
Brenda Trinidad  Human and Social Dimen. of Sci. & Tech.  
Dwarakanath Triplican  Sustainable Engineering & Built Envir.  
Caitlin Troyer  Biology & Society  
Yusuf Tufail  SOLS Graduate Programs  
Madeline Tyson  Sustainability  
Oriol Vidal Aparicio  Political Science  
Kaitlin Vortherms  Civil, Environmental & Sustainable Engr.  
Jennifer Watkins  Chemistry & Biochemistry  
Benjamin Wender  Civil, Envir., & Sust. Engineering  
Kyle Whitman  Public Policy  
Aubrey Wigner  Human & Social Dimen. of Sci. & Tech.  

Award #0937591  
Sept. 1, 2015 - Aug. 31, 2016
Affiliated

Post-Doctoral Scholars

Muharrem Yildirim  Media Arts & Sciences
Jinglei Zhang  Chemistry & Biochemistry

Affiliated

Ashley Anderson  George Mason University  Climate Change Communication
Ravtosh Bal  North Carolina State Univ.  Public Policy
Christian Beauudrie  Univ. of British Columbia  Resources, Environment & Sustainability
Laura Cabrera  University of Basel  Biomedical Ethics
Silvia Casini  Universita Ca’ Foscari Venezia  Visual Studies & Image Science
Jason Delborne  Wisconsin  Rural Sociology
Pierre Delvenne  University of Liege  Political Science
Matthew Eisler  California, 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
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 Rajagopal  Wisconsin  Sociology
Luis Reyes-Galindo  Cardiff University  Social Science
Sujatha Raman  University of Nottingham  Science & Technology Studies
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
Andrea Bandelli  Vu University Amsterdam  Communication Sciences
Javiera Barandiaran  California, Berkeley  Environmental Sciences
Amy Barr  New Hampshire  Sociology
Kimberly Beachell  Massachusetts Amherst  Public Policy
Christian Beauudrie  Univ. of British Columbia  Resource Management Envir.Studies
Sean Becker  Unv. of Wisconsin-Madison  Sociology
Gennady Belyakov  Georgia Tech  Public Policy
Noel Benedetti  Wisconsin  Life Sciences Communication
Gaymon Bennett  California, Berkeley  Systematic Theology
Meagan Betke  Massachusetts Amherst  Anthropology
Gayle Beyah  Georgia Tech  Public Policy
Ajay Bhaskarabhatla  Georgia Tech  Public Policy
Sonja Billerbeck  ETH Zurich  Synthetic Biology
Anwesha Borthakur  Jawaharlal Nehru University  Science Policy
Colette Bos  Utrecht University, NL  Technology Assess., NanoNextNL Project
Angie Boyce  
Rachel Brockhage  
Ben Brucato  
Antonio Calleja-Lopez  
Stephen Carley  
Rafael Castillo  
Gong Chao  
Shih-Hsin Chen  
Doo-Hun Choi  
Mary Collins  
Rodrigo Cortes-Lobos  
Rachel Cranfill  
Yvonne Cuijpers  
Chris Cummings  
Sandara Cutts  
Wendy Dagle  
Mads Dahl Gjesen  
Amy Dale  
Kajsa Dalrymple  
Robert Del Barco  
Ann Delaney  
Ana Delgado  
L. Del Toro-Mejias  
Julie Dillemuth  
Larisa Doroshenko  
Anthony Dudo  
Roger Eardley-Pryor  
Philip Egert  
Paul Ellwood  
Cassandra Engeman  
Gina Eosco  
Zumel Espinoza  
Wei Fan  
Alice Fiddian-Green  
Steven Flipse  
Jason Gallo  
Reynold Galope  
John Garner  
Matthew Gebbie  
Harmee Gandhi  
Cecile Glerup  
Kyle Gracey  
Ted Greenhalgh  
Ying Guo  
Shirley Han  
Courtney Hanna  
Shannon Hanna  
John Harlow  
M. Hartzog Storment  
Rachel Hauser  
Leela Hebbar  
Cornell  
Grove City College  
Rensselaer Polytechnic  
University of Seville  
Georgia Tech  
Georgia Tech  
Dalian Univ. of Technology  
National Chiao Tung University  
Wisconsin-Madison  
California, Santa Barbara  
Georgia Tech  
California, Santa Barbara  
Utrech University  
North Carolina  
Alabama A&M University  
Massachusetts Amherst  
University of Oslo  
Carnegie Mellon University  
Wisconsin  
Autonomous Univ. Zacatecas  
Boise State University  
University of Bergen  
Massachusetts Amherst  
California, Santa Barbara  
Wisconsin  
Wisconsin  
California, Santa Barbara  
Virginia Tech  
Leeds Univ. Business School  
Cornell University  
Autonomous Univ. Zacatecas  
Beijing Institute of Tech.  
Massachusetts Amherst  
Technical University of Delft  
Northwestern  
Georgia Tech  
Georgia Tech  
California, Santa Barbara  
Georgia Tech  
Copenhagen Business School  
University of Chicago  
Nevada, Las Vegas  
Beijing Institute of Tech.  
California, Santa Barbara  
Univ. of British Columbia  
California, Santa Barbara  
Arizona State University  
North Carolina State Univ.  
Colorado  
Rutgers  
Science & Technology Studies  
Communication Studies  
Inst. Science & Technology Studies  
Ethics & Political Philosophy  
Public Policy  
Public Policy  
Humanities  
Life Sciences Communication  
Environmental Science & Management  
Public Policy  
Linguistics  
Innovation Studies  
Communication  
Applied Physics  
Public Policy  
Technology, Innovation & Culture  
Engineering & Public Policy  
Life Sciences Communication  
Development Studies  
Public Policy  
Sciences and the Humanities  
Public Health  
Geography  
Communication Arts  
Journalism & Mass Communication  
History  
Science & Technology Studies  
Business  
Social Science  
Communication  
Development Studies  
Management  
Public Health  
Responsible Innovation  
Media, Technology & Society  
Public Policy  
Computing  
Science and Engineering  
Quantitative & Computational Finance  
Public Policy  
Public Policy  
Environmental Studies  
Management  
Science & Engineering  
Integrated Sciences  
Science & Engineering  
Policy Informatics  
Communication, Rhetoric & Digital Media  
Environmental Studies  
Public Policy  

Award #0937591  
Sept. 1, 2015 - Aug. 31, 2016  
22
Elizabeth Hennessy
North Carolina, Chapel Hill
Geography
Cornell University
Wisconsin
University of Lausanne
Wisconsin
Georgia Tech
Chinese Academy of Science
Georgia Tech
Georgia Tech
Beijing Institute of Tech.
University of Vienna
Wisconsin
University of Manchester
Massachusetts Amherst
Rensselaer Poly. Institute
Wisconsin
Wisconsin
Wisconsin
North Carolina State Univ.
Georgia Tech
Groningen
Virginia Tech
Bowling Green State Univ.
Wisconsin
Georgia Tech
University of Pennsylvania
Ecole des Mines
Wisconsin
Portland State University
Wisconsin
Georgia Tech
Wisconsin
Tsinghua University
Michigan State University
Georgia Tech
Wisconsin
Venezuelan Ins. Sci. Research
Massachusetts Amherst
Inst. for Adv. Sustain. Studies
University of Bielefeld
University of Twente
Beijing Institute of Tech.
Birmingham, U.K.
Georgia Tech
Univ. Federal do Estado do Rio de Janiero
Georgia Tech
Georgia Tech
Virginia Tech
Geography
Science & Technology Studies
Journalism & Mass Communication
Politics and International Studies
Journalism & Mass Communication
Public Policy
English
Information Science
Industrial Management
International Affairs, Science & Tech.
Management
Economics and Social Science
Public Policy
Quantitative Finance & ISYE
Innovation Research
Environmental Conservation
Science & Technology
Journalism & Mass Communication
Life Sciences Communication
Journalism & Mass Communication
Public Administration
Public Policy
Science & Society
Urban Planning
Applied Philosophy
Life Sciences Communication
Public Policy
Psychology
Public Policy
Sociology
Urban Studies & Planning
Life Sciences Communication
Public Policy
Life Sciences Communication
Science, Technology & Society
Philosophy
Management
Life Sciences Communication
Studies of Science
Anthropology and Archeology
Emerging Tech. & Social Transformations
Science and Technology Studies
Philosophy
Management
Geog., Earth and Envir. Sciences
Industrial & Systems Engineering
Education
Public Policy
Public Policy
Natural Resources Policy
<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
<th>Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daniel Miller</td>
<td>Virginia Polytechnic Inst.</td>
<td>Science &amp; Technology Studies</td>
</tr>
<tr>
<td>Georgia Miller</td>
<td>Univ. of New South Wales</td>
<td>Humanities</td>
</tr>
<tr>
<td>Bastien Miorin</td>
<td>Grenoble Inst. of Technology</td>
<td>Science &amp; Technology Democracy</td>
</tr>
<tr>
<td>Mary Moore</td>
<td>Wisconsin</td>
<td>Computer Science</td>
</tr>
<tr>
<td>R. John Naranjan Jr.</td>
<td>Northeastern</td>
<td>Law</td>
</tr>
<tr>
<td>Hari Narayanan</td>
<td>Georgia Tech</td>
<td>Quantitative Finance &amp; ISYE</td>
</tr>
<tr>
<td>Christina Ndoh</td>
<td>North Carolina State Univ.</td>
<td>Public Administration</td>
</tr>
<tr>
<td>Jayme Neiman</td>
<td>Univ. of Nebraska, Lincoln</td>
<td>Public Policy</td>
</tr>
<tr>
<td>Gustavo Oliveira</td>
<td>Univ. of Illinois, Chicago</td>
<td>Public Administration</td>
</tr>
<tr>
<td>Tanner Osman</td>
<td>Georgia Tech</td>
<td>Public Policy</td>
</tr>
<tr>
<td>Christopher Palmer</td>
<td>Massachusetts Amherst</td>
<td>Public Policy</td>
</tr>
<tr>
<td>Poonam Pandey</td>
<td>Jawaharlal Nehru University</td>
<td>Science Policy</td>
</tr>
<tr>
<td>Krishna Parthasathi</td>
<td>Georgia Tech</td>
<td>Industrial &amp; Systems Engineering</td>
</tr>
<tr>
<td>Jayesh Patil</td>
<td>Georgia Tech</td>
<td>Computing</td>
</tr>
<tr>
<td>Ruimin Pei</td>
<td>Chinese Academy of Science</td>
<td>Management</td>
</tr>
<tr>
<td>Elizabeth Pitts</td>
<td>North Carolina State Univ.</td>
<td>Communication, Rhetoric &amp; Digital Media</td>
</tr>
<tr>
<td>Dena Plemmons</td>
<td>California, San Diego</td>
<td>Research Ethics</td>
</tr>
<tr>
<td>Vasiliki Rahimzadeh</td>
<td>McGill University</td>
<td>Bioethics</td>
</tr>
<tr>
<td>Sofia Randhawa</td>
<td>Georgia Tech</td>
<td>Quantitative Finance &amp; ISYE</td>
</tr>
<tr>
<td>Jie Ren</td>
<td>Beijing Institute of Tech.</td>
<td>Management Science &amp; Engineering</td>
</tr>
<tr>
<td>Gernot Rieder</td>
<td>Vienna</td>
<td>Science, Technology &amp; Society</td>
</tr>
<tr>
<td>Kristin Runge</td>
<td>Wisconsin</td>
<td>Life Sciences Communication</td>
</tr>
<tr>
<td>Martin Sand</td>
<td>Karlsruhe Institute of Tech.</td>
<td>Humanities &amp; Social Science</td>
</tr>
<tr>
<td>Hannah Rose Schonwald</td>
<td>Arizona State University</td>
<td>Sustainability Engineering</td>
</tr>
<tr>
<td>Simone Schumann</td>
<td>Vienna</td>
<td>Social Studies</td>
</tr>
<tr>
<td>Vanessa Schweizer</td>
<td>Carnegie Mellon</td>
<td>Engineering &amp; Public Policy</td>
</tr>
<tr>
<td>Sarah Scripps</td>
<td>South Carolina</td>
<td>History</td>
</tr>
<tr>
<td>Jeong Yim Seo</td>
<td>Ewha Women’s Univ., Korea</td>
<td>Nanotechnology</td>
</tr>
<tr>
<td>Oliver Shackleton</td>
<td>Manchester</td>
<td>Business, Innovation and Policy</td>
</tr>
<tr>
<td>Lea Shanley</td>
<td>Wisconsin</td>
<td>Environment &amp; Resources</td>
</tr>
<tr>
<td>Tsung-Jen Shih</td>
<td>Wisconsin</td>
<td>Journalism &amp; Mass Communication</td>
</tr>
<tr>
<td>Molly Simis</td>
<td>Wisconsin</td>
<td>Life Sciences Communication</td>
</tr>
<tr>
<td>Harmeeet Singh</td>
<td>Georgia Tech</td>
<td>Quantitative Finance &amp; ISYE</td>
</tr>
<tr>
<td>John Slanina</td>
<td>Georgia Tech</td>
<td>Public Policy</td>
</tr>
<tr>
<td>Robert Smith</td>
<td>University of Nottingham</td>
<td>Bioethics</td>
</tr>
<tr>
<td>Diran Soumonni</td>
<td>Georgia Tech</td>
<td>Public Policy</td>
</tr>
<tr>
<td>James Spartz</td>
<td>Wisconsin</td>
<td>Life Sciences Communication</td>
</tr>
<tr>
<td>Shannon Spruit</td>
<td>Delft University of Technology</td>
<td>Philosophy of Technology</td>
</tr>
<tr>
<td>Anthony Stavrianakis</td>
<td>California, Berkeley</td>
<td>Anthropology</td>
</tr>
<tr>
<td>Alexa Stephens</td>
<td>Georgia Tech</td>
<td>Public Policy &amp; City &amp; Regional Planning</td>
</tr>
<tr>
<td>Galen Stocking</td>
<td>California, Santa Barbara</td>
<td>Social Science</td>
</tr>
<tr>
<td>Maria Stubbings</td>
<td>Wisconsin</td>
<td>Life Sciences Communication</td>
</tr>
<tr>
<td>Leona Yi-Fan Su</td>
<td>Wisconsin</td>
<td>Life Sciences Communication</td>
</tr>
<tr>
<td>Vrishali Subramanian</td>
<td>Georgia Tech</td>
<td>Public Policy</td>
</tr>
<tr>
<td>Meghnaa Tallapragada</td>
<td>Cornell</td>
<td>Communication</td>
</tr>
<tr>
<td>Dhanaraj Thakur</td>
<td>Georgia Tech</td>
<td>Public Policy</td>
</tr>
<tr>
<td>Francois Thoreau</td>
<td>University of Liege</td>
<td>Political Science</td>
</tr>
<tr>
<td>Roberto Toledo</td>
<td>Stony Brook University</td>
<td>Philosophy</td>
</tr>
<tr>
<td>Juin-Yi Tsai</td>
<td>Wisconsin</td>
<td>Journalism</td>
</tr>
<tr>
<td>Rutger van Merkerk</td>
<td>University of Twente</td>
<td>Innovation &amp; Environmental Sciences</td>
</tr>
<tr>
<td>Name</td>
<td>University/Major</td>
<td></td>
</tr>
<tr>
<td>--------------------</td>
<td>------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>M. Van Oudheusden</td>
<td>Antwerp University Political &amp; Social Sciences</td>
<td></td>
</tr>
<tr>
<td>Stephanie Vasko</td>
<td>Washington Materials Chemistry &amp; Nanotechnology</td>
<td></td>
</tr>
<tr>
<td>Andrew Quitmeyer</td>
<td>Georgia Tech Digital Media</td>
<td></td>
</tr>
<tr>
<td>Charles Walsh</td>
<td>Georgia Tech Public Policy</td>
<td></td>
</tr>
<tr>
<td>Wenping Wang</td>
<td>Beijing Institute of Tech.</td>
<td></td>
</tr>
<tr>
<td>Alec Waterworth</td>
<td>National Taiwan University Management</td>
<td></td>
</tr>
<tr>
<td>Rosalyna Wijaya</td>
<td>Wisconsin Malawi National University Journalism</td>
<td></td>
</tr>
<tr>
<td>John Willingham</td>
<td>North Carolina State Political Science</td>
<td></td>
</tr>
<tr>
<td>Thomas Woodson</td>
<td>Georgia Tech Public Policy</td>
<td></td>
</tr>
<tr>
<td>Xuanting Ye</td>
<td>Beijing Institute of Tech.</td>
<td></td>
</tr>
<tr>
<td>Sara Yeo</td>
<td>Wisconsin Life Sciences</td>
<td></td>
</tr>
<tr>
<td>Heming Zhang</td>
<td>Nankai Univ./Georgia Tech Political Science</td>
<td></td>
</tr>
<tr>
<td>Shuliang Zhang</td>
<td>Beijing Institute of Tech.</td>
<td></td>
</tr>
<tr>
<td>Yi Zhang</td>
<td>Beijing Institute of Tech.</td>
<td></td>
</tr>
<tr>
<td>Xiao Zou</td>
<td>Beijing Institute of Tech.</td>
<td></td>
</tr>
<tr>
<td>Qin Zhu</td>
<td>Purdue University Engineering Education</td>
<td></td>
</tr>
<tr>
<td>John Willingham</td>
<td>Georgia Tech Public Policy</td>
<td></td>
</tr>
<tr>
<td>Thomas Woodson</td>
<td>National Taiwan University Management</td>
<td></td>
</tr>
<tr>
<td>Xuanting Ye</td>
<td>National Taiwan University Management</td>
<td></td>
</tr>
<tr>
<td>Sara Yeo</td>
<td>Wisconsin Life Sciences</td>
<td></td>
</tr>
<tr>
<td>Heming Zhang</td>
<td>Nankai Univ./Georgia Tech Political Science</td>
<td></td>
</tr>
<tr>
<td>Shuliang Zhang</td>
<td>Beijing Institute of Tech.</td>
<td></td>
</tr>
<tr>
<td>Yi Zhang</td>
<td>Beijing Institute of Tech.</td>
<td></td>
</tr>
<tr>
<td>Xiao Zou</td>
<td>Beijing Institute of Tech.</td>
<td></td>
</tr>
<tr>
<td>Qin Zhu</td>
<td>Purdue University Engineering Education</td>
<td></td>
</tr>
</tbody>
</table>

*ASU*

Undergrad Interns & Researchers

**Krizia Alba**
- Graphic Design
  - Molecular Biotechnology
  - Sustainability
  - Political Science
  - Biomedical Engineering
  - Sustainability
  - Materials Science & Engineering
  - Geography
  - Management

**Robert Bui**
- Electrical Engineering
  - Supply Chain Management

**Geoffrey Byers**
- Business Tourism/Management
  - Molecular Bioscience & Biotechnology

**Ricky Carmago**
- Marketing/Management

**Wyatt Chafin**
- Marketing
  - Chemistry
  - Biomedical Engineering & Economics
  - Psychology
  - Biomedical Engineering
  - Sustainability
  - Biology

**Kendall Denike**
- Industrial Design

**Emilie Doering**
- Global Studies

**Daniel Dykas**
- Industrial Design
  - English & Creative Writing

**Tara Egnatios**
- Film & Media Production
  - Management, Political Science, Spanish

**Daniel Escolin**
- Global Studies

**Alicia Fremling**
- Industrial Engineering

**Teresa Fritz**
- Film & Media Studies

**Andrew Gaddis**

**Ian Griffith**

**Alexandria High**
- Business
Hannah Hall  Sustainability
Catherine Hoke  Mechanical Engineering
Sarah Hoke  Asian Language
Rebecca Hudson  Business
Joleen Jansen  Industrial Design
Thomas Kajder  Computer Science
David Kreie  Graphic Design
Dania Lopez  Biochemistry
Benjamin Lowenstein  Sociology
Rachel Lowenstein  Business
Alexandar MacLean  Honors
Keith Martin  Film
Colin McDonald-Smith  Computer Science
Tobie Milford  Biology & Society
Timothy Norris  Architectural Studies
Sidra Omer  Journalism & Mass Communication
Girish Pathangey  Biomedical Engineering
Mark Petersen  Economics
Zachary Pirtle  Mechanical Engineering
Jaron Reed  Political Science
David Renolds  Chemical Engineering
Lucas Rogers  Engineering
Sarah Rupprecht  Physics
Dusana Schnell-Vivas  Marketing
Jesse Shedd  Anthropology
Suzanne Shlom  Design Studies
Nicole Smith  Economics
Rachel Smith  Biology & Society
Chad Steams  Sustainability
Evan Taylor  Biomedical Engineering
Jonah Thomas  Graphic Design
Duncan Thomason  Earth Space Exploration
Clelia Tommi  Microbiology
Daryl Traylor  Mechanical Engineering
Xavier Vargas  Civil Engineering (Envir. Engin.)
Kaitlin Vortherms  Sustainability
Tai Wallace  Interdisciplinary Studies
Amelia Walsh  Global Studies
Julia Weakley  Biology & Society
Brian Young  Biology & Society
Ke Wu

Affiliated Undergrad Interns & Researchers
Annie Bidgood  Georgia Tech
Audrey Campbell  Georgia Tech
Brescia Cassellius  Wisconsin
Gordon Cutler  Georgia Tech
Sharyn Finney  Georgia Tech
Brian Lynch  Georgia Tech
John Garner  Georgia Tech
Clay Karwisch  Georgia Tech

Sustainability
Mechanical Engineering
Asian Language
Business
Industrial Design
Computer Science
Graphic Design
Biochemistry
Sociology
Business
Honors
Film
Computer Science
Biology & Society
Architectural Studies
Journalism & Mass Communication
Biomedical Engineering
Economics
Mechanical Engineering
Political Science
Chemical Engineering
Engineering
Physics
Marketing
Anthropology
Design Studies
Education Studies
Biology & Society
Economics
Sustainability
Biomedical Engineering
Graphic Design
Earth Space Exploration
Microbiology
Mechanical Engineering
Civil Engineering (Envir. Engin.)
Sustainability
Interdisciplinary Studies
Global Studies
Biology & Society
Biology & Society

ISYE
Industrial Systems & Engineering
Journalism & Mass Communication
Computing
Public Policy & Economics
Public Policy
Public Policy
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
Deron Ash Program Manager
Jennifer Banks Program Coordinator
Melissa Cornish Program Coordinator
Elizabeth Curran Program Coordinator
Corrine Dillon Program Manager
Daniel Hooker Program Coordinator
Michelle Iafrat Program Coordinator
Patricia Ryan Program Coordinator
Regina Sanborn Assistant Director
Nisha Sherma Program Coordinator
Anton Spevacek Information Technology
Joy Trottier Administrative Associate

Participants affiliated, not receiving CNS-ASU support:

ASU
Kenneth Abbott Professor Law
Azadeh Adibi Graduate Student Industrial Design
Luis Aguiler 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 Consortium for Science, Policy & Outcomes
Jose Ashford Student Design
Heman Au Student
James Audiss Student
Ricardo Avila Student
Denise Baker Graduate Student
John Ball Graduate Student
Carl Ballard Graduate Student
Sasha Barab Professor
Maribel Barba Wed Designer/Developer
Anna Barker Director
Michelle Barry Graduate Research Associate
Tain Barzso Instructional Tech. Analyst
Jennifer Bekki Doctoral Student
Leslie Beres Director College Facility
Zachariah Berkson Student
Vineet Bhosle Graduate Student

Law
Industrial Design
Business
Interior Design
Industrial Engineering
Design
Engineering
Earth & Space Exploration
Mary Lou Fulton Teachers College
Consortium for Science, Policy & Outcomes
Social Work
Industrial Design
Business
Art
Psychology
Design, Environment & Arts
Applied Math for Life & Social Sci.
Educational Leadership & Innovation
Foundation

Transformative Healthcare Networks
Sustain. Engr. & Built Envir.
Digital Culture
Industrial Engineering
Design & Arts
Chemical Engineering
Architecture
<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jordan Biechler</td>
<td>Student</td>
<td>Explore-Social &amp; Behavioral Sci.</td>
</tr>
<tr>
<td>Colleen Bivona</td>
<td>Program Manager</td>
<td>Arts Media &amp; Engineering</td>
</tr>
<tr>
<td>James Blasingame</td>
<td>Associate Professor</td>
<td>English</td>
</tr>
<tr>
<td>Thomas Bleasdale</td>
<td>Graduate Student</td>
<td>Environmental Social Sciences</td>
</tr>
<tr>
<td>Timur Boskailo</td>
<td>Student</td>
<td>Architectural Studies</td>
</tr>
<tr>
<td>Rachel Bowditch</td>
<td>Assistant Professor</td>
<td>Theatre &amp; Film</td>
</tr>
<tr>
<td>Amanda Breaux</td>
<td>Events Coordinator</td>
<td>Law</td>
</tr>
<tr>
<td>Nicholas Broderick</td>
<td>Student</td>
<td>Theatre &amp; Film</td>
</tr>
<tr>
<td>Daniel Brune</td>
<td>Faculty Research Associate</td>
<td>Life Sciences</td>
</tr>
<tr>
<td>Banel Bucknor</td>
<td>Student</td>
<td>Design</td>
</tr>
<tr>
<td>Winslow Burleson</td>
<td>Assistant Professor</td>
<td>Computing &amp; Informatics</td>
</tr>
<tr>
<td>Daragh Byrne</td>
<td>Assistant Research Professor</td>
<td>Arts Media &amp; Engineering</td>
</tr>
<tr>
<td>David Calverley</td>
<td>Attorney</td>
<td>Law, Science and Technology</td>
</tr>
<tr>
<td>Joel Carrasco</td>
<td>Graduate Student</td>
<td>Landscape Architecture</td>
</tr>
<tr>
<td>Angela Cazel-Jahn</td>
<td>Artist/Graduate Student</td>
<td>Humanities Research</td>
</tr>
<tr>
<td>M. Chavez-Echeagaray</td>
<td>Graduate Student</td>
<td>Computer Science</td>
</tr>
<tr>
<td>Jeffrey Chudy</td>
<td>Student</td>
<td>Art Exploratory</td>
</tr>
<tr>
<td>Sam Chung</td>
<td>Faculty</td>
<td>Art (Ceramics)</td>
</tr>
<tr>
<td>Daniel Cifuentes</td>
<td>Graduate Student</td>
<td>Arch. &amp; Urban Design</td>
</tr>
<tr>
<td>Jeffrey Clancy</td>
<td>Graduate Student</td>
<td>Architecture</td>
</tr>
<tr>
<td>Robert Clinton</td>
<td>Professor</td>
<td>Law</td>
</tr>
<tr>
<td>Grisha Coleman</td>
<td>Assistant Professor</td>
<td>Arts Media &amp; Engineering</td>
</tr>
<tr>
<td><strong>Dan Collins</strong></td>
<td><strong>Professor</strong></td>
<td><strong>School of Art</strong></td>
</tr>
<tr>
<td>David Corral</td>
<td>Student</td>
<td>Civil Engineering</td>
</tr>
<tr>
<td>Jacqueline Cortez</td>
<td>Graduate Student</td>
<td>Architecture</td>
</tr>
<tr>
<td>Michael Crow</td>
<td>President</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Roy Curtiss</td>
<td>Professor</td>
<td>Biodesign Institute</td>
</tr>
<tr>
<td>Daniel Cutrara</td>
<td>Assistant Professor</td>
<td>English</td>
</tr>
<tr>
<td>Williams Dabars</td>
<td>Dir. Special Communications</td>
<td>Office of Public Affairs</td>
</tr>
<tr>
<td><strong>Peter de Marneffe</strong></td>
<td><strong>Professor</strong></td>
<td><strong>Historical, Philosophical &amp; Religious Stud.</strong></td>
</tr>
<tr>
<td>S. Doddaballapur</td>
<td>Graduate Student</td>
<td>Urban Design &amp; Built. Environ.</td>
</tr>
<tr>
<td>Heather Draper</td>
<td>Graduate Student</td>
<td>Design</td>
</tr>
<tr>
<td>Michelle Duah</td>
<td>Graduate Student</td>
<td>Design</td>
</tr>
<tr>
<td>Mark Dudlik</td>
<td>Management Intern</td>
<td>Office of the President</td>
</tr>
<tr>
<td>Margaret Duff</td>
<td>Graduate Student</td>
<td>Bioengineering</td>
</tr>
<tr>
<td>Lauren Dykes</td>
<td>Graduate Teaching Assistant</td>
<td>Theatre &amp; Film</td>
</tr>
<tr>
<td>Mark Edwards</td>
<td>Professor</td>
<td>Business</td>
</tr>
<tr>
<td>Farzaneh Eftekhari</td>
<td>Graduate Student</td>
<td>Design</td>
</tr>
<tr>
<td>Mohamed Elkhesky</td>
<td>Graduate Student</td>
<td>Mechanical Engineering</td>
</tr>
<tr>
<td>Ron Elliott</td>
<td>Graduate Student</td>
<td>Architecture</td>
</tr>
<tr>
<td>John Ernzen</td>
<td>Student</td>
<td>Biomedical Engineering</td>
</tr>
<tr>
<td><strong>Greg Esser</strong></td>
<td><strong>Director</strong></td>
<td><strong>Art Museum</strong></td>
</tr>
<tr>
<td><strong>Faye Farmer</strong></td>
<td><strong>Associate Director</strong></td>
<td><strong>OKED Research Strategy Group</strong></td>
</tr>
<tr>
<td>Michelle Fehler</td>
<td>Lecturer</td>
<td>Design</td>
</tr>
<tr>
<td>Susan Felt</td>
<td>Comm. &amp; Mrktg. Coord.</td>
<td>Design &amp; Arts</td>
</tr>
<tr>
<td>Camilla Finnie</td>
<td>Student</td>
<td>Art</td>
</tr>
<tr>
<td>Joseph Fletcher</td>
<td>Student</td>
<td>Computer Science</td>
</tr>
<tr>
<td>Alfinio Flores</td>
<td>Professor</td>
<td>Curriculum &amp; Instruction</td>
</tr>
<tr>
<td>Mary Fonow</td>
<td>Director &amp; Professor</td>
<td>Social Transformation</td>
</tr>
<tr>
<td>Jason Franz</td>
<td>Special Advisor to Dean</td>
<td>Design &amp; Arts</td>
</tr>
</tbody>
</table>

Sept. 1, 2015 - Aug. 31, 2016

Award #0937591

28
<table>
<thead>
<tr>
<th>Jennifer Fuller</th>
<th>Graduate Student</th>
<th>Environmental Social Sciences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ralph Gabbard</td>
<td>Librarian</td>
<td>Hayden Library</td>
</tr>
<tr>
<td>Brian Ganter</td>
<td>Student</td>
<td>Art</td>
</tr>
<tr>
<td>Antonio Garcia</td>
<td>Associate Director</td>
<td>Hispanic Research Center</td>
</tr>
<tr>
<td>Justin Gauger</td>
<td>Student</td>
<td>History</td>
</tr>
<tr>
<td>Alan Gersfeld</td>
<td>Consultant</td>
<td>Mary Lou Fulton External Projects</td>
</tr>
<tr>
<td>Lance Gharvi</td>
<td>Associate Professor</td>
<td>Theatre &amp; Film</td>
</tr>
<tr>
<td>Joshua Gigantino</td>
<td>Graduate Student</td>
<td>Design</td>
</tr>
<tr>
<td>Gina Gillies</td>
<td>Assistant to Director</td>
<td>LightWorks</td>
</tr>
<tr>
<td>Maureen Goggin</td>
<td>Chair &amp; Professor</td>
<td>English</td>
</tr>
<tr>
<td><strong>Peter Goggin</strong></td>
<td><strong>Associate Professor</strong></td>
<td><strong>Intl. Student Exchange Partner</strong></td>
</tr>
<tr>
<td>Nicola Goldberg</td>
<td>Sr. Healthcare Tech. Manager</td>
<td><strong>Computer Science</strong></td>
</tr>
<tr>
<td>J. Gonzalez-Sanchez</td>
<td>Graduate Student</td>
<td><strong>Politics and Global Studies</strong></td>
</tr>
<tr>
<td>Gisela Grant</td>
<td>Internship Coordinator</td>
<td><strong>Design</strong></td>
</tr>
<tr>
<td>Nancy Gray</td>
<td>Graduate Teaching Assistant</td>
<td><strong>Public Policy</strong></td>
</tr>
<tr>
<td>Joel Greene</td>
<td>Professor</td>
<td><strong>Ins. for Strengthening Math &amp; Science</strong></td>
</tr>
<tr>
<td>Priscilla Greenwood</td>
<td>Research Professor</td>
<td><strong>Arch. &amp; Landscape Arch.</strong></td>
</tr>
<tr>
<td>Jason Griffiths</td>
<td>Assistant Professor</td>
<td><strong>Social and Behavioral Sciences</strong></td>
</tr>
<tr>
<td>Diane Gruber</td>
<td>Senior Lecturer</td>
<td><strong>Elect. Comptr. &amp; Energy Eng.</strong></td>
</tr>
<tr>
<td>Andrey Gunawan</td>
<td>Graduate Teaching Assistant</td>
<td><strong>Office of University Initiatives</strong></td>
</tr>
<tr>
<td>Daniil Gunitskiy</td>
<td>United Way Univ. Innov. Fel.</td>
<td><strong>Design Studies</strong></td>
</tr>
<tr>
<td>Jennifer Gunther</td>
<td>Professor</td>
<td><strong>School for the Future of Innov. in Society</strong></td>
</tr>
<tr>
<td>Jodi Guyot</td>
<td>Vice President</td>
<td><strong>Public Affairs &amp; Foreign Relations</strong></td>
</tr>
<tr>
<td>Stuart Hadley</td>
<td>Student</td>
<td><strong>Biomedical Engineering</strong></td>
</tr>
<tr>
<td>Joshua Hammer</td>
<td>Assistant Professor</td>
<td><strong>Art</strong></td>
</tr>
<tr>
<td>Hilary Harp</td>
<td>Associate Professor</td>
<td><strong>Design</strong></td>
</tr>
<tr>
<td>Thomas Hartman</td>
<td>Professor</td>
<td><strong>EVPP Consultant Group</strong></td>
</tr>
<tr>
<td>Lee Hartwell</td>
<td>Professor</td>
<td><strong>English</strong></td>
</tr>
<tr>
<td>Elisabeth Hayes</td>
<td>Student</td>
<td><strong>Chemical Engineering</strong></td>
</tr>
<tr>
<td>Stephen Hermens</td>
<td>Student</td>
<td><strong>Mechanical Engineering</strong></td>
</tr>
<tr>
<td>Colin Ho</td>
<td>Student</td>
<td><strong>Biomedical Engineering</strong></td>
</tr>
<tr>
<td>Jenna Hoban</td>
<td>Graduate Student</td>
<td><strong>Mass Communication</strong></td>
</tr>
<tr>
<td>Kim Holscaw</td>
<td>Dir. of Programs-Solutions</td>
<td><strong>Offc of Knowledge Enterprise Dev.</strong></td>
</tr>
<tr>
<td>Janet Holston</td>
<td><strong>Professor</strong></td>
<td><strong>Engineering</strong></td>
</tr>
<tr>
<td><strong>Christiana Honsberg</strong></td>
<td>Graphic Designer Principal</td>
<td><strong>Education Outreach &amp; Student Svcs.</strong></td>
</tr>
<tr>
<td>Timothy Horn</td>
<td>Graduate Teaching Assistant</td>
<td><strong>Arch. &amp; Landscape Arch.</strong></td>
</tr>
<tr>
<td>Afzal Hossain</td>
<td>Manager Creative Services</td>
<td><strong>Design &amp; Arts</strong></td>
</tr>
<tr>
<td>Sarah Hough</td>
<td>Graduate Student</td>
<td><strong>Design</strong></td>
</tr>
<tr>
<td>Oscar Huerta</td>
<td><strong>Mgr, Marketing &amp; Comm.</strong></td>
<td><strong>LightWorks</strong></td>
</tr>
<tr>
<td>A Magdalena Hurtado</td>
<td>Professor</td>
<td><strong>Human Evolution &amp; Social Change</strong></td>
</tr>
<tr>
<td>Zahra Hussaini</td>
<td>Student</td>
<td><strong>Materials Science &amp; Engineering</strong></td>
</tr>
<tr>
<td>Joanna Iacovelli</td>
<td>Student</td>
<td><strong>Foundation</strong></td>
</tr>
<tr>
<td>Jeffrey Ignaszewski</td>
<td>Prospect Research</td>
<td><strong>Design &amp; Arts</strong></td>
</tr>
<tr>
<td>Todd Ingalls</td>
<td>Graphic Design Specialist</td>
<td><strong>Arts Media &amp; Engineering</strong></td>
</tr>
<tr>
<td>Aziza Ismael</td>
<td>Associate Professor Research</td>
<td><strong>Design Studies</strong></td>
</tr>
<tr>
<td>Courtney Jackson</td>
<td>Student</td>
<td><strong>Design &amp; Production</strong></td>
</tr>
<tr>
<td>Jane Jackson</td>
<td>Student</td>
<td><strong>Physics</strong></td>
</tr>
<tr>
<td>Jennifer Jaeckals</td>
<td>Retired Faculty</td>
<td><strong>CSPO</strong></td>
</tr>
<tr>
<td><strong>Amelia Huggins</strong></td>
<td>Communications Cordinator</td>
<td>****</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Position/Role</td>
<td>Department/Field</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------------------------------</td>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>Erin Jeffries</td>
<td>Specialist to Director</td>
<td>Arts Media &amp; Engineering</td>
</tr>
<tr>
<td>Adriene Jenik</td>
<td>Professor and Director</td>
<td>Herberger Inst. for Design &amp; Arts</td>
</tr>
<tr>
<td>Jeff Jilek</td>
<td>Graduate Student</td>
<td>Architecture</td>
</tr>
<tr>
<td>Parker Jones</td>
<td>Student</td>
<td>Art</td>
</tr>
<tr>
<td>Joseph Jurado</td>
<td>Student</td>
<td>Film</td>
</tr>
<tr>
<td>Korhan Kaftanoglu</td>
<td>Graduate Research Associate Student</td>
<td>Elect. Comptr. &amp; Energy Engineering</td>
</tr>
<tr>
<td>Michael Katic</td>
<td>Student</td>
<td>Applied Computer Science</td>
</tr>
<tr>
<td>Josh Katzker</td>
<td>Graduate Teaching Assistant Student</td>
<td>Theatre &amp; Film</td>
</tr>
<tr>
<td>Braden Kay</td>
<td>Project Manager</td>
<td>Global Institute of Sustainability</td>
</tr>
<tr>
<td>Anita Keitel</td>
<td>Graduate Student</td>
<td>Architecture</td>
</tr>
<tr>
<td>James Keller</td>
<td>Student</td>
<td>Theatre</td>
</tr>
<tr>
<td>Aisling Kelliher</td>
<td>Assistant Professor</td>
<td>Design</td>
</tr>
<tr>
<td>Amruta Khanolkar</td>
<td>Graduate Teaching Assistant Student</td>
<td>Design</td>
</tr>
<tr>
<td>Daniel Kharisima</td>
<td>Graduate Student</td>
<td>Arch. &amp; Landscape Arch.</td>
</tr>
<tr>
<td>Sheri Klug Boonstra</td>
<td>Associate Research Profess.</td>
<td>Civil, Envir. &amp; Sustain. Engineering</td>
</tr>
<tr>
<td>Dhara Kothavala</td>
<td>Graduate Student</td>
<td>Earth and Space Exploration</td>
</tr>
<tr>
<td>Matthew Krise</td>
<td>Shop Superintendent</td>
<td>Sustainability</td>
</tr>
<tr>
<td>Michael Kroelinger</td>
<td>Professor</td>
<td>Design</td>
</tr>
<tr>
<td>Nicholas Kunz</td>
<td>Student</td>
<td>Design</td>
</tr>
<tr>
<td>Michael Lande</td>
<td>Assistant Professor</td>
<td>Housing &amp; Urban Development</td>
</tr>
<tr>
<td>Heather Landes</td>
<td>Associate Dean</td>
<td>Engineering</td>
</tr>
<tr>
<td>Heather Le Fur</td>
<td>Graphic Design Principal</td>
<td>Design &amp; Arts</td>
</tr>
<tr>
<td>Neal Lester</td>
<td>Assoc. VP &amp; Professor</td>
<td>Design &amp; Arts</td>
</tr>
<tr>
<td>Tyler Libey</td>
<td>Graduate Student</td>
<td>Knowledge Enterprise Development</td>
</tr>
<tr>
<td>Min Lin</td>
<td>Student</td>
<td>Biomedical Engineering</td>
</tr>
<tr>
<td>Heather Lineberry</td>
<td>Interim Associate Director</td>
<td>Computer Systems Engineering</td>
</tr>
<tr>
<td>Sydneys Lines</td>
<td>Management Intern</td>
<td>Art Museum</td>
</tr>
<tr>
<td>Priscilla Long</td>
<td>Student</td>
<td>LightWorks</td>
</tr>
<tr>
<td>Lauren Loosveldt</td>
<td>Graduate Student</td>
<td>Art</td>
</tr>
<tr>
<td>Richard Loveless</td>
<td>Emeritus Professor</td>
<td>Architecture</td>
</tr>
<tr>
<td>Ryan Luikens</td>
<td>Student</td>
<td>Sustainability</td>
</tr>
<tr>
<td>Jane Magruder</td>
<td>Dir. Print Comm. &amp; Med. Rel. Graphic Designer</td>
<td>Sustainability</td>
</tr>
<tr>
<td>Giada Mannino</td>
<td>Graduate Student</td>
<td>Computer Science</td>
</tr>
<tr>
<td>Jingzian Mao</td>
<td>Associate Professor</td>
<td>Human Communication</td>
</tr>
<tr>
<td>Erik Margolis</td>
<td>Director</td>
<td>Engineering Technical Services</td>
</tr>
<tr>
<td>Richard Martorano</td>
<td>Graduate Student</td>
<td>Sustainable Engrg. &amp; Built Environment</td>
</tr>
<tr>
<td>Carolyn Mattick</td>
<td>Support Systems Analyst</td>
<td>Design &amp; Arts</td>
</tr>
<tr>
<td>Maritza Maurer</td>
<td>Professor</td>
<td>Psychology</td>
</tr>
<tr>
<td>Michael McBeath</td>
<td>Faculty Associate</td>
<td>Sustainability</td>
</tr>
<tr>
<td>Scott McClintock</td>
<td>Professor</td>
<td>Learning Sciences Institute</td>
</tr>
<tr>
<td>Danielle McNamara</td>
<td>Graduate Student</td>
<td>English</td>
</tr>
<tr>
<td>Michael Meeder</td>
<td>Dean</td>
<td>Fulton School of Engineering</td>
</tr>
<tr>
<td>Deirdre Meldrum</td>
<td>Associate Professor</td>
<td>Anthropology</td>
</tr>
<tr>
<td>Kostalena Michelaki</td>
<td>Student</td>
<td>Theatre &amp; Film</td>
</tr>
<tr>
<td>George Moakley</td>
<td>Graduate Student</td>
<td>Design</td>
</tr>
<tr>
<td>Erika Mohaupt</td>
<td>Graduate Teaching Assistant Student</td>
<td>Chemistry &amp; Biochemistry</td>
</tr>
<tr>
<td>Adam Monroe</td>
<td>Assistant Professor</td>
<td>Arch. &amp; Landscape Arch.</td>
</tr>
<tr>
<td>Gabriel Montemayor</td>
<td>Student</td>
<td>Psychology</td>
</tr>
<tr>
<td>Michael Montgomery</td>
<td>Graduate Student</td>
<td>Technology</td>
</tr>
<tr>
<td>Scott Murphy</td>
<td>Graduate Student</td>
<td>Engineering</td>
</tr>
<tr>
<td>Rafiu Mustapha</td>
<td>Graduate Student</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Position</td>
<td>Department/Program</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Allison Shannon</td>
<td>Grant Proposal Writer</td>
<td>Sustainability</td>
</tr>
<tr>
<td>Ankur R. Sharma</td>
<td>Graduate Student</td>
<td>Electrical Engineering</td>
</tr>
<tr>
<td>Nicholas Shekerjian</td>
<td>Student</td>
<td>Architectural Studies</td>
</tr>
<tr>
<td>Denis Simon</td>
<td>Vice Provost</td>
<td>China Initiatives and Strategy</td>
</tr>
<tr>
<td>Vipul Singh</td>
<td>Graduate Research Assistant</td>
<td>Built Environment</td>
</tr>
<tr>
<td>Ian Smith</td>
<td>Student</td>
<td>Interdisciplinary Studies</td>
</tr>
<tr>
<td>Bryan Smith</td>
<td>Student</td>
<td>Sustainability</td>
</tr>
<tr>
<td>Michael E. Smith</td>
<td>Professor</td>
<td>Hum. Evol. &amp; Social Change</td>
</tr>
<tr>
<td>Milton Sommerfield</td>
<td>Professor</td>
<td>Life Sciences</td>
</tr>
<tr>
<td>Alexandra Spaeth</td>
<td>Student</td>
<td>Bio Science</td>
</tr>
<tr>
<td>Andreas Spanias</td>
<td>Professor</td>
<td>Elect. Conptr. &amp; Energy Eng.</td>
</tr>
<tr>
<td>Anton Spevacek</td>
<td>Manager Information Tech.</td>
<td>Arts</td>
</tr>
<tr>
<td>Joseph Spiro</td>
<td>Graduate Student</td>
<td>Computer Science</td>
</tr>
<tr>
<td>Jim St. Leger</td>
<td>Technology Marketing Mgr.</td>
<td>Intel</td>
</tr>
<tr>
<td>Ellen Steechel</td>
<td>Deputy Director &amp; Professor</td>
<td>LightWorks</td>
</tr>
<tr>
<td>Anne Stone</td>
<td>Professor</td>
<td>Hum. Evol. &amp; Social Change</td>
</tr>
<tr>
<td>Jason Sukut</td>
<td>Graduate Student</td>
<td>Applied Ethics</td>
</tr>
<tr>
<td>Hari Sundaram</td>
<td>Professor</td>
<td>Arts, Media &amp; Engineering</td>
</tr>
<tr>
<td>Douglas Sylvester</td>
<td>Interim Dean</td>
<td>Law</td>
</tr>
<tr>
<td>Christine Szuter</td>
<td>Professor of Practice</td>
<td>Hist., Phil. &amp; Religious Studies</td>
</tr>
<tr>
<td>Chen Tang</td>
<td>Graduate Student</td>
<td>Industrial Design</td>
</tr>
<tr>
<td>Michael Thomet</td>
<td>Graduate Student</td>
<td>English</td>
</tr>
<tr>
<td>Michael Thompson</td>
<td>Student</td>
<td>Theatre &amp; Film</td>
</tr>
<tr>
<td>Leslie Thornton</td>
<td>Assistant Professor</td>
<td>Journalism &amp; Mass Comm.</td>
</tr>
<tr>
<td>Ben Tien</td>
<td>Student</td>
<td>Graphic Design</td>
</tr>
<tr>
<td>Paulette Tohonnie</td>
<td>Student</td>
<td>Interior Design</td>
</tr>
<tr>
<td>Lisa Tolentino</td>
<td>Graduate Student</td>
<td>Media Arts &amp; Sciences</td>
</tr>
<tr>
<td>Jose Torres</td>
<td>Student</td>
<td>Landscape Architecture</td>
</tr>
<tr>
<td>Pavan Turaga</td>
<td>Assistant Professor</td>
<td>Arts Media &amp; Engineering</td>
</tr>
<tr>
<td>Steven Turner</td>
<td>Student</td>
<td>Business &amp; Management</td>
</tr>
<tr>
<td>Diane Van Hoy</td>
<td>Student</td>
<td>Aerospace Engineering</td>
</tr>
<tr>
<td>Arvin Villena</td>
<td>Student</td>
<td>Explore-Health/Life Sciences</td>
</tr>
<tr>
<td>David Wahls</td>
<td>Regional Major Gift Officer</td>
<td>Foundation</td>
</tr>
<tr>
<td>Sheila Wakelam</td>
<td>Graduate Student</td>
<td>Design</td>
</tr>
<tr>
<td>Qiao Wang</td>
<td>Student</td>
<td>Art Media &amp; Engineering</td>
</tr>
<tr>
<td>Matt Watkins</td>
<td>Student</td>
<td>Theatre &amp; Film</td>
</tr>
<tr>
<td>Zachary Watson</td>
<td>Student</td>
<td>Landscape Architecture</td>
</tr>
<tr>
<td>Eric Wheeler</td>
<td>Student</td>
<td>Theatre &amp; Film</td>
</tr>
<tr>
<td>Jorden Whicker</td>
<td>Student</td>
<td>Computer Science</td>
</tr>
<tr>
<td>Dave White</td>
<td>Associate Professor</td>
<td>Community Res. &amp; Develop.</td>
</tr>
<tr>
<td>Laurie Valenti</td>
<td>Specialist</td>
<td>Theatre &amp; Film</td>
</tr>
<tr>
<td>Jennifer Wilken</td>
<td>Budget Analyst Principal</td>
<td>Office of V.P. and Provost</td>
</tr>
<tr>
<td>Thomas Williams</td>
<td>Chief Staff/Asst. Dean</td>
<td>Law</td>
</tr>
<tr>
<td>Lea Wilson</td>
<td>Graduate Teaching Assistant</td>
<td>Sustainability</td>
</tr>
<tr>
<td>Greg Wise</td>
<td>Associate Dean &amp; Professor</td>
<td>New Interdisc. Arts &amp; Sciences</td>
</tr>
<tr>
<td>Russell Wisniewski</td>
<td>Student</td>
<td>Architectural Studies</td>
</tr>
<tr>
<td>Kuan-Chuen Wu</td>
<td>Graduate Student</td>
<td>Electrical Engineering</td>
</tr>
<tr>
<td>Trish Yasolsky</td>
<td>Assistant to Dean</td>
<td>Sustainability</td>
</tr>
<tr>
<td>Mark Zeigler</td>
<td>Student</td>
<td>Mathematics</td>
</tr>
</tbody>
</table>

Award #0937591
Sept. 1, 2015 - Aug. 31, 2016

32
Affiliated

**Carl Abbot**
Affiliated with Portland State University

**Clement Adebamowo**
Affiliated with University of Maryland

**Maria S M Alencar**
Affiliated with Federal University of Rio de Janeiro

**Ida Andersen**
Affiliated with Danish Board of Technology

**Iris Andrade**
Affiliated with Richard + Bauer Architecture

**Timothy Apenzeller**
Affiliated with National Geographic

**Peter Ashton**
Affiliated with Council of Scientific & Indus. Res. Policy Studies

**David Attis**
Affiliated with RWTH Aachen University

**Daniel Barben**
Affiliated with Portland State University

**Kelly Bauer**
Affiliated with Towson University

**Fletcher Beaudoin**
Affiliated with Portland Bureau of Environmental Svs.

**David Beck**
Affiliated with SmithGroup

**Amy Becker**
Affiliated with Brilliant Concepts LLC.

**David Beltran-del-Rio**
Affiliated with Nanotech. Industry Liaison

**Francois Berger**
Affiliated with INSERM

**Rosalyn Berne**
Affiliated with University of Virginia

**Jill Bernstein**
Affiliated with Downtown Phoenix Journal

**Roberta M. Berube**
Affiliated with Georgia Institute of Technology

**David Berube**
Affiliated with North Carolina State University

**Rachel Bess**
Affiliated with North Carolina State University

**Gary Bild**
Affiliated with Nanotech. Industry Liaison

**Jenn Bildersee**
Affiliated with Portland Bureau of Environmental Svs.

**Anne Bilsbarrow**
Affiliated with Downtown Phoenix Journal

**Craig Boardman**
Affiliated with Georgia Institute of Technology

**Marianne Boenink**
Affiliated with North Carolina State University

**Christopher Bosso**
Affiliated with SciTech Strategies, Inc.

**Kevin Boyack**
Affiliated with Brilliant Concepts LLC.

**Elizabeth Boyd**
Affiliated with Brilliant Concepts LLC.

**Eileen Brill Wagner**
Affiliated with Brilliant Concepts LLC.

**Dominique Brossard**
Affiliated with Brilliant Concepts LLC.

**Garrett Brown**
Affiliated with Brilliant Concepts LLC.

**Mark Brown**
Affiliated with Brilliant Concepts LLC.

**Sebastien Brunet**
Affiliated with Brilliant Concepts LLC.

**Holly Buck**
Affiliated with Brilliant Concepts LLC.

**James Buizer**
Affiliated with Brilliant Concepts LLC.

**Regula Burri**
Affiliated with Brilliant Concepts LLC.

**Hilary Burton**
Affiliated with Brilliant Concepts LLC.

**Dale Buskirk**
Affiliated with Brilliant Concepts LLC.

**Michael Cacciatore**
Affiliated with Brilliant Concepts LLC.

**Alexander Calderon**
Affiliated with Brilliant Concepts LLC.

**Heather Campbell**
Affiliated with Brilliant Concepts LLC.

**Phillip Campbell**
Affiliated with Brilliant Concepts LLC.

**Rick Canady**
Affiliated with Brilliant Concepts LLC.

**Heather Canary**
Affiliated with Brilliant Concepts LLC.

**Amy Carroll**
Affiliated with Brilliant Concepts LLC.

**Kenneth Carter**
Affiliated with Brilliant Concepts LLC.
<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darlene Cavalier</td>
<td>Founder</td>
<td>Science Cheerleader, University of Iowa</td>
</tr>
<tr>
<td>Lorenzo Cena</td>
<td>Graduate Student</td>
<td></td>
</tr>
<tr>
<td>Jan Cerveny</td>
<td>Staff</td>
<td>Department of Energy, Legislative &amp; Public Affairs</td>
</tr>
<tr>
<td>Joshua Chamot</td>
<td>Staff</td>
<td>Max Chandler Robot Art, University of Sussex</td>
</tr>
<tr>
<td>Diego Chavarro</td>
<td>Artist</td>
<td></td>
</tr>
<tr>
<td>Vanessa Chenel</td>
<td>Student</td>
<td>University of Sherbrooke (Quebec)</td>
</tr>
<tr>
<td>Soon Cheon Byeon</td>
<td>Senior Researcher</td>
<td>Korea Inst. of Science &amp; Technology</td>
</tr>
<tr>
<td>Denise Chiavetta</td>
<td>Program Chair</td>
<td>Search Technology, Boise State University</td>
</tr>
<tr>
<td>Stephanie Chism</td>
<td>Professor</td>
<td>Harvard University, Italian National Research Council</td>
</tr>
<tr>
<td>William Clark</td>
<td>Associate Professor</td>
<td></td>
</tr>
<tr>
<td>Maria Coccia</td>
<td>Senior Researcher</td>
<td>University of Cape Town</td>
</tr>
<tr>
<td>Cassie Cohen</td>
<td>Executive Director</td>
<td>South Mountain Community College</td>
</tr>
<tr>
<td>Mathilde Colin</td>
<td>Research Assistant</td>
<td>Wisconsin-Madison, National Science Foundation</td>
</tr>
<tr>
<td>James Collins</td>
<td>Head of Biological Sciences</td>
<td></td>
</tr>
<tr>
<td>Matthew Cooper</td>
<td>Participant</td>
<td></td>
</tr>
<tr>
<td>Bluo Cope</td>
<td>Artist</td>
<td>David Crowley Gallery</td>
</tr>
<tr>
<td>David Crowley</td>
<td>Designer</td>
<td>Richard + Bauer, Technical University of Delft</td>
</tr>
<tr>
<td>Stacey Crumbaker</td>
<td>Professor</td>
<td>University of Iowa</td>
</tr>
<tr>
<td>Scott Cunningham</td>
<td>Graduate Student</td>
<td>University of Cape Town</td>
</tr>
<tr>
<td>William Cyrs</td>
<td>Assoc. Prof., Health Sciences</td>
<td>University of Copenhagen</td>
</tr>
<tr>
<td>Collet Dandara</td>
<td>Marie Curie Research Fellow</td>
<td></td>
</tr>
<tr>
<td>Sarah Davies de Saille</td>
<td>Critical Envir., Data Ctr Adv.</td>
<td>Sociology, CB Richard Ellis</td>
</tr>
<tr>
<td>Stevienna</td>
<td>Staff</td>
<td>Society &amp; Technology</td>
</tr>
<tr>
<td>Luke Denmon</td>
<td>Research Technologist</td>
<td>General Dynamics, DeVry University</td>
</tr>
<tr>
<td>Michael Dennis</td>
<td>Owner</td>
<td>Microchip Technology Inc.</td>
</tr>
<tr>
<td>Richard Diehl</td>
<td>Scenario Facilitator</td>
<td>Ira Domsky Environmental</td>
</tr>
<tr>
<td>Robert Diehl</td>
<td>Staff</td>
<td>McGill University</td>
</tr>
<tr>
<td>Johnathan Dillon</td>
<td>Res. Assoc., Human Genomics</td>
<td>Virginia Tech, NISEnet</td>
</tr>
<tr>
<td>Ira Domsky</td>
<td>Alumni Disting. Professor</td>
<td>Mayo Clinic, Equus Development Corporation, Digital Thinking Network, Buckeye Express, Buckeye Express</td>
</tr>
<tr>
<td>Edward Dove</td>
<td></td>
<td>University of Alberta</td>
</tr>
<tr>
<td>Gary Downey</td>
<td></td>
<td>Bioscience High School</td>
</tr>
<tr>
<td>Kate Duckworth</td>
<td></td>
<td>Sapienza University of Rome</td>
</tr>
<tr>
<td>Megan Dyer</td>
<td></td>
<td>University of New Hampshire, TGen</td>
</tr>
<tr>
<td>Douglas Edgelow</td>
<td></td>
<td>University of California, Irvine</td>
</tr>
<tr>
<td>Daniel Erasmus</td>
<td></td>
<td>Karlsruhe Institute of Technology</td>
</tr>
<tr>
<td>Chris Ewald</td>
<td></td>
<td>Phoenix Public Library</td>
</tr>
<tr>
<td>Vicki Ewald</td>
<td></td>
<td>Science Foundation Arizona</td>
</tr>
<tr>
<td>Iwona Faferk</td>
<td></td>
<td>Portland State University</td>
</tr>
<tr>
<td>Dee Dee Falls</td>
<td></td>
<td>Carnegie Mellon University</td>
</tr>
<tr>
<td>Francesca Farioli</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elizabeth Farrell</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ellen Feigel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Martha Feldman</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Todd Fernandez</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arianna Ferrari</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aimee Fifarek</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leonard Fine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jonathan Fink</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baruch Fischhoff</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Award #0937591

Sept. 1, 2015 - Aug. 31, 2016

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

Mark Fuji
Assistant Director
Portland State University

Ken Galluppi
Senior Scientist
University of North Carolina

Lidan Gao
Chinese Academy of Sciences
Patent Analysis

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

Yun-Csang Ghimn
Postdoctoral Fellow
University of Alberta

Richard Gibbs
Professor, Baylor Coll. Med.
Human Genetics

Brian Gleim
Instructor
Glendale Community College

Jerry Gless
Dep. 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

Laura Graham
Graduate Research Assistant
University of Alberta

Michael Granzow
Graduate Research Assistant
University of Alberta

Henry Greely
Director, Stanford Univ.
Law and Biosciences

Dan Gruber
Participant

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

Carolyn Hart-Lucien
Director, Information Tech.
Pioneer Valley Transit Authority

Sean Hays
Postdoctoral Fellow
University of Bergen

Aaron Heinzmann
Hardware Engineer
Intel

Aaron Herring
Designer
Gould Evans

Brad Herring
Mus. of Life Science, Director
Nanoscale Informal Science Education

Katie Herzog
Graduate Research Assistant
University of Alberta

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

Linda Holman Bentley
Manager, Adult Services Dept.
Burton Barr Central Library

Liz Hormann
Program Manager
South of Market EcoDistrict

Prathma Howe
Participant

Wan-Ling Huang
Assistant Professor
Tamkang University
John Hughes  
Kent Hughes  
**Noela Invernizzi**  
Ali Jackson  
Sol Jaffe  
Anil Jain  
Ann Jarmusch  
Charles Jeffery  
Carol Johnson  
Eric Juarez  
**Nikki Julien**  
Eli Kawam  
Luciano Kay  
Donna Kent  
Timothy Kiehl  
Zach Kieter  
Matt Kim  
Evgeny Klochikhin  
Mitzi Krockover  
Ray Kurzweil  
**Daniel LaDuke**  
Nancy LaPlaca  
Claudia Leon  
Loet Leydesdorff  
Dirk Libaers  
Jiayong Li  
**Leslie Lindon**  
Troy Livingston  
**Jim Lodge**  
Paul Loomans  
**Juan Lucena**  
Eric Luchian  
Connie Mabelson  
Eric Magrane  
Uttam Malani  
**Nikhil Malvankar**  
Tony Maniaci  
Benjamin M. Mann  
Robin Marks  
Florence Matusky  
Catherine May  
**Carol Mayer-Reed**  
Kimberlie McCue  
John McGarity  
Chris McKibben  
Guy McLain  
Maxwell J. Mehlman  
**Denise Meridith**  
Celia Merzbacher  
Daniel Metlay  
Kostalena Michelaki  
Member  
Director  
**Federal University of Parana**  
Indep. Mgmt. Consultant  
Computer Science & Engin.  
Writer / Editor  
Dean, Institutional Planning  
Planning Department  
Participant  
**Participant**  
President and CTO  
Postdoctoral Scholar  
Global Studies  
Artist/Craftsman  
Participant  
Member  
Student  
Senior Consultant  
Member  
Energy Engineer  
Former Policy Advisor  
Project Manager  
Professor  
Public Policy  
Participant  
Founder  
Vice President  
Member  
Associate Professor  
Research Associate  
Attorney  
Graduate Student  
Public Policy  
Postdoctoral Research Assoc.  
Director Product Develop.  
Program Manager  
Staff  
Writer  
Senior Historical Analyst  
Landscape Architect  
Asst. Dir, Research, Conserv.  
Member  
Estimator  
Director  
Professor  
CEO/President  
Staff  
Staff  
Jeff Michelsen  
Nanotech. Industry Liaison  
Teach America  
Development Studies  
Sciencenter  
Michigan State University  
Glendale Community College  
City of Phoenix  
EKLATEK Engineering  
California, Santa Barbara  
Televerde  
Airplayn  
Nanotech. Industry Liaison  
University of Manchester  
Sokolov, Sokolov, Burgess Solutions  
Board of Visitors  
**Western Mass. Electric Company**  
**Arizona Corporation Commission**  
**Eureka**  
University of Amsterdam  
Georgia Institute of Tech.  
Ikologi/Phoenix Rising  
NISEnet  
**NRG Energy, Inc.**  
Phoenix Spokes People  
**Colorado School of Mines**  
Lancaster University  
Mabelson Law Group  
University of Arizona  
Georgia Institute of Technology  
**Massachusetts Amherst**  
ITel  
Defense Science Office  
NISEnet  
Salt River Project  
**Mayer-Reed Architects**  
Desert Botanical Garden  
Nanotech. Industry Liaison  
Underwood Bros., Inc.  
**Lyman & Merrie Wood Museum**  
Case Western Reserve Univ.  
**Denise Meridith Consultants, Inc.**  
Office of Naval Research  
Nuclear Waste Review Board  
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  
Member  
Scottsdale Community College

Sean Murdock  
Fellow & Policy Director  
Nanotech. Industry Liaison

Mark Muro  
Congressman  
Brookings Institute

Richard Neal  
Professor  
U.S. Congress

Paul Nealey  
Technical Delivery Manager  
University of Chicago

Carolyn Nelson  
Prin., Scott L. Libby Elem.  
Bank of America

Lee Nelson  
Member  
Litchfield Elementary School District

Richard Nelson  
Editor  
Board of Visitors

Susan Norton  
Strategic Mgmt of Afford.  
National Geographic

Christina Nulle  
Product Support Manager  
Kaiser Permanente

Thomas Ormston  
Staff  
Apriva ISS

James Paul  
Director, Assess. Services  
House Committee

Jim Paisley  
Member  
Leathers Milligan & Associates

Lisa Parks  
Participant  
Phoenix Spokes People

Spencer Pearce  
Joint Research Centre

Angela G. Pereira  
Adjunct Professor  
University of Alberta

Nils Petersen  
Participant  
The Embryo Project

Pat Petriai  
Writer  
Philosophy

Maggie Pingolt  
Michigan State University  
Re/Max Fine Properties

Zachary Piso  
Real Estate Agent  
Richard + Bauer Architecture

Diane Planidin  
Marketing Coordinator  
Shannon and Wilson, Inc.

Melissa Pulsifer  
Geotechnical Engineer  
PACEHR

Allison Pyrch  
Executive Director / CEO  
Science & Technology Policy Research

Kristin Raffaelle  
Sr. Lecturer, Univ. of Sussex  
Georgia Tech

Ismael Rafols  
Adjunct Professor  
Social, Behavioral & Econ.

Jud Ready  
Professor  
Univ. of California, San Diego

Priscilla Regan  
Composer/Professor  
University of Florida

Roger Reynolds  
Systemist  
Johns Hopkins University

Jack Ring  
Graduate Student  
National Science Foundation

Estelle Robichaux  
Profess, Cell Biology  
Heatsync Labs

Douglas Robinson  
Senior Advisor  
Depave

Michael Roco  
Maker  
Legislative & Public Affairs

Jacob Rosenthal  
Program Director  
University of Manchester

Eric Rosewall  
Participant  
Brookings Institute

Donald Roth  
Staff  
Scottsdale League for the Arts

Marc Rothenberg  
Professional  
Home Depot

Sean Rothman  
Senior Research Associate  
House Committee on Science

Jonathan Rothwell  
Vice President  
Rose Community Development Corp.

Leslie Rycroft  
District Human Resources  
Unicorn Media, Inc.

Dana Sadler  
Staff  

Tind Shepper Ryan  
Executive Director  

Nick Sauvie  
Senior Software Architect  

Michael Savarese  

Michael Savarese

37
Laura Schiavo Curator National Building Museum
Stuart Scott Participant
Evan Selinger Associate Professor
Karen Shakman Project Architect
Mark Shapiro Member
Clare Shelley-Egan Post-doc Researcher
Rob Shields Chair and Professor
Ingrid Shults Educator
Gregory Simonson Professor
Mitchell Small Professor
Scott Smith Founder
Jacque Sokolov Chairman / Senior Partner
Alexa Stephens Public Policy
Karen Tanenbaum Graduate Student
Kerri Stone Student
Reva Stone Assistant Professor
Deborah Strumsky University of Michigan
Matthew Sullivan Participant
Lorraine Szarka Graduate Student
Carlos Tarin Graduate Student
Julie Taylor Graduate Student
Samantha Taylor Participant
Jason Teske Buyer / Planner
Judith Testani Owner/President
D.A. Therrien Instructor
Gerald Thurman Assoc. Dir, Leukemias Prog.
Raoul Tibes Senior Budget Analyst
Mike Trier Associate Editor
Rebecca Toor Program Manager
Joanne Tornow Participant
Dawn Visser Associate
Cassandra Valdez Owner
Steve Valev President
Ian Vandeventer Owner/President
Dawn Visser Owner
Simone van der Burg UMC St. Radboud, Sr. Res.
Anna Waldron Professor
Jacob Warr Policy Advisor
Fred Weber Member
Fan Wei Student
Sarah Weingarz Maastricht University
Eric Welch Associate Professor
Marshall Whitmire Owner
Thalia Williams Owner & Managing Director
Kristine Wilcox Principal
Jeff Williamson CEO/Pres. & Exec. Director
James Wilsdon Director
Carly Wobig Graduate Student
Doug Wolens Filmmaker
Gregory Woodhead Director of Support Services
Chen Xu Graduate Student
Anita Yap Community Advocate

National Building Museum
Rochester Institute of Technology
Iconic Architecture
Board of Visitors
University of Twente
University of Alberta
Collins College
Science, Tech. & Military
Carnegie Mellon University
Changeist, LLC.
Sokolov, Sokolov, Burgess Solutions
Georgia Tech
Colorado School of Mines
Winnipeg Art Gallery
UNC Charlotte
Sociology
Simon Fraser University
University of Utah
University of Utah
Lasertel, Inc.
Testani Design Troupe, Inc.
Scottsdale Community College
Mayo Clinic
Maricopa Community Colleges
Research Media Ltd.
National Science Foundation
Gould Evans
Ivy Consulting, Inc.
MJS Designs, Inc.
Scientific Inst., Quality of Healthcare
Cornell University
Trimet
Nanotech. Industry Liaison
Beijing Institute of Technology
Philosophy
University of Illinois, Chicago
RCI Surveys, Inc.
Kristine Wilcox Consulting
Phoenix Zoo
The Royal Society
University of Illinois
Independent
Corinthian Colleges
Georgia Tech
<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Donghua Zhu</td>
<td>Professor</td>
<td>Beijing Institute of Technology</td>
</tr>
<tr>
<td>Ranu Zunjarwad</td>
<td>Product Designer/Writer</td>
<td></td>
</tr>
</tbody>
</table>

**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                |

**Workshop on Research Agendas in the Societal Aspects of Synthetic Biology Participants**
- Brad Allenby      | President’s Professor          | Arizona State University            |
- Deron Ash         | Program Manager                | Arizona State University            |
- Scott Ashmore     | Graduate Student               | Arizona State University            |
- Denise Baker      | Graduate Student               | Arizona State University            |
- Jennifer Banks    | Program Coordinator            | Arizona State University            |
- Larry Bell        | Sr. VP, Dir. Of NISE Net       | Museum of Science                   |
- Steve Benner      | Founder                        | Foundation for Applied Molecular Evolution |
- Gaymon Bennett    | Assistant Professor            | Arizona State University            |
- Frazier Benya     | Program Officer                | National Academy of Engineering      |
- Michael Bernstein | Graduate Student              | Arizona State University            |
- David Berube      | Director, PCOST               | North Carolina State University     |
- Colette Bos       | Visiting Scholar               | University of Utrecht               |
- Patrick Boyle     | Organization Designer         | Gingko Bioworks                     |
- Ty Branch-Smith   | Graduate Student               | University of Waterloo              |
- Jenny Brian       | Honors Faculty Fellow          | Arizona State University            |
- Miles Brundage    | Graduate Student               | Arizona State University            |
- Jane Calvert      | Reader, Science Technology &  | University of Edinburgh             |
- Innovation Studies|                                      |                                     |
- Luis Campos       | Associate Professor            | University of New Mexico            |
- Lynn Carruthers   | Graphic Recording Artist       |                                     |
- Jae Cheon         | Graduate Student               | Duke University                     |
- Christopher Coenen| Scientific Staff, Innov. Processes | Karlsruhe Institute of Technology |
- Jim Collins       | Professor                       | Arizona State University            |
- Bob Cook-Deegan   | Research Professor             | Duke University                     |
- Kevin Costa       | Managing Director              | University of California - Berkeley |
- Michael Crow      | President                       | Arizona State University            |
- Sarah Davies      | Marie Curie Research Fellow    | University of Copenhagen            |
- Jason Delborne    | Associate Professor            | North Carolina State University     |
- Tess Doezema      | Graduate Student               | Arizona State University            |
- Susan Ehrlich     | Retired Judge                  |                                     |

Award #0937591  
Sept. 1, 2015 - Aug. 31, 2016  
39
<table>
<thead>
<tr>
<th>Name</th>
<th>Position/Title</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karin Ellison</td>
<td>Administrative Professional</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Margret Engelhard</td>
<td>Senior Researcher</td>
<td>European Academy GmbH</td>
</tr>
<tr>
<td>Daniel Escolin</td>
<td>Graduate Student</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Levi Espinoza</td>
<td>Graduate Student</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Samuel Evans</td>
<td>Research Fellow</td>
<td>Massachusetts Institute of Technology</td>
</tr>
<tr>
<td>Erik Fisher</td>
<td>Assistant Professor</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Bob Friedman</td>
<td>VP, Policy &amp; Univ. Relations</td>
<td>J. Craig Venter Institute</td>
</tr>
<tr>
<td>Emma Frow</td>
<td>Lecturer</td>
<td>University of Edinburgh</td>
</tr>
<tr>
<td>Eriko Fukumoto</td>
<td>Graduate Student</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Silvio Funtowicz</td>
<td>Professor II</td>
<td>University of Bergen</td>
</tr>
<tr>
<td>Steve Gamboa</td>
<td>Graduate Student</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Gretchen Gano</td>
<td>Research Fellow</td>
<td>University of Massachusetts - Amherst</td>
</tr>
<tr>
<td>David Gillum</td>
<td>Associate Director, Biosafety</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Theresa Good</td>
<td>Acting Dep. Director, Program Director</td>
<td>National Science Foundation</td>
</tr>
<tr>
<td>Dave Guston</td>
<td>Co-Director, Professor</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Ed Hackett</td>
<td>Professor</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Megan Halpern</td>
<td>Post-doctoral Scholar</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Jaydee Hanson</td>
<td>Policy Director</td>
<td>Center for Food Safety</td>
</tr>
<tr>
<td>Sarah Harper</td>
<td>Graduate Student</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Barbara Harthorn</td>
<td>Director, NSEC</td>
<td>University of California - Santa Barbara</td>
</tr>
<tr>
<td>Karmella Haynes</td>
<td>Assistant Professor</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Nathan Hillson</td>
<td>Computational Staff Scientist</td>
<td>Lawrence Berkeley National Labs</td>
</tr>
<tr>
<td>Ben Hurlbut</td>
<td>Assistant Professor</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Richard Johnson</td>
<td>Retired Partner</td>
<td>Arnold &amp; Porter, LLP</td>
</tr>
<tr>
<td>Pierre-Benoit Joly</td>
<td>Director du LISIS</td>
<td>Institut Francilien Recherche, Innov. et Société</td>
</tr>
<tr>
<td>Ellen Jorgensen</td>
<td>Exec. Dir. &amp; Co-founder</td>
<td>Genspace</td>
</tr>
<tr>
<td>Greg Kaebnick</td>
<td>Research Scholar</td>
<td>The Hastings Center</td>
</tr>
<tr>
<td>Linda Kahl</td>
<td>Director, Legal Program</td>
<td>BioBricks Foundation</td>
</tr>
<tr>
<td>George Khushf</td>
<td>Professor, Director Medical Humanitarian Minor</td>
<td>University of South Carolina</td>
</tr>
<tr>
<td>Harald Koenig</td>
<td>Scientific Staff, Innov. Processes &amp; Impacts of Technology</td>
<td>Karlsruhe Institute of Technology</td>
</tr>
<tr>
<td>Frederick Kronz</td>
<td>Program Director</td>
<td>National Science Foundation</td>
</tr>
<tr>
<td>Todd Kuiken</td>
<td>Sr. Research Associate</td>
<td>The Woodrow Wilson Center</td>
</tr>
<tr>
<td>Jennifer Kuzma</td>
<td>Distinguished Prof., Co-Director</td>
<td>North Carolina State University</td>
</tr>
<tr>
<td>Steve Laderman</td>
<td>Director, Molecular Tools Lab.</td>
<td>Agilent Technologies</td>
</tr>
<tr>
<td>Jason Leard</td>
<td>Federal Ageng</td>
<td>U.S. Federal Bureau of Investigation</td>
</tr>
<tr>
<td>Stephanie Leite</td>
<td>Evaluator</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Rachel Levinson</td>
<td>Industrial/Govt. Res. Liaison</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Cliff Li</td>
<td>Graduate Student</td>
<td>University of Exeter</td>
</tr>
<tr>
<td>Xiao Liang</td>
<td>Graduate Student</td>
<td>Manchester Institute of Innovation Research</td>
</tr>
<tr>
<td>Jennifer Liu</td>
<td>Assistant Professor</td>
<td>University of Waterloo</td>
</tr>
<tr>
<td>Gary Marchant</td>
<td>Exec. Dir., Regent’s Professor</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Claire Marris</td>
<td>Sr. Research Fellow, Deputy Leader of SSHM’s BPPP Research Group</td>
<td>King’s College - London</td>
</tr>
<tr>
<td>Name</td>
<td>Position</td>
<td>Institution</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----------------------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Debra Mathews</td>
<td>Assist. Dir., Science Programs</td>
<td>Johns Hopkins University</td>
</tr>
<tr>
<td>Mary Maxon</td>
<td>Executive Director</td>
<td>Lawrence Berkeley National Lab</td>
</tr>
<tr>
<td>Irene Mendoza</td>
<td>Associate Biosafety Officer</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Morgan Meyer</td>
<td>Assistant Professor</td>
<td>Agro ParisTech</td>
</tr>
<tr>
<td>Clark Miller</td>
<td>Asst. Director, Assoc. Prof.</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Susan Molyneux-Hodgson</td>
<td>Sr. Lecturer, Director of Science &amp; Technology Rsh. Grp.</td>
<td>University of Sheffiel</td>
</tr>
<tr>
<td>Jeff Morris</td>
<td>National Program Director for Nanotechnology</td>
<td>U.S. Environmental Protection Agency</td>
</tr>
<tr>
<td>Richard Murray</td>
<td>Thomas E &amp; Doris Everhart Professor</td>
<td>California Institute of Technology - Pasedena</td>
</tr>
<tr>
<td>Tina Ndoh</td>
<td>Graduate Student</td>
<td>North Carolina State University</td>
</tr>
<tr>
<td>Ken Oye</td>
<td>Associate Professor</td>
<td>Massachusetts Institute of Technology</td>
</tr>
<tr>
<td>Megan Palmer</td>
<td>William J. Perry Fellow</td>
<td>Stanford University</td>
</tr>
<tr>
<td>Eleonore Pauwels</td>
<td>Public Policy Scholar</td>
<td>The Woodrow Wilson Center</td>
</tr>
<tr>
<td>Elizabeth Pitts</td>
<td>Graduate Student</td>
<td>North Carolina State University</td>
</tr>
<tr>
<td>George Poste</td>
<td>Chief Scientist, Regent’s Prof.</td>
<td>Complex Adaptive Systems Institute</td>
</tr>
<tr>
<td>Margaret Race</td>
<td>Sr. Research Scientist</td>
<td>University of CA - Santa Cruz, SETI Institute</td>
</tr>
<tr>
<td>Sujatha Raman</td>
<td>Deputy Dir., Assist. Prof.</td>
<td>University of Nottingham</td>
</tr>
<tr>
<td>Brian Rappert</td>
<td>Professor</td>
<td>University of Exeter</td>
</tr>
<tr>
<td>Jody Roberts</td>
<td>Director</td>
<td>Chemical Heritage Foundation</td>
</tr>
<tr>
<td>Mark Robinson</td>
<td>Assistant Professor</td>
<td>DePaul University</td>
</tr>
<tr>
<td>Patty Ryan</td>
<td>Program Coordinator</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Dan SarewitzC</td>
<td>Center Director, Professor</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Kathryn Scheckel</td>
<td>Asst. dir. Special Projects</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Dietram Scheufele</td>
<td>John E. Ross Professor</td>
<td>University of Wisconsin - Madison</td>
</tr>
<tr>
<td>Debby Scott</td>
<td>Graduate Student</td>
<td>Rutgers University</td>
</tr>
<tr>
<td>Mark Segal</td>
<td>Sr. Microbiologist</td>
<td>U.S. Environmental Protection Agency</td>
</tr>
<tr>
<td>Phil Shapiro</td>
<td>Professor, Dir. Science, Tech. &amp; Innovation Policy</td>
<td>Univ. of Manchester Georgia Inst. of Tech.</td>
</tr>
<tr>
<td>David Sittenfeld</td>
<td>Program Manager, Forum</td>
<td>Museum of Science, Boston</td>
</tr>
<tr>
<td>Jim Thomas</td>
<td>Research Programme Manager and Writer</td>
<td>ETC Group</td>
</tr>
<tr>
<td>Ginni Ursin</td>
<td>Technology Prospecting Lead, Research</td>
<td>Monsanto Company</td>
</tr>
<tr>
<td>Russell VanHerik</td>
<td>Executive Director</td>
<td>Great lakes Protection Fund</td>
</tr>
<tr>
<td>Willem Vermass</td>
<td>Graduate Student</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Kathleen Vogel</td>
<td>Director, Science Technology &amp; Society Program</td>
<td>North Carolina State University</td>
</tr>
<tr>
<td>Wendell Wallach</td>
<td>Lecturer, Consultant, Ethicist</td>
<td>Yale Interdisciplinary Center for Bioethics</td>
</tr>
<tr>
<td>Xiao Wang</td>
<td>Graduate Student</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Jamey Wetmore</td>
<td>Assoc. Director, Assoc. Prof.</td>
<td>Arizona State University</td>
</tr>
<tr>
<td>Lauren Withycombe-Keeler</td>
<td>Post-doctoral Scientist</td>
<td>Leuphana Universität Lüneburg</td>
</tr>
<tr>
<td>Gregor Wolbring</td>
<td>Assoc. Prof., Comm. Rehab. &amp; Disability. Studies</td>
<td>University of Calgary</td>
</tr>
<tr>
<td>Amy Wolfe</td>
<td>Team Leader</td>
<td>Oak Ridge National Laboratory</td>
</tr>
<tr>
<td>Britt Wray</td>
<td>Graduate Student</td>
<td>University of Copenhagen</td>
</tr>
<tr>
<td>Matthew Ykema</td>
<td>Graduate Student</td>
<td>Arizona State University</td>
</tr>
</tbody>
</table>
Ed You  Supervisory Special Agent  U.S. Federal Bureau of Investigation
Jan Youtie  Dir, Policy Research Services  Georgia Institute of Technology
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
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

Lawrence Bell, Sr. Vice President, Strategic Initiatives, Museum of Science Boston
Edward Cupoli, Professor Emeritus, State University of New York at Albany
Heather Douglas, Associate Professor/Chair, Department of Philosophy, University of Waterloo
William Hallman, Director, Food Policy Institute, Rutgers University
Jennifer Kuzma, Associate Professor, Humphrey School of Public Affairs, University of Minnesota
Andrew Maynard, Director, Risk Science Center, University of Michigan
Colin Milburn, Associate Professor, English & Science & Tech. Studies, University of California, Davis
Albert Teich, Research Professor, Center for International Science & Technology Policy, George Washington University

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.
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, Policy Researcher, Science & Technology Policy Institute
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
5. Quantifiable Outputs

Table 1: Quantifiable Outputs - NSF Award #0937591

<table>
<thead>
<tr>
<th>Outputs</th>
<th>Reporting Year-1</th>
<th>Reporting Year-2</th>
<th>Reporting Year-3</th>
<th>Reporting Year-4</th>
<th>Reporting Year-5</th>
<th>Reporting Year-6</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publications resulted from NSEC Support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in Peer Reviewed Journal</td>
<td>18</td>
<td>42</td>
<td>45</td>
<td>39</td>
<td>32</td>
<td>42</td>
<td>218</td>
</tr>
<tr>
<td>in Peer Reviewed Conference Proceedings</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>in Peer Reviewed Book Chapters</td>
<td>10</td>
<td>20</td>
<td>15</td>
<td>20</td>
<td>2</td>
<td>7</td>
<td>74</td>
</tr>
<tr>
<td>Technical Reports</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>Working Papers</td>
<td>7</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>Books</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Theses</td>
<td>10</td>
<td>8</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>in Trade Journals</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Other Journal Publications</td>
<td>2</td>
<td>6</td>
<td>5</td>
<td>2</td>
<td>17</td>
<td>2</td>
<td>34</td>
</tr>
<tr>
<td>Internet</td>
<td>23</td>
<td>9</td>
<td>15</td>
<td>12</td>
<td>6</td>
<td>2</td>
<td>67</td>
</tr>
<tr>
<td>With Multiple Authors</td>
<td>29</td>
<td>43</td>
<td>53</td>
<td>54</td>
<td>33</td>
<td>45</td>
<td>257</td>
</tr>
<tr>
<td>Co-authored with NSEC faculty</td>
<td>29</td>
<td>43</td>
<td>51</td>
<td>49</td>
<td>31</td>
<td>44</td>
<td>247</td>
</tr>
<tr>
<td>NSEC Technology Transfer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inventions Disclosed</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Patents Filed</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Patents Awarded</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Software Licensed</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Spin-off Companies Started</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Degrees to NSEC Students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelors Degrees Granted</td>
<td>14</td>
<td>8</td>
<td>12</td>
<td>12</td>
<td>10</td>
<td>0</td>
<td>56</td>
</tr>
<tr>
<td>Masters Degrees Granted</td>
<td>12</td>
<td>11</td>
<td>9</td>
<td>10</td>
<td>6</td>
<td>1</td>
<td>49</td>
</tr>
<tr>
<td>Doctoral Degrees Granted</td>
<td>14</td>
<td>10</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>39</td>
</tr>
<tr>
<td>NSEC Graduates Hired by</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry</td>
<td>12</td>
<td>15</td>
<td>3</td>
<td>10</td>
<td>8</td>
<td></td>
<td>48</td>
</tr>
<tr>
<td>NSEC participating Firms</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other US Firms</td>
<td>12</td>
<td>15</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>Government</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Academic Institutions</td>
<td>15</td>
<td>12</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>39</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Unknown</td>
<td>10</td>
<td>0</td>
<td>18</td>
<td>13</td>
<td>6</td>
<td></td>
<td>47</td>
</tr>
<tr>
<td>NSEC Influence on Curriculum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Courses Based on NSEC Research</td>
<td>4</td>
<td>7</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>Courses Modified to Include NSEC Research</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>New Textbooks Based on NSEC Research</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Free-standing Course Modules or Instructional CDs</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>New Full Degree Programs</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>New Certificate</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Information Dissemination/Educational Outreach</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workshops, Short Courses to Industry</td>
<td>0</td>
<td>3</td>
<td>8</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>Workshops, Short Courses to Others</td>
<td>5</td>
<td>9</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>0</td>
<td>26</td>
</tr>
<tr>
<td>Seminars, Colloquia, Presentations, etc.</td>
<td>91</td>
<td>137</td>
<td>98</td>
<td>88</td>
<td>75</td>
<td>53</td>
<td>542</td>
</tr>
<tr>
<td>World Wide Web courses</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>
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 2014), and a historical exploration of a critical case in anticipation of the atomic bomb (Guston 2012). 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 (annually since 09) and the Society for Social Studies of Science of Science (F 09; F 10) dedicated to anticipatory governance, and elsewhere. In recent years, Guston has spoke to colleagues at Kyung Hee University, Korea, University of California, Berkeley, University College, London, and University of Sussex (UK), about the mission, ambitions, and organization of the Center, as well as with visitors to ASU from the University of Nantes (France) and the Technical University of Ambatao (Ecuador) to discuss interdisciplinary research and training. Emerging dialogue and policy around responsible innovation (RI) also owes much to the emphasis on RI and anticipatory governance as well, as RI frameworks adopted, for example, by the UK Engineering and Physical Sciences Research Council show significant intellectual inheritances from anticipatory governance.

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 (2014) 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. Our leadership has been recognized by our designation as the lead institution for social and ethical implications of nanotechnology under the new National Nanotechnology Coordinated Infrastructure (via a subcontract from overall lead, GA Tech).
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 – edited by de Ridder *Vignone*, *Miller* and *Barben* – is in its final stages of preparation. 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* 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 13 books published, under review or under contract around Center-related material, seven of which are primary CNS publications.

The Center’s researchers have published, had accepted or submitted for review 269 peer-reviewed journal articles (219 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*),
- politics, policy and innovation studies (e.g., *Science and Public Policy; Politics and the Life Sciences, Research Policy; Journal of Technology Transfer, Review of Policy Research, Research Evaluation; Scientometrics; Journal of Responsible Innovation*),
- law and ethics (*Science and Engineering Ethics; Journal of Law, Medicine, and Ethics, Jurimetrics*),
- foresight (*Technological Forecasting & Social Change; Futures; Foresight; International Journal of Foresight and Innovation Policy*),
- communication (*Science Communication; Journal of Mass Communication Quarterly; Public Understanding of Science; New Media and Society, International Journal of Public Opinion Research; Environmental Communication*),
- urban sustainability issues (*Cities; Journal of Urban Technology, Sustainability Science; Journal of Environmental Planning and Management*),
- other interdisciplinary specialty journals (*Risk Analysis; Leonardo; Appetite; Long-range Planning; China Intellectual Property*),
- broader science and engineering journals (*Proceedings of the National Academy of Sciences; PLoS ONE; Environmental Science and Technology*), and
- specific, NSE-related audiences for
  - scientists (*Journal of Nanoparticle Research; Nanotoxicology; Nature Nanotechnology; Journal of NanoScience and Nanotechnology*),
  - policy makers and business leaders (*Nanotechnology Law and Business*),
  - social scientists and humanists (*NanoEthics*), and
  - educators (*Journal of Nanotechnology Education*).

The Center’s researchers have produced seven 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”
- *Shapira* and *Youtie*, *Journal of Technology Transfer* 36(6) “Nanotechnology and Innovation Policy”
- Invernizzi and Davies, *Journal of Nanotechnology Law and Business* 9(3) “Studying Nanotechnology in the Private Sector”
Center faculty have assumed major leadership roles in creating and contributing to the new *Journal of Responsible Innovation*. Launched by Taylor & Francis in early 2014, *Guston* is the founding editor-in-chief, serving for the first two volumes, and he has now been followed by *Fisher*, who had been one of the associate editors. Jennifer Brian, co-PI on the CNS-ASU associated award to conduct a "Workshop on Research Agendas in the Societal Aspects of Synthetic Biology," edited a special section of *JRF*’s "Perspectives" derived from the workshop.

The Center has 59 non-peer-reviewed publications in trade journals and other journals, including commentaries by Brossard and *Scheufele* (2013) in *Science*, *Guston* (2008) and *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 96 book chapters (79 of which are primary CNS-supported publications), including three contributions to the field-defining *Handbook of Science and Technology Studies, 3rd edition* (2008) and four contributions to the 4th edition (forthcoming 2017), 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 they are a somewhat crude measure of scholarly impact, citations to this body of published work are accumulating – more than 8600 citations as documented in Google Scholar (as of Apr 16), up from 7100 citations in the previous year and more than 4900 citations in Apr 14, roughly 3300 citations in Apr 13, 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 50 from 47 last year, from 38 the previous year, 28 in 2013, 21 in 2012 and 19 in 2011 (indicating precisely 50 publications with 50 or more citations each). (This total does not include the more than 90% of the 531 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 publications that 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. H-indexed papers account for slightly more than 6000, or about 70% of the Center’s citations.¹

CNS-ASU has also attempted to make its research and other products available in other formats, including 39 reports of various types available on the Internet and numerous video and audio clips

¹ In 2014, RTTA 1 colleagues performed a bibliometric analysis of CNS-ASU publications using combined Web of Science and Scopus data and returned similar results, finding 4038 citations in early 2014 compared to 2917 the previous year, and an H-index of 36, accounting for 54% of CNS citations. They also found that citations to CNS-ASU publications accounted for ~40% of all citations to nano social science papers through early 2014. They have further found that mean citation rate for CNS-ASU papers is higher than for non-CNS-ASU papers, and that this difference increased between 2013 (9.86 > 6.10) and 2014 (13.09 > 7.43).
available through the CNS website, YouTube, and other organized blogs. The occasional speaker series is available at vimeo.com/album/1542414 and the Science Café series at vimeo.com/album/1662457.

As evidence of its impact on education, the Center has primarily contributed to the completion of 49 student theses, including 22 doctoral theses, 4 master’s theses, and 22 undergraduate honors theses, across a variety of disciplines. CNS has contributed to the completion of an additional 25 student theses, including undergraduate honors students, STIR collaborators, CNS-Biodesign and CNS-FSE 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 occurred in June 13. While the Center has not succeeded in getting additional follow-up funding to this meeting, it is proceeding with a plan to archive the Center’s work with ASU Libraries.

Center activities have also helped generate additional research projects, including more than $9M of associated and spin-off awards at ASU and roughly $5.4M 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, $34K (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;”

• Wender et al., $2K, ASU Graduates in Integrative Society and Environment Research on “Burdens and Barriers to Terrawatt-scale Photovoltaic Energy;”

• Seager, Selin et al, NSF NUE, $200K, Cross-disciplinary Education in the Social and Ethical Aspects of Nanotechnology, Nov 13 – Oct 15;

• Wetmore et al., NSF, $248K, Capacity Building in Computer Science as a Driver of Innovation, Oct 13 – Sept 15;

• Guston and Fisher, NSF, $500K, NSF SAVI: Virtual Institute for Responsible Innovation, Oct 13 – Sept 16;

• Finn and Guston, NSF, $50K, Informal Learning and Scholarship in Science and Society: A Multi-disciplinary Workshop on Scientific Creativity and Social Responsibility, Mar 14 – Feb 15;

• Guston, Farooque, and Bennett, NASA, $200K, “A Participatory Technology Assessment of NASA’s Asteroid Initiative,” Apr 14 to June 15;

• Guston, Murray and Brian, NSF, $150K, Workshop on Research Agendas for the Societal Aspects of Synthetic Biology, June 14 – May 15;

• Fisher et al., NSF, $313K, STIR City, Aug 15 – Jul 18; and


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., 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;
• 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;
• Arora, Georgia Tech Research and Innovation Conference, $1.5K, Feb 12;
• Shapira (with Gok, PI), Novel data analysis, synthetic biology. $12K, 2014;
• Shapira, Youtie, et al., EU-SPRI, Manchester Summer School on Emerging Technologies, $20K 2014; and

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;
• Scheufele (with PI Wilson), DOE, Developing a User Experience for the Next Generation Nuclear Fuel Cycle Simulator, $1.2M, Sep 11-Oct 14;
• Scheufele (sub-PI with PI’s Larry Bell, Paul Martin & Robert J. Semper), NSF, Nanoscale Informal Science Education Network Award # DRL-0940143 $160K (total center grant: $4.2 million) 2011-2015; and
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:

- seeded the creation at ASU of the new School for the Future of Innovation in Society and the Institute for the Future of Innovation in Society;
- collaborated with ASU’s Biodesign Institute to require integrated societal training of the doctoral students in its Biological Design PhD program;
- collaborated with ASU’s Professional Science Master’s program in Nanoscience to offer a societal training course in the new curriculum;
- collaborated with ASU’s Professional Science Master’s program in Solar Energy Engineering and Commercialization to offer integrated societal training in the new curriculum;
- collaborated with ASU’s 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, as well as other connections between the CNS group and NSE at GA Tech that led to the inclusion of research totaling more than $400K to the successful GA Tech NNCI bid;
- 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 over $37M in awards:
  - 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;
  - Vermass, NSF IGERT, Solar Utilization Network, $3M, Jun 12 – May 17; and

In addition, CNS-ASU researchers have the following associated or collaborative proposals that incorporate CNS ideas under review or in preparation:

- A $137K proposal to NSF on anticipatory governance of self-driving cars, by Foley at UVA with Bennett at ASU.
- A $4M proposal to NSF on infrastructure and hazard mitigation, with Wetmore receiving approximately $1M as co-PI;
- A $750K proposal to NSF by Fisher on collaborative socio-technical learning; and
CENTSS is preparing to lead the Education and Outreach aspect of ASU’s MRSEC proposal in preparation.

While Section 13 Shared and other Experimental Facilities details the visits and other contributions by more than international scholars and practitioners to the Center from roughly two dozen 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 and in Summer 2012 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:
  - RTTA 1/1: that the framing of social science research around “big data” has shifted from general sociological considerations to targeted application areas and privacy concerns; and
  - RTTA 1/1: a rising share of active nanotechnology in publications, indicating engagement with the next generation of R&D.

- **RTTA 2** Public Opinion and Values: From large scale public opinion surveys, CNS-ASU researchers have found:
  - RTTA 2/1: “Spillover” from previous labeling controversies like genetically modified organisms (GMOs) affects the attitudes that people have toward labeling nanotechnology products. Members of the public who pay more attention to ethical, legal and social implications of nanotechnology in the press are more likely to support labeling (Scheufele et al. under review).

- **RTTA 3** researches have found:
  - The importance of capacity building as a valid outcome of public engagement activities (Selin et al. 2016);
  - The importance – through rehabilitating the concept of “obduracy” in the context of public engagement, of the diverse temporalities at play in deliberations about the societal implications of emerging technologies.

- **RTTA 4/4**: Reflexivity and Integration: Through a set of integrative research and educational activities with NSE researchers, CNS-ASU researchers have:
  - With others from the Communities of Integration project and workshops, developed a "comparative integration" framework that accommodates the variety of socio-technical integration projects as either “reformative,” “problematizing,” “facilitating,” or “augmenting” (Fisher et al. 2015).

- **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:
  - The pro-poor promise of a number of nanotechnologies is not playing out well in actual nanotechnology research agendas (various publications).

- **TRC 2**: Working in cross-disciplinary and intervention-oriented fashion, TRC 2 researchers have found:
  - That lack of cross-linkages among innovation actors in Phoenix area limits the opportunities for collaboration, coordination and joint-learning.
  - Through the creation of new evaluation measures, that CNS interventions such as the Science Outside the Laboratory program and the Community Engagement Workshops conducted by TRC 1 are accomplishing their goals of changing the way that their participants think about science, technology, governance, and publics (Bernstein et al. 2015).

**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:
o RTTA 1 researchers have created a biometric search strategy for defining “big data analytics.”
o They have tested new methods for defining synthetic biology bibliometrically, and have included patent citations in this new set of boundary definitions.
o They have advanced methodologies to map and visualize patent data and developed an indicator to represent the extent of diversity and similarity in a patent portfolio.

• RTTA 2 Public Opinion and Values:
o The RTTA 2/1 researchers are coordinating data collections with related efforts at Wisconsin, Singapore, Rutgers, Universität Hamburg, and elsewhere to build comparable data sets that will inform policy making and outreach efforts. 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 3 Anticipation and Deliberation:
o RTTA 3 researchers have codified a new mode of public deliberation that makes use of analog and digital tools to build up the capacity of diverse stakeholders to explore socio-technical change.

• RTTA 4 Reflexivity and Integration:
o RTTA 4 researchers have determined that all four aspects of CNS-ASU’s mission (to research, train, reach out and engage) have been served, and that the Center has “rippling” impacts across a variety of institutions and opportunities for impact.
o STIR has been adopted by new colleagues in tidal energy at University of Washington and in neuro-tech and technology transfer at the University of Szeged, Hungary.

• TRC 1 Equity, Equality and Responsibility
o To help engineers and scientists begin to recognize the need to listen and develop the skills necessary to engage in community development, TRC 1 has conducted and (positively) evaluated several workshops with transferable modules.

• TRC 2 Urban Design, Materials and the Built Environment
o Continued work to develop the Nanotechnology in City Environments (NICE) database, which has drawn more than 14,000 unique visitors during the reporting year. Visits track from 1,000 different cities globally, helping to diffuse information on nanotechnology applications in urban environments.

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, former post-doc Megan Halpern has taken a tenure-track position at Michigan State University, and current post-doc Lauren Keeler will be moved to a visiting assistant professor position at ASU’s School for the Future of Innovation in Society.
• At the graduate level, CNS-ASU has involved more than two dozen graduate students (funded, unfunded, and visiting) in its YR 10 research activities, not including another approximately 20 STIR students. The Center held its fourth Winter School in early 2016. 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 still coordinated by Center senior personnel Miller
during the reporting year and both now located in the new School for the Future of Innovation in Society. CNS-FSE fellow Ben Wender received a Mirzayan Fellowship at the NAS and a follow-on full-time position there, and Michael Bernstein will be starting a post-doc with a large participatory technology assessment project run by CENTSS for DOE.

- At the undergraduate level, CNS-ASU continues to teach classes influenced by the Center, including “Introduction to Science and Technology Policy” which was also turned into an online course at ASU. Even though CNS did not sponsor any InnovationSpace teams in the current year, CNS personnel continued to make contributions in the cross-training of business, design, and engineering students. The associated NUE award, “Nano Ethics at Play,” created a set of workshops and a new undergraduate course that use Lego Serious Play to help teach more abstract concepts in the societal and environmental aspects of nanotechnology.

- In informal science education, CNS-ASU extended its strategic and highly generative partnership with NISE Net into a set of informal and/or participatory engagement activities for NSF, NOAA and DOE.

- In training for scientists and engineers, CNS-ASU continues its relationship with local NSE researchers through collaborating on the successful NNCI node proposal both at ASU and at GA Tech, and by contributing to GA Tech’s bid to lead the NNCI as the subaward for the SEI lead.

**Industrial collaborations.** The most significant private-sector collaborations that CNS-ASU participated in over the past year are:

- Publication of the complete volume 2 of the *Journal of Responsible Innovation*, with Taylor & Francis;
- RTTA 4 continued a dialogue with the Association of Innovation Managers around responsible innovation.

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, although with changes in state requirements this method of fulfilling continuing education credits is less attractive than it had been. 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. Three (on geoengineering, synthetic biology, and biodiversity) were conducted in prior years. At ASU, we continue our deepening relationship with Phoenix Bioscience High School.

**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 hoped to do more, but HRC lost the relevant funding stream. In the reporting year, and using supplementary resources, the Center implemented its program to recruit and mentor undergraduate students from 9 of 12 participating universities for the first of two planned DC workshops that we hope will provide these students with a more concrete understanding of STS and science policy and research opportunities in these fields, and thus better establish them on a trajectory toward graduate school.

**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 was redesigned last year and we continue to tweak it. 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;
- The Virtual Institute for Responsible Innovation (http://cns.asu.edu/viri), which has a site publishing news and linking to a listserv established to link scholars and others with an interest in responsible innovation;
- The Futurescape City Tours site (http://futurescapecitytours.org), which has an electronic version of the FCT guidebook and a short video to provide background instruction for anyone hoping to conduct their own tours;
• The Synthetic Biology workshop site (http://cns.asu.edu/synbio), which maintains a record of the Workshop on Research Agendas for Societal Aspects of Synthetic Biology, including images, video and background papers; and
• The Policy, Science, Technology and Society (POSTS) Scholars program site (https://cns.asu.edu/diversity), which supports the program to increase diversity in STS and science policy fields.

CNS-ASU has been crucial in the creation and maintenance of the Society for the Study of Nanoscience and Emerging Technologies (S.NET; Guston was 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 and its STIR Project hosted the first Communities of Integration workshop in 2013; a subsequent workshop was held in Canada at the University of Waterloo and the third will be held in Cardiff in Summer 16. 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 119 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 in addition to having published commentaries and letters in both Science and Nature, we have published research in Proceedings of the National Academy of Sciences. CNS-ASU researchers have given 900 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 andunsupported invitations to our All Hands meeting, extended to roughly 10 individuals, including students, each year. 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.
  o 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.
  o 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., the design studio conducted in Sp 13 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 have used 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; and
- CNS-ASU has created activities through its ISE collaborations that travel very well, e.g., the Nano Around the World card came developed by TRC 2 not only serves as an activity for our own purposes at Winter School, but it has been adapted by a large NSF-sponsored ISE project on synthetic biology to inform two card games it has developed, and researchers from McGill University (Canada) are adapting the game to foster communication between children with terminal brain cancer and their parents.

• “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
  - 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;” and
  - CNS designed its new POSTS Scholars program to attract and retain undergraduates from under-represented groups into STS and science policy fields.
“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 approximately 119 international visitors, from 26 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;
  - The Center conducted its fourth 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;
  - TRC 2 trained more than 50 students at four universities in three countries through its Community Engagement Workshops on international collaborations and pro-poor technologies; and
  - The associated VIRI has expanded its participation to 20 centers of excellence in thirteen countries, including some smaller counties and those closer to the periphery, e.g., Hungary, Korea and Israel.

- 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 School of Molecular Sciences;
  - CNS supports InnovationSpace, which bridges the schools of design, engineering, and business;
  - 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;
  - CNS collaborative research and teaching activities are included on virtually every large NSF proposal (IGERT, ERC, SRN, STC) submitted by ASU; and
  - CNS forming the core of the new School for the Future of Innovation in Society.

- CNS-ASU partners with community organizations – in previous years the Arizona Science Center and in the recent year the Tempe Center for the Arts – for the production of monthly Science Cafes during the academic year;

- CNS-ASU has served as the nucleus for the creation of an entirely new School for the Future of Innovation in Society at ASU.

“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 more than 900 talks across all audiences since the inception of the Center;
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 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 – e.g., use of FCT techniques by former post-doc de Ridder-Vignone to support local innovation and entrepreneurship Harsville, SC;
- 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:
  - Youtie and Shapira’s provision of data to the Office of Science and Technology Policy, for the regular strategic review that the President’s Council of Advisors for Science and Technology prepares on the National Nanotechnology Initiative;
  - The Center’s collaboration with the CSPO office in Washington, DC on the “New Tools for Science Policy” series, which hosted Guston and Brian in conversation with 30-40 science policy makers in the reporting year on societal research topics in symbio.
  - Scheufele’s ongoing participation in the Sackler Colloquium at the National Academy of Sciences on “the science of science communication,” and as co-chair of the NAS panel on the same topic.
  - TRC 2’s interaction with the Institute for Technology Assessment and Systems Analysis (ITAS), the chief technology assessment agency in Germany.
Monitoring patents and research citations enables analysts to determine the growth and direction of emerging technologies. However, because these counts, as well as the connections between them, can run in the millions and come from a myriad of sources, compiling comprehensive and digestible data presents challenges.

To help overcome these challenges, Dr. Jan Youtie, Dr. Philip Shapira, and their Georgia Tech colleagues have developed research tools to better mine, compile, and present large sets of data and its interconnections to reveal innovation trends and pathways.

As part of SENIC, Youtie and colleagues will update the publication and patent datasets associated with two of these tools—a two-stage bibliometric search method and a patent-mapping system—to create information on nanotechnology research citations and patent documents covering 1990-2016 (mid-year).

These datasets will be used to examine innovation pathways of nano-related applications.

Youtie, Shapira, and colleagues were selected by the Southeastern Nanotechnology Infrastructure Corridor (SENIC), which is partnership under the National Nanotechnology Coordinated Infrastructure program between Georgia Tech and the Joint School of Nanoscience and Engineering in North Carolina, to lead the social and ethical implications (SEI) component. A key element of their work involves developing an I-Corps-plus pilot to encourage researchers involved in SENIC to anticipate commercial applications as well as societal implications. Youtie will serve as the SEI Coordinator for SENIC.

Coordination of Nanotechnology Social and Ethical Issues and Commercialization at Georgia Tech

Dr. Jan Youtie co-leads the Real-Time Technology Assessment (RTTA 1) at CNS-ASU that focuses on the scope of the Nanoscale Science and Engineering (NSE) enterprise and its effects on public values and outcomes.
RTTA 3 explores the role of anticipation in the development of emerging science and technology. Our research studies and invents new methodologies for investigating the future and strives to incorporate a more nuanced understanding of the social dimensions of technical change into future projections and analyses. The new future-oriented methods invented are geared toward building the capacity of lay people, scientists, and engineers, and civic stakeholders to approach the intersections between science, technology, and society with greater reflexivity, foresight and systemic thinking.

RTTA 3 leader Cynthia Selin and colleagues have especially worked to develop alternative experiential and digital methods of engagement that incorporate more affective, visual, imaginative, and sensorial modes of anticipation into deliberation.

In 2015, the RTTA 3 team produced two scenario development research workshops with collaborators from engineering. The first drew together scientists and engineers, legal experts, medical professionals and patient advocates to explore the social, political and economic dimensions of new medical diagnostic technologies. The second workshop investigated alternative futures for waste-water sensing technologies by exploring the variety of ways that different stakeholders might use and interpret data.

Emerge 2015 focused thematically on “the Future of Choices and Values” drawing attention to the relationship between emerging technology, freedom and responsibility. Partnering scientists and engineers with arts and designers lead to inventive thinking and tinkering in a design studios, and public events.

2016 marked the initiation of a new curatorial research project called A Year Without Winter that aims to generate new visions and narratives about living in the Anthropocene.
The new, associated **STIR Cities** project engages broadly with technical experts working with the electric grid in Phoenix, Arizona and Portland, Oregon. It compares how “smart” energy systems are being developed and deployed, how they are being imagined to support desirable forms of social and technological order, and to what extent social science integration with diverse technical experts foster creative reflection and socially responsive innovation.

The **Hungarian STIR Pilot** study explores whether and to what extent approaches associated with Responsible Innovation function similarly in an Eastern European setting.

The **Tidal Energy** project adapted STIR to make engineering design more sustainable by integrating the socio-environmental dimensions of the system into tidal renewable energy research on tidal turbine devices. What sets this STIR study apart is that the engineering team applied the STIR method primarily on their own.

The **STIR Project** established proof of concept for the integrative components of Anticipatory Governance and Real-Time Technology through partnering with over 30 laboratories around the world. Through a number of new projects, and as part of the legacy of CNS-ASU, the STIR approach is being refined, adapted, and extended into new contexts of science and innovation. New projects (described at left) adapt STIR engagement methods as well as the settings of engagement.

Associate Professor **Erik Fisher** leads RTTA 4, which aims to understand the dynamics of nanoscale science and engineering laboratories through ethnographic and other methods. He is PI on the STIR Cities project (NSF #1535120) and was PI on the STIR project (NSF #0849101).
Increasing Diversity in Fields Where Science and Society Intersect

While many career opportunities exist at the intersection of science and society, undergraduates may not know about them, especially if they are first-generation college students. To help increase participation by underrepresented minorities in science policy and science and technology studies (STS) fields, NSF awarded a supplemental grant to CNS-ASU in 2014 to develop a program to give a select group of undergraduate students a better understanding of the careers available and the educational paths to those careers.

The program created a cohort of 25 students—the Policy, Science, Technology & Society (POSTS) Scholars—from 9 universities across the US. The program targeted sophomores and juniors who have already shown an interest in STS and science policy fields, the program includes mentorship and guidance from an STS or science policy faculty member, a personalized research experience, and two summer workshops in Washington, DC, to introduce students to the complexity of the science policy process.

The program attracted nearly twice as many applications as there was open slots. The students participated in programming across Washington DC. In Summer of 2016 the students will come back to Washington DC for a two week program that will focus on careers.

**Dr. Ira Bennett**, the assistant director of education for CNS-ASU, for 10 years has led the Consortium for Science, Policy and Outcomes (CSPO) Science Outside the Lab program, a DC-based workshop that introduces graduate engineering and science students to the science policy process and players. Together with **Dr. Jameson Wetmore**, he leads CNS-ASU education and outreach.
The science museum work originally fostered through collaborations between CNS-ASU and the Nanoscale Informal Science Education Network (NISE Net) has grown significantly. The experience gained developing posters, displays, games, table top demonstrations, and nation-wide training programs with NISE Net to further public reflection on and conversations about emerging technologies has led to an expansion of efforts not only at NISE Net, but at ASU as well.

In the fall of 2014 a number of these efforts were repackaged CENTSS, led by Ira Bennett and Jameson Wetmore. The center has secured over $2.5 million in the past year and a half to further develop museum programs and other public engagement exercises from a number of organizations including the NSF, NASA, NOAA, and the DOE and has strong partnerships with the nation’s leading science museums including the Museum of Science, Boston, Science Museum Minnesota, and the Exploratorium as well as an MOU with our local Arizona Science Center.

CENTSS is leading the development of a series of tabletop demo kits for the Sustainability in Science Museums kits project of the Walton Sustainability Solutions Initiative. https://sustainabilitysolutions.asu.edu/sciencemuseums/

NISE Net has recently rebranded itself the National Informal STEM Education Network to pursue activities beyond Nano. A major grant from NASA helps to fund much of the infrastructure, but CENTSS also collaborates with the network in areas of synthetic biology and the Frankenstein Bicentennial.

"Increasing Learning and Efficacy about Emerging Technologies through Transmedia Engagement by the Public in Science-in-Society Activities" award from Advances in Informal STEM Learning at NSF. Colton is managing the day to day development of projects.
Two primary goals of CNS are to help develop a language for discussing applications and implications of emerging nanotechnologies, and to develop strategies for engaging multiple disciplines in these discussions for a holistic problem-framing and solution space.

To these ends, CNS provides financial support to PhD candidate Camilla Nørgaard Jensen, who also received funding through a NSF-NUE grant to develop a cross-disciplinary curriculum that addresses these challenges.

Jensen leads the development and delivery of the Nano Ethics At Play (NEAP) course, a series of four, 3-hour classes in which students from eleven different disciplines use LEGO® Serious Play® to engage in discussions of ethical, environmental, social, and economical implications of emerging nanotechnologies.

The problem that the NanoEthics At Play project addresses is two fold: 1) Language about nanoethics exists within different disciplines, creating barriers to communication; and 2) Learning about nanoethics is dominated by abstraction and reflection, but it contains little experience and experimentation. This curriculum addresses these problems by introducing material deliberation in the form of LEGO® Serious Play® (LSP), expanding the bandwidth of communication and overcoming linguistic barriers. The LSP process encourages reflection and improves attentiveness in small group discussions and teamwork through hands-on minds-on engagement and shared experiences.

CNS Fellow Camilla Nørgaard Jensen is a PhD candidate in ASU’s School of Design. She collaborates with Dr. Cynthia Selin who leads the CNS-ASU research program on Anticipation and Deliberation.
Researchers and government policymakers are key players in the world of science policy – but though both are crucial for societal process, they may not understand how best to work together. And that can be a big obstacle to success.

Fighting this disconnect is the aim of the consortium’s Science Outside the Lab (SOTL) program. The two-week program, held in Washington, D.C., for the past 10 summers, exposes graduate science and engineering to policy analysts, lobbyists, business people, decision makers and program managers – the key players in the science policy process.

The goal is to give the students a better understanding of their role in the very complex world of research funding and science policy.

But does the program really work? Do the students leave with a better grasp of science policy relationships? Have their minds been opened?

Kiera Reifschneider, a senior physical scientist with the U.S. Government Accountability Office in Washington, D.C., and former post-doctoral researcher at CNS-ASU, and Michael Bernstein, a research associate with the CNS-ASU and a doctoral candidate in the School of Sustainability, used a novel research approach to understand the impact of the SOTL program on participants.

The researchers used a combination of pre- and post- surveys, concept mapping, and “burst reflections”, where students quickly wrote down 5 words they free-associated with each discussion. The words were then scored along emotional dimensions. Results indicate that students leave SOTL with greater humility about the role of scientific expertise in science and engineering policy; greater skepticism toward linear notions of progress from scientific advances; and a deeper, more nuanced understanding of the actors involved in shaping science policy.

Bernstein presented results of the novel assessment approach at the 2015 American Association for the Advancement of Science student poster competition, where the poster won the social sciences category. The achievement was announced in the April 3 issue of Science.

On this project, Reifschneider and Bernstein collaborated with Dr. Ira Bennett and Dr. Jameson Wetmore, who lead the CNS-ASU education and outreach efforts.
“We are planning now for the kinds of futures that we will want to inhabit,” says David Guston, director of the School for the Future of Innovation in Society (SFIS), launched in the fall semester of 2015, when he is asked about the goal of ASU’s new academic unit. He sees the school, in part, as the academic culmination of project activities pursued by the Center for Nanotechnology in Society and its associated faculty over the past decade. With the addition of eight new faculty, multiple research centers and a new undergraduate program – as well as the adoption of affiliated graduate programs including a doctoral program, three master’s programs and a certificate – the school is tackling novel challenges as it is helping birth a new field of research and pedagogy focused on societal aspects of knowledge-based innovation.

The school uses a transdisciplinary approach in examining the role of innovation in shaping society, and vice versa, including the interplay of both technical and social elements, science communication, responsible innovation, and the formation of effective science and innovation policies. Faculty, many who have pursued research in the societal aspects of nanotechnology with CNS-ASU, have backgrounds in social sciences, law and policy, renewable energy, biology and conservation, engineering, journalism, chemistry, global development, physics, and more. Students at the new school study ways of making and studying futures, the processes and politics of innovation, systems of knowledge and technologies, etc.

For more information about the School for the Future of Innovation in Society, visit [sfis.asu.edu](http://sfis.asu.edu).

**David Guston** | Arizona State University  
Director, School for the Future of Innovation in Society  
Professor, School of Politics and Global Studies  
Director, The Center for Nanotechnology in Society (CNS-ASU)  
Co-Director, Consortium for Science, Policy and Outcomes (CSPO)
The Virtual Institute of Responsible Innovation (VIRI) was created to accelerate the formation of a community of scholars and practitioners who, despite divides in geography and political culture, will create a common concept of responsible innovation for research, training and outreach - and in doing so contribute to the governance of emerging technologies under conditions dominated by high uncertainty, high stakes, and challenging questions of novelty.

The Institute’s mission is to develop and disseminate a sophisticated conceptual and operational understanding of RI by facilitating collaborative research, training and outreach activities among a broad partnership of academic and non-academic institutions.

The first annual meeting of VIRI was held July 14 to 16, 2015 in Sussex, UK organized by ASU and hosted by SPRU, the Science and Policy research Unit at the University of Sussex. The meeting featured overviews of projects by current institute members and then focused on presentations by early career researchers from institutions in Brazil, Spain (Basque Country), Sweden, the Netherlands, Norway, the U.K. and the U.S. Discussion sessions followed, led by doctoral student Brenda Trinidad of ASU, around the creation of a virtual library of teaching materials for Responsible Innovation, one of the major goals of the VIRI project.

VIRI also funded 2015 summer research for a number of early career scholars, allowing Seokbeom Kwon of Georgia Tech to visit SPRU, Beverley Gibbs of the University of Nottingham to visit UVA, and Megan Halpern of ASU to visit the University of Copenhagen.

VIRI PI David Guston and co-PI Erik Fisher have been included as collaborators on several European-level project proposals on responsible innovation.

David Guston | Arizona State University
Professor, School of Politics and Global Studies
Director, The Center for Nanotechnology in Society (CNS-ASU)
Director, School for the Future of Innovation in Society (SFIS)
Director, Virtual Institute for Responsible Innovation

Research, education and outreach activities at CNS-ASU are supported by the National Science Foundation under cooperative agreement #0937591
8. Strategic Research Plan – CNS-ASU beyond NSF Funding

The long-term research goals of CNS-ASU have been 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 throughout 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 2014).

In the eleven years of the Center – as documented elsewhere in this report – we have demonstrated the ability to perform RTTA and to build the capacities of foresight, engagement and integration that represent the vision of anticipatory governance. In looking beyond the expiration of the Center’s funding (in August 2016 after a planned no-cost extension), there are at least three important ways in which we plan to extend the life of CNS-ASU, its personnel, and its core intellectual contributions: 1) continued project funding for Center personnel on associated and spin-off awards; 2) continued project funding for Center personnel on large, collaborative S&E awards; and 3) infrastructural and other support from a new academic organization at ASU.

1. Associated and spin-off awards. To date, ASU members of CNS have been awarded roughly $7M in associated and spin-off funds, making the share of such awards approximately 50% of the total amount of the 10-year CNS-ASU award plus supplements and closer to 70% or more of the total CNS award retained at ASU. We expect to be able to continue on at least this same pace, if not increase, as a) some infrastructure will be taken over by the new academic organization at ASU (see #3) and b) we have added additional faculty capacity in the societal aspects of emerging technologies, including Andrew Maynard, Diana Bowman, and Michael Bennett, who joined the new School for the Future of Innovation in Society (see below) in August 2015. Among the associated awards, the Virtual Institute for Responsible Innovation (VIRI) provides an excellent opportunity to continue international collaborations into the near future, and the awarding of an NNCI node to ASU, as well as the SEI coordinating role for NNCI as a subcontract from GA Tech (see below).

2. Large collaborative awards. To date, CNS-ASU has partnered in more than $33M in large collaborative awards with science and engineering colleagues. These awards often allow CNS-ASU personnel to fund curricular and co-curricular projects (e.g., Science Outside the Laboratory, which began its CNS life under-written by the Center and is now “pay-to-play”), graduate students (e.g., Miles Brundage on the SUN IGERT and the VIRI), or some additional summer salary. ASU as an institution is getting more and more successful in competing for such awards, and its internal procedures are becoming more sophisticated at including social sciences early enough in the research process (e.g., by appointing an assistant vice president for research/social sciences reporting to the VPR). CNS earned an important share of ASU’s NNID bid – one that would continue bringing an increasing number of visiting students and scholars to the Center for 5-10 years and allow the continuity of such programs as the Winter School. The new Center for Engagement and Training in Science and Society, which is significantly a spin-off of CNS-ASU, is also coordinating the education and outreach aspects of ASU’s upcoming MRSEC bid.

3. New academic organization at ASU. More important still is an effort that PI Guston and senior investigator Sarewitz – as co-directors of the Consortium for Science, Policy and Outcomes – have been pursuing based on a request last year from ASU President Michael Crow. Since opening at ASU in 2004, CSPO has been a research center that has also participated significantly
in curricular activities – and CNS has been its largest project and test-bed. Following preliminary
discussions with Crow and Provost Rob Page in Sp14, Sarewitz and Guston commenced planning
for a reorganization of CSPO into a degree-granting and tenure-holding graduate School for the
Future of Innovation in Society (SFIS), a university-wide Institute for the Future of Innovation in
Society (IF/IS), and a broader array centers in addition to CNS held in consortium as the new
with Guston as its founding director, reporting to (new) Provost Mark Searle. The Institute is also
founded under the joint, interim leadership of Guston and Sarewitz.

IF/IS will chart the responsible role of knowledge-based innovation at ASU and throughout society,
asking the question, “How are universities and other knowledge institutions best organized to make the
most responsible contributions to society?” The Institute, the School and CSPO place human choice and
responsibility at the forefront of considerations of innovation. They are committed to the ideas that:

- Innovation is a complex process in which social and technical elements and their interactions are
  mutually constitutive in creating desired outcomes;
- Knowledge must also be understood as contextual, contingent, and pluralistic; and thus
- Future-making needs to be a more interdisciplinary, more anticipatory, and more democratic
  practice.

The mission of IF/IS will be to help embody these ideas across ASU and to develop them broadly
throughout society, through an ambitious and integrated agenda for research, engagement, and training.
The mission of SFIS will be to instill these ideas in the next generation of (graduate) students, including
those (at the PhD level) who will contribute to new knowledge and practice, as well as those (at the
Master’s level) who will translate this knowledge for public and private audiences, domestically and
internationally. IF/IS will comprise an array of centers, each roughly equivalent in size or scope to CNS.
Its current array includes CNS-ASU (Guston, director), the Center for Engagement and Training in
Science and Society (CENTSS; Bennett and Wetmore, co-directors), the Risk Innovation Laboratory
(RIL; Maynard, director), the Center for Energy and Society (Miller, director), and the CSPO DC Center
(Sarewitz, director). In the new ASU fiscal year (1 July 2016), we will add the Center for Science and the
Imagination (CSI; Ed Finn, director) and the Center for Biopolitics, Bioeconomics and Biosociety (CB3;
Robert Cook-Deegan, director), and centers for innovation and development (Netra Chhetri, director) and
the study of the future (Selin, director), will be founded imminently. In the coming academic year, we
plan to search for a director for a Center for Engineering, Policy and Society (CEPS). In addition to these
core centers, the Institute will engage allied centers from elsewhere at ASU, including the Center for Law,
Science and Innovation, the Center for Biology and Society, the Center for the Future of War,
PlanetWorks, and the Center for Biodiversity Outcomes. It will also engage affiliated non-ASU (and
non-US) centers such as those that are part of VIRI plans to take on remaining CNS-ASU staff.

SFIS houses the curricular activities in which CNS-ASU has been active, including the PhD in Human
and Social Dimensions of Science and Technology, the Master of Science and Technology Policy, and the
graduate certificate in responsible research and innovation. It will also include related graduate degrees
such as the Master of Science in Global Technology and Development [GTD] and the Master of Arts in
Applied Ethics and the Professions. The School also plans to create new degree programs related to
research areas and specific courses that CNS has pursued, including: a master’s degree in sustainable
futures, related to the foresight capacity built by the Center and the studio on the “Future of Phoenix” that
Wiek and Selin developed to much acclaim; a master’s degree in science-in-society for formal and
informal educators, related to the engagement capacity built by the Center and supported by new part-
time, non-track hires Rae Ostman (extending connections with NISE Net) and Darlene Cavalier
(institutionalizing the relationship begun in the ECAST spin-off); and a master’s degree in the intersection
of STEAM/design and urban issues, related to the “nano and the city” and art-science nexus that CNS has
explored. It will also develop a new PhD program to pair with GTD. The School has also developed an
undergraduate curriculum in Innovation in Society, including a BS, a BA, a minor and a certificate – all to be launched in Fall 2016 under the leadership of Wetmore, undergraduate director.

The relationship between these new organizations and CNS-ASU is terrifically important, as many people and activities initially associated with the Center will find a more permanent home in the new School and Institute. SFIS will become the tenure home of CNS-related faculty Guston, Sarewitz, Miller, Wetmore, Fisher and Selin, as well as the academic home of non-track faculty such as Bennett, Ostman, and Cavalier. The administration has invested approximately $1.2M in salary + benefits for faculty in the School arriving in Fall 2016, and we expect a similar investment in the coming year – especially if the plan to allow SFIS to hire two faculty members to be shared with each of ASU’s six schools of engineering persists. The Institute and the expanded capacity at CSPO will help extend the Center’s emphasis on responsible innovation and anticipatory governance to new audiences at ASU and beyond. Planned partnerships with non-US institutions (VIRI partners) will revolve in part around themes of innovation, responsibility and sustainability – themes that CNS has made significant efforts to articulate through its current TRCs – and consolidated in the VIRI.

Some of CNS-ASU’s capacity will remain within the center bearing its name. Other capacities – particularly the education and outreach activities – will be captured by CENTSS, and its close relations with the Biodesign Institute and the Ira A. Fulton Schools of Engineering will be manifest in CB3 and CEPS, respectively.

While most of the School and Institute are currently housed within the same building in which CNS-ASU has been located, ASU plans to provide newly constructed, contiguous space with a single School/Institute identity for Fall 2018.
9. Research Program and Accomplishments

RTTA 1: Research and Innovation Systems Analysis (RISA) (Georgia Tech)

Personnel – faculty and senior participants

Philip Shapira, (Georgia Tech, professor, Public Policy) (Georgia Tech PI)
Jan Youtie (Georgia Tech, principal researcher, Enterprise Innovation Institute and adjunct, School of Public Policy) (team co-leader; GT Co-PI; CNS-ASU Co-PI)
Alan Porter (Georgia Tech, professor emeritus, ISYE and Public Policy)
Juan Rogers (Georgia Tech, professor, Public Policy)

Other Personnel: graduate students (4), undergraduate students (2), visiting scholars (3)
Graduate students: Sanjay Arora (Public Policy), Yin Li (Public Policy), Seokbeom Kwon (Public Policy), Sahra Jabbehdari (Public Policy, June 2014-May 2015)
Undergraduates: Joshua Jacobs (International Affairs, April 1, 2015-April 30, 2016)
Visiting Scholars: Ying Wang (Beijing Institute of Technology, Management), Xuefeng Wang (Beijing Institute of Technology, Management), Daniele Rotolo (Science Policy Research Unit, University of Sussex), Jianhua Liu (Chinese Academy of Science), Haoshu Peng (Chinese Academy of Science), Jannik Schuehle (Karlsruhe Institute of Technology)

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 – develops 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 Program and Accomplishments, RTTA 1/1

RTTA 1/1 Organization, Structure, and Trajectories of Emerging Nanoscience originally constructed a large-scale set of global datasets of nanotechnology research publication records comprised of roughly 1 million from the Web of Science’s Science Citation Index (SCI) covering the period 1990-2014. In addition to the publication dataset, we also have worked with a patent database from PatStat that includes more than 200,000 nanotechnology patent documents.

The database originates out of a two-stage bibliometric search method that was developed and published in Porter, Youtie, Shapira, Schoeneck (2008) and updated in Arora, Porter, Youtie, Shapira (2013). This method is emerging as a public tool that other research groups are using or adapting. The former article describing the database has attracted 299 citations in Google Scholar (as of March 15, 2016) and 145 citations in the Web of Science.

In this closing period of the center, RTTA 1/RISA has focused on seeding efforts in other emerging technologies. We have conducted analyses of Big Data Analytics which has begun from a systematic effort to create a bibliometric search strategy for defining the field, which was published in Zhang, Schuehle, Porter, Youtie (2015). We also have applied the method for understanding issues raised
in articles written by social scientists about emerging technologies in Shapira, Porter, Youtie (2010) to obtain similar insights about Big Data Analytics. The resulting article from Youtie, Porter, Huang (to appear) finds that eight sub-literatures are important in framing social science research about Big Data and that these literatures have evolved from general sociological considerations toward applications issues and privacy concerns. This work is being co-supported through a grant from NSF (award number 1527370) and being performed in parallel and with an objective of sharing information with the US Government Accountability Office, which is performing a technology assessment of the topic. Additional work in this area includes:

1. Cybersecurity and the Internet of Things are among the fastest growing subtopics in the Big Data Analytics domain (Zhang, Chen, Zhang, Porter, Zhu, Lu, J., Online, 2016)
2. NSF relies to a greater extent on multi-program funding from different fields than does the National Natural Science Foundation of China to ramp up funding for Big Data Analytics (Huang, Youtie, Porter, Wang X., under submission with PLoSOne)

We also have seeded efforts to bibliometrically define the synthetic biology domain. We have improved upon existing methods, which have either been too narrow or too broad, by extracting keywords, performing noise ratio tests, and applying exclusion terms. For patents in the domain, we conducted an additional set of boundary definition tests based on several rounds of patent citations (Kwon, Youtie, Shapira, in process). The resulting search term identified 7,700 papers worldwide, of which nearly 3,000 had US authors. These papers involved more than 1,800 US reprint authors and another 253 authors who were principal investigators on grants indexed through the Star Metrics system. We provided these records to RTTA 2 colleagues in support of their synthetic biology survey.

Additional selected findings from this research in the reporting year include:

- Nanotechnology publications from grant-sponsored research exhibit higher impacts as measured by journal ranking and citation counts than research that is not grant sponsored (Wang and Shapira 2015).
- 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).

Research Program and Accomplishments, RTTA 1/2

RTTA 1/2 advances knowledge about nanotechnology commercialization in the US and globally, through bibliometric and patent analysis methods, web scraping, but also through the creation of a corporate panel data set. A corporate panel 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 used our publication and patent datasets from RTTA 1/1, extracted articles authored by private companies and patents assigned to private companies, grouped these together, and developed a corporate panel from those companies with four or more publications or patents (to ensure that the nanotechnology activity accounted for a sizable quantity in the corporate organizations).

Much of our work has focused on tracking and analyzing R&D strategies of small and medium-sized enterprises (SMEs). In prior years, we found evidence of two different strategic approaches pursued by SMEs 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 and Shapira 2013). We also observed that one in ten small and medium-sized nanotechnology firms are ultimately 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 2014). A study published in that past year found that for SMEs maintaining independent operations, some of these firms publish to selectively manage and disclose publicly-funded work, even though publishing risks limiting the firm’s ability to appropriate value from its R&D (Li, Youtie and Shapira 2015).

We have extended our work into diverse application areas. Our work suggests that the path to take-up of nano-enabled commercial applications is not smooth. In graphene, the discovery-to-application cycle is accelerated and rapidly globalized, but growth patterns vary in different application areas (Shapira, Youtie and Arora 2012) and patents and publications are not significant predictors of product development (Shapira, Gök, Yazdi, 2015). Nano-enabled drug delivery analysis shows that even though breast cancer and Alzheimer’s disease have different pathologies, they hold some developmental pathways in common (Ma, Porter, Aminabhai, Zhu 2015). Likewise, Dye Sensitized Solar Cells offer unique advantages but compare less favorably with incumbent technologies on conversion efficiency and long-term stability (Wang, Qui, Zhu, Mitkova, Lei, Porter 2015).

In prior years, we reported on development of a methodology for visualizing patent diversity. The central methodological advance is the creation of patent maps from transformed international patent classification (IPC) categories which unpack hierarchical groupings and reassemble them to better reflect the distribution of patents. This year saw the development of an indicator to represent the extent of diversity and similarity in a patent portfolio (Kwon, Porter, Youtie, 2016). The indicator quantitatively demonstrates that graphene is a field with a research orientation that is focused on a cluster of disciplines but has many applications, while nano-enabled drug delivery follows the reverse pattern.

Another methodological advance has been our ability to scale-up analysis of small firm websites or “webscraping.” We used manual methods for webscraping of these sites in prior work, but were only able to apply this method to 20-30 firm websites (Youtie, Hicks, Shapira, Horsley 2012; Arora, Youtie, Shapira, Gao, and Ma 2013; Arora, Youtie, Li and Shapira 2015). In the current work, we have been able to increase the order of magnitude of firm websites to 300 and use the results from current websites and archived websites in the Wayback Machine (archive.org) to address questions about “Triple Helix” effects and strategic pivots on firm growth (Li, Arora, Youtie, Shapira 2016). We find that it is the mix of partners from different sectors, rather than the depth of partnerships, that matters in SME performance.

Contributions to “ensemble-ization” or other center-wide activities.

RTTA 1/1’s co-authored publications with TRC 2 on drivers of adoption of manufactured nanotechnology products in the building construction industry began through a collaboration between doctoral students in RTTA 1/1 (Arora) and TRC 2 (Foley) at an CNS-ASU All Hands meeting in 2010. A presentation at the first S.NET Conference workshop led to an article on environmental, health, and safety in nanotechnology published in 2011 which is co-authored with a CNS-ASU PhD+ graduate. This publication would have never been possible without access through CNS-ASU to the ASU graduate student who was a scientist in the nanotechnology environmental, health, and safety area.
In addition, there are several other activities to which RTTA 1/1 has contributed:

- RTTA 1/1’s organization of the EU-US Transatlantic Workshop on Nanotechnology Research and Innovation Policy included two researchers from CNS-ASU, including one from RTTA 3.
- RTTA 1/1 provided listings of reprint authors for surveys performed by RTTA 2, including the most recent synthetic biology survey.
- RTTA 1/2 is examining the “green” nature of nanotechnology applications in conjunction with TRC 2.

RTTA 1/1 (Shapira, Youtie) have also shared their publication and patent datasets and search strategy with colleagues at CNS-Santa Barbara and attended the All Hands meeting for CNS-Santa Barbara, January 31-February 1, 2014 to share research directions and plans for joint research. RTTA 1/1 also co-developed and submitted a joint proposal to the NSF STS program; although the proposal was not funded, it did represent a productive collaboration. RTTA 1 researchers also co-developed (with Luciano Kay at CNS-UCSB) an entry for the highly-regarded, traveling “Places and Spaces” exhibit (http://scimaps.org/exhibitions).

The organizations and individuals with whom RTTA 1 researchers have collaborated (structured based on the intellectual trajectory of the group) reflects an extensive network of domestic and international participants in this research enterprise.
**RTTA 3: Anticipation and Deliberation**

**Personnel: Faculty and senior participants**
Cynthia Selin, RTTA 3 leader (ASU, assistant professor, School for the Future of Innovation in Society, School of Sustainability)
Lauren Withycombe Keeler (ASU, Postdoctoral Scholar, CNS)
Dehlia Hannah (ASU, Assistant Research Professor, SFIS and Arts, Media and Engineering)
Hannah Star Rogers (ASU, Postdoctoral Scholar, CNS, since Aug ’15)
Megan Halpern (ASU, Postdoctoral Scholar, CNS, through June ’15 now Assistant Professor, Lyman Briggs College and the Residential College of Arts and Humanities, Michigan State University)

**Goals.** As a whole, RTTA 3 problematizes conventional deliberative approaches to anticipation that unreflexively predict technological outcomes. Instead, this research pursues anticipatory governance by honing in on future-oriented methods informed by plausibility (Selin 2011; Ramirez & Selin 2014) and drawing on STS perspectives path dependency, co-production and responsible innovation.

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. This program has not been active in this reporting year. RTTA 3/3 Probing Future-Oriented Deliberation probes in experimental settings the frameworks, inputs, structures and qualities of future-oriented deliberation. RTTA 3/4 Futurescape City Tours (FCT) builds on the foregoing and implemented a large-scale citizen engagement activity that included independent and joint deliberation of six groups of locally representative lay citizens from across North America on issues related to nanotechnology and the city.

**Research Accomplishments and Plans, RTTA 3/1: Futures of Foresight.**
RTTA 3.1 explores and assesses alternative approaches to imagining plausible futures of technology in society. Two main research and curatorial programs were the focus of YR 11 activity: the art/science collaboration of Emerge, and a new project entitled “A Year Without Winter”.

**Emerge: Artists And Scientists Redesign The Future**
This art-science event and research project gathers artists, designers, researchers, scientists, engineers, and audiences to imagine possible futures and explore the ways those futures are devised. Since its co-founding by Selin in 2012, Emerge has, each year and with different themes, explored the intersections of art, science, technology, and design by asking challenging questions about our choices about where our lives are headed by building, sharing, and experimenting with visceral experiences with the future. Part performance, part hands-on interactive experience, the now annual town-gown event explores the ways we are already creating the future and asks us to think about how we ensure it is the future one we have chosen. In doing so, Emerge has pushed the envelope in experimenting with deliberative methods and convening moments for critical thinking through workshops, research, and public events.

In YR 11, RTTA 3 has continued to play a lead in the design and implementation of Emerge. The Future Design Studio (FDS), a visitation at Emerge 2015, has proven to be a rich source of continued research and inspiration for future work. The project guided visitors through a brief design process to help them create prototypes of artifacts from the future. Improvisational actors from The Torch Theatre then created a performance that explored the world in which some of those artifacts might exist.

Currently, YR 11 postdoctoral scholar Megan Halpern (now at University of Michigan) is in the middle of
the revise and resubmit process with an article about the FDS for the Participatory Design Conference (PDC 2016). Like many design-based conferences, PDC is peer reviewed and highly selective. Proceedings are published by the ACM (Association for Computing Machinery) and are on par with, or cited more often, than most design journals.

Additionally, Halpern and co-authors has submitted a NSF proposal to turn FDS into a first year orientation activity to get STEM students thinking about the social and ethical implications of science and technology. This is an EAGER proposal with the potential to grow to a full IUSE (Improving Undergraduate STEM Education) project to develop ways of using making and performance to teach values, ethics, and social/cultural implications as part of a STEM education.

Halpern is also first author on a manuscript recently accepted for a special issue of BSTS on Science Fiction. The article, "Stitching Together Creativity and Responsibility: Interpreting Frankenstein Across Disciplines", is currently in the hands of copy editors for the journal. Halpern is also actively drafting a short book on *Frankenstein* for CSPO’s Rightful Place of Science series with an expected submission date summer ’16.

Emerge ’16, scheduled for April 29th, raises questions about possible futures around the theme of sports. CNS-ASU post-doctoral researcher Hannah Rogers has acted as Director of Research and Collaboration, leading efforts to create five research projects with interactive components. These activities are an extension of her dissertation research “The Practices of Art and Science” (Cornell, 2012). For example, artist Adam Flynn’s team of artist and designers will use climate change data about the warming and drying effects in much of the southwestern US as a basis for the design of an imagined climate change sport called Cistern, which involves “stealing” water from other players. Members of the public will have a chance to talk with Adam about climate change and the sports it might produce, as well as having a chance to play the game.

The 2016 Emerge event is expected to attract 5,000+ members of the public to experience collaborations by more than 18 groups of artists and scientists. Eight social science researchers will be involved in gathering data for four distinct projects through the event. In addition, Rogers’ research team will collect data on interactions between artists/scientist collaborators and from participants about their Emerge experiences. Rogers and her team will participate in each of these aspects of Emerge to 1) create cutting edge research protocols to simultaneously investigates questions about the roles of artists, scientists, and hybrid practitioners, 2) produce new knowledge and present it through novel methods, and 3) provide the Emerge team with evaluative information to understand public engagement and improve future events.

At present, five research experiences have been planned for the 2016 event. Research protocols have been developed for each and publication plans are underway. Each research experience uses a novel approach for collecting data and offering participants an interactive experience. A post-survey for audience members to receive following the event has been designed, with IRB approval pending. Possible publication venues include NordiChi’s Future Scenarios panel, *Leonardo*, and *Configurations*; additional popular press publications will also be covering visitations including Slate’s Future Tense and Arts Daily.

**Cross-fertilizations: Art & Science in STS**

Inspired by Emerge 2012, Selin published in YR 11 a co-edited special issue derived from the scholarly dialogue at the Oxford Futures Forum (held at University of Oxford in 2014), focused on the intersections between future scenario thinking and design thinking, building on the work on mediated
scenarios initiated within RTTA 3. Included in this special issue is an article led by Selin called “Scenarios and Design: Scoping the Dialogue Space.”

Halpern co-organized a three panel stream at the Society for the Social Studies of Science (4S) conference with Rogers, Hannah, and past CNS postdoctoral scholar Kathryn de Ridder Vignone. The panels invited submissions that focused on art and science studies. Panelists included noteworthy scholars Hanna Rose Shell (MIT) and Trevor Pinch (Cornell University). The panelists are currently working on a book proposal inspired by this panel. The aim is to develop an edited volume that would function as a kind of handbook for the fledgling field of art/science studies, and features chapters from some of these scholars.

A Year Without a Winter
Dehelia Hannah, an Assistant Research Professor jointly appointed in ASU's School of Arts, Media and Engineering and the School for the Future of Innovation in Society, joined CNS in July 15 to extend CNS work on with a broad array of "scenaric devices" like designed objects, images and experiences. She brings her training in philosophy of science, aesthetic theory, and curation of art/science research and exhibitions to bear on a set of research, outreach and education offerings that create new paths in the future of foresight. Over the years, CNS-ASU has been on this vanguard of a “material turn” in public engagement activities and has been active in pursuing novel ways to produce new future-facing narratives. With Selin, Hannah's primary activity during this period was the initiation of a new project called A Year Without a Winter, an international collaborative project aimed at cultivating imaginative comprehension of climate change through a collective thought experiment. Staged as part of ASU's Frankenstein Bicentennial Project, A Year Without a Winter considers the profound creative, scientific and political consequences of the global climate crisis remembered as the 'year without a summer,' a cooling episode set into motion by the eruption of Mount Tambora in 1815. If, as the story goes, Mary Shelley was inspired by the atmosphere of sublime horror occasioned by this profound environmental disturbance, what visions, stories and insights might be forged in response to imminent climate futures?

Over the past nine months Hannah and Selin have set in place the architecture of a radically transdisciplinary project by articulating the central research questions at the core of the project and establishing a network of scholars and artists with whom we will collaborate over the next three years to produce workshops, publications, exhibitions and pedagogical activities. Our focus is at once thematic and epistemological: How do we viscerally and imaginatively inhabit the worlds described to us by the best available climate models and the trajectories of change that they predict? And how can we use our hindsight into the aftermaths of a historical climate crisis in order to reorganize our understanding of the situation in which we are immersed today?

In YR 11, Selin and Hannah have presented the project at multiple venues worldwide and have planned several events and publications for the coming months. In Jan '16 we launched a website (www.ayearwithoutawinter) that hosts scholarly essays, artwork and literature and serves as a platform for our growing research network. We have also contributed to several transdisciplinary collaborations, that each help to crystallize a distinct aspect of the research and its practical outcomes. For instance, in order to explore how scientific data become not only intellectually comprehensible, but personally resonant, Hannah and Selin collaborated with an artist, Adrienne Jenik (Director of the School of Art, ASU), and an environmental social scientist, Dave White (Director of the Decision Center for a Desert City, ASU), to explore epistemologies of anticipation through practices ranging from divination to prediction at the Carnegie Desert Cities Symposium, ASU, November 19-21, 2015. Another project launched in YR 11, working with meteorologist Melissa Bukovsky (NCAR), we explored the question of how A Year Without a Winter could be defined scientifically and when it could be projected to occur based on current climate model intercomparison data. This research forms the basis of an online
interactive map that we are developing to enable users to learn about how specific geographical locations will be affected by climate change as well as to input qualitative reflections about the varied cultural indicators and significance of seasonal change around the globe.

A third project in YR 11, with Ariel Anbar, Hilaire Hartnett and Stephen Romaniello of the School of Earth and Space Exploration at ASU, we designed a workshop for 100 members of the ASU community called “Planetary Design: Climate 3.0.” The event engaged participants in envisioning more desirable climate futures through transdisciplinary dialogue. We sought to reframe the discussion in terms of a design philosophy that emphasizes the need to bring about both different conditions in Earth systems and new social norms and practices of interacting with those physical systems. The narrative force of A Year Without a Winter offered one exemplary case through which participants were invited to think about Anthropocene futures.

During the last nine months, several events have been planned that will take place later this year. In collaboration with the Center for Science and the Imagination, Hannah and Selin will design and host a writer’s retreat that takes the form of a re-enactment of the “The Dare”—as the competition that led to the publication of Frankenstein was called. The outcome will be a literary anthology, A Year Without a Winter, for which we will write a prologue. To explore the implications of narratives and the arts, we will hold a workshop for policy makers with Angela Periera at the European Commission-Joint Research Council in Italy in November 2016. In YR 11, we have also begun planning an exhibition of “A Year Without a Winter” at the ASU Art Museum for 2018.

InnovationSpace is an entrepreneurial joint venture among the Herberger Institute for Design and the Arts, Ira A. Fulton Schools of Engineering, W.P. Carey School of Business and the School of Sustainability 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. Since 2006, CNS-ASU has supported the work of three transdisciplinary teams (a total of 12 students) annually. This program is no longer active. However, Selin and Boradkar are collaborating on developing a piece for an exhibition as part of the CNS event “Advancing the Legacy of Anticipatory Governance” slated for early May.

Probing Future-Oriented Deliberation puts anticipatory governance and responsible innovation into practice utilizing tools of foresight to explore the future of emerging technologies under development at ASU. In Yr 11, CNS-ASU has partnered with the Biodiesese Institute’s Center for Innovations in Medicine, including lead researchers Stephen Johnston and Neal Woodbury, to revisit “Doc-in-a-Box.” The future of Doc-in-a-Box was first explored by Selin in 2008 (AY 08-09) in a scenario development workshop. In 2015, new and existing collaborators were brought together to explore the future of presymptomatic medicine and health monitoring in light of the maturing of Doc-in-a-Box and the technology’s impending commercialization. Graduate and undergraduate students were recruited and trained to act as note takers and facilitators during the workshop. For the research team it was an opportunity, once again, to inform the research trajectory of our biotech partners and also to study longitudinally the impact of participatory scenario construction on responsible research and innovation. Results of the second workshop and insights from the longitudinal study of scenario planning as a tool for anticipatory governance are being detailed in a publication under preparation which is planned for submission to Science, Technology, and Human Values later this year.

The need for this type of foresight work and innovative approaches to future oriented deliberation applied to new technologies (beyond nanotechnology) was the focus of an article by RTTA 3 researcher
Lauren Withycombe Keeler and former CNS graduate student and post-doc Rider Foley (now at University of Virginia) in the *Journal of Responsible Innovation*. “The Monster and the Polar Bears: Constructing the future knowledge landscape of synthetic biology to inform responsible innovation” details the emerging discourse around the future of synthetic biology. The article makes the case for future-oriented deliberation around synthetic biology that goes beyond consideration of the societal implications of each technology or innovation “to one of finding evidence-based solutions for pressing sustainability challenges in which synthetic biology may be among many high- and low-tech options (Wiek et al. 2012).” This work was also presented by Withycombe Keeler at the Assembling Cities conference in Zurich, Switzerland in 2015. The extension of anticipatory governance methods, particularly participatory scenario construction, to new communities and new technologies – here, autonomous vehicles – was also the focus of Withycombe Keeler’s presentation at the 2015 S. NET conference in Montreal.

Building on CNS’s YR 11 mission to extend insights on anticipatory governance and responsible innovation of nanotechnology to other areas of research and development in science and engineering, a scenario workshop was held with partners from ASU’s Center for Environmental Security. The two-day workshop probed development in the field of wastewater sensing to explore plausible future applications of the technology and its societal implications. Experts from ASU’s School for Sustainable Engineering and the Built Environment were joined by wastewater management professionals, policy experts, regulators (EPA), potential users (US Army and DTRA), and STS scholars who were challenged to consider how wastewater sensing technology might development in the future and with what implications for the sustainability of communities and the privacy of individuals. The workshop directly intended to impact the development of wastewater sensing technology at ASU and initial post-interviews indicate that researchers found the conversations and resulting scenarios surprising and informative to their research. In addition, though, the conversation engaged new communities in future-oriented deliberation around the responsible innovation of wastewater sensing technology, a technology new to CNS. Like the Doc-in-a-box workshop, graduate and undergraduate students were recruited and trained to act as facilitators and note-takers during the workshop.

Results of the workshop, including the scenarios and the empirical evidence the workshop provided for the utility of anticipatory governance activities for sustainable water management, are detailed in an article in preparation by Withycombe Keeler, Selin, Halden, White, and Guston entitled “Anticipatory governance of water resources in practice: Participatory construction of future scenarios for wastewater sensing technology.” This paper follows two papers published in 2015 by Withycombe Keeler and colleagues on how novel forms of future-oriented deliberation can help shape and inform sustainable water management, including: “Linking stakeholder survey, scenario analysis, and simulation modeling to explore the long-term impacts of regional water governance regimes” in *Environmental Science and Policy* (Withycombe Keeler et al. 2015) and “Envisioning the future of water governance: A survey of central Arizona water decision makers” in *Environmental Practice* (White, Withycombe Keeler et al. 2015).

Engaging in future-oriented deliberation is particularly relevant for technologies aimed at addressing sustainability challenges. Planning is underway for the third participatory scenario workshop, which explicitly engages with sustainability, with ASU physics professor and director of the Center for Negative Carbon Emissions (CNCE) Dr. Klaus Lackner. CNCE is developing technology to capture and store carbon dioxide from the atmosphere as a mechanism to combat climate change. CNS will conduct a scenario workshop with CNCE researchers and other experts in carbon capture and storage, climate communication, economics, and marketing to explore future challenges to the adoption and efficacy of carbon capture technology. This builds on ongoing work within CNS to explicitly engage with, create, and assess sustainable futures.
CNS has a number of partners at ASU and other universities working in the field of sustainability science. There are ongoing efforts to share research and educational opportunities between departments and universities. CNS researcher Withycombe Keeler published an article, currently in press, in *Sustainability Science* on these partnerships and presents a typology of research and teaching partnerships that can advance efforts to address sustainability challenges. This research was part of ongoing work by Withycombe Keeler to bridge foresight and sustainability science to inform anticipatory governance in practice. An article published by Withycombe Keeler in 2015, “How much sustainability substance is in urban visions?” analyzes how often and how well cities plan for their own sustainability. In addition, Withycombe Keeler was part of the team at the Hartwell Education Initiative awarded the 2015 ASU President’s Award for Sustainability for their work to spread sustainability education across ASU and to other universities through the Sustainability Science for Teachers Course.

**Research Accomplishments and Plans, RTTA 3/4: Futurescape City Tours.**

Research and practice around innovative forms of public engagement with science and technology have been a key component of RTTA 3. In YR 9, a novel public engagement method – the Futurescape City Tours – was implemented in six cities in North America. The methods of the Futurescape City Tours, taken together, offer a novel push on the forefront of public deliberation as practiced by STS scholars. Through pilot projects, experimentation and the national scale up of the approach, our goal has been to demonstrate the value of public engagement activities that integrate diverse stakeholders and publics, tend to the politics of place, rigorously trigger imagination, and creatively use multi-media tools. Three major peer-reviewed articles and two peer-reviewed book chapters were submitted in YR 10, and have seen publication in YR 11. Of note is “Experiments in Engagement: Designing PEST for Capacity Building” in *Public Understanding of Science*. This article establishes the conceptual styling of and design principles behind the FCTs and lays out a novel conception of the import of public engagement: capacity building. In that article, we articulate public engagement design principles that (1) lead with citizen-led interests, giving primacy to the concerns and curiosities of publics; (2) critically engage with technology, setting attention on the social and political dimensions of emerging technologies (3) use material deliberation, moving beyond discourse to incorporate material, visual, and affective elements; and (4) approach the future in a tempered fashion, evoking anticipations grounded in the appreciation of obduracy, with imaginations unleashed with the ballast of historical reflection. The article delineates the import of capacity building as a worthwhile outcome of future-oriented public engagement exercises, which should vie for prominence alongside of the traditional, though nevertheless elusive, outcomes of policy impact or integration in decision-making. These capacities are explained as important enablers for laypeople and other stakeholders to contribute productively—in a distributed and diverse fashion—to the democratization of science and technology and in the construction of better futures.

Other findings derived from the YR 9 national implementation of the FCTs are being explored analytically through the empirical data collected on the tour. In YR 11, papers under development or in review include:

- **Phadke** has submitted “Place, Space and Hope in the Interstitial City,” to *Cities and the Environment* especially invited for the Special Issue on “Urban Vacant Land and Community Access”.
- **De Ridder-Vignone** on “Against Reports: Representing results of public engagements through Images and Exhibitions” for *Leonardo* examines the value of media art based mini-exhibits that represent the collaborative work of participants.
- **de Ridder-Vignone** on “Images as Authoritative Knowledge in Public Engagement with Emerging Technologies” argues that visual forms of communication are powerful means of facilitating critical dialogue and representing citizens’ values, desires, concerns, and curiosities about emerging technologies.
• Gano has submitted “Participatory Technology Assessment as Urban Technological Wayfinding,” under review Journal of Urban Technology.

Finally, Selin, along with others from the FCT research team, developed and presented an exhibition entitled “The Futurescape City Tours” at the Society for the Social Studies of Science’s Making and Doing Program in Denver, CO, USA.
**RTTA 4: Reflexivity and Integration**

**Personnel – faculty and senior participants**

Erik Fisher RTTA 4 leader (ASU, associate professor, School for the Future of Innovation in Society, CSPO)  
Elizabeth Corley RTTA 4 co-leader (ASU, associate professor, Public Affairs)  
Ira Bennett (ASU, clinical research professor, CSPO)  
Shannon Conley (assistant professor, James Madison University)  
David H. Guston (ASU, professor, School for the Future of Innovation in Society, CSPO)

**Other Personnel:** graduate students (24), 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 theorizes and informs the integrative agenda of anticipatory governance through field research, methodological refinement and collaborative inquiry with NSE researchers. RTTA 4/3 implements the integrative agenda of anticipatory governance through interactions and collaborations with NSE and co-curricular activities. RTTA 4/4 studies the meaning and implementation of integration and reflexivity in the international sphere of science policy.

Projects under the RTTA 4 rubric include: interviews with and surveys of Center participants including collaborating NSE researchers, including the supplement awarded in YR 8 to study the impacts and outcomes of CNS-ASU activities; 30 laboratory engagement studies coordinated by the associated STIR project; additional STIR studies including the associated STIR Cities project; the DC Summer Session; and various projects that characterize, map and assess the integration of societal dimensions into NSE research and policy.

**Research Program, Accomplishments and Plans, RTTA 4/1: Center Assessment**

**Annual Interviews**

As reported on earlier, in years 1-6, we documented and assessed the influence of Center activities on the NSE researchers with whom we collaborate by annually implementing an interview protocol focused on the knowledge, identity, and practices of these NSE researchers, particularly around their understanding of the societal aspects of their work. The bulk of the interview work was initially conducted by the late Dave Conz. As reported last year, it was revisited by Fisher, Guston and ASU doctoral student Brenda Trinidad in light of distinct conceptual, policy and pedagogical features of responsible innovation and this material is presently being incorporated in a chapter for the edited volume *Can Innovators be Made?* intended for MIT Press.

**Center Assessment**

As reported earlier, in Fa 12, we shifted away from annual interviews with participating NSE researchers to implementing a broad survey that included all Center participants. Under supplementary NSF grant #0937591, RTTA 4 researchers set out to measure impacts and outcomes of the Center as a whole. This self-assessment study investigated CNS-ASU’s
ability to serve its mission and how CNS-ASU uses its place as an interdisciplinary center to accomplish its conceptual goals. CNS-ASU differentiates itself from other research centers by its ability to engage a variety of stakeholders, disseminate knowledge, and build capacity to understand and anticipate the futures of emerging technologies, namely nanotechnology. The assessment also sought to explore possible experimental metrics suitable for assessing impact on the numerous and diverse communities which CNS-ASU interacts. An experimental survey design sought to assess how CNS-ASU facilitates and translates discussions about the societal aspects of emerging technologies. It sought to do so by taking into account learning and behavior (Guston, 1999) as opposed to more traditional university research metrics in order to understand the impact of the Center beyond that of the immediate research community.

As previously reported, postdoc Michael Reinsborough was initially hired to assist Guston, Corley and Fisher in performing an impact assessment that surveyed all Center (N=798) participants to that time and included approximately 80 follow-up interviews. As reported last year, the survey garnered a 51.3% response rate. After Reinsborough’s departure, ASU doctoral student Alecia Radatz reformatted and reanalyzed the data. Last year, we summarized the data collection methods used for the Center self-assessment and reported on preliminary findings. Results from the survey contextualize the impact of CNS-ASU activities and help reveal whether CNS-ASU is serving its mission. Survey results demonstrated that CNS-ASU not only serves its mission, but that it also plays an active role in creating and disseminating knowledge, capacity building, and that it serves as a catalyst in thinking about emerging technologies. As reported in detail last year, survey results indicate that all four components of the mission were served. Additionally, Center impacts were found to have had rippling effects, with CNS-ASU activities and initiatives resulting in changes in daily behavioral, institutional, and some authoritative changes, indicating that the impacts from center activities are not confined to within the walls of academic work. Instead, these activities appear to have changed the way people think, speak and act regarding nanotechnology and other emerging technologies.

Research Program, Accomplishments and Plans, RTTA 4/2: Socio-Technical Integration Research (STIR)

CNS-ASU supports a unique set of laboratory studies and engagements. These studies are not traditional laboratory ethnographies with a focus on observation and explication, but rather are efforts to integrate social science and humanities with NSE research and to understand the conditions and effectiveness of such integration. Early Center reports detail initial individual integrative research and the Education section of this report discusses integrative curricular and educational activities. From Sp 09 to Fa 14, the separately funded NSF Socio-Technical Integration Research project (STIR; # 0849101; Fisher, PI; Guston, Co-PI) has constituted the Center’s principle research activities focused on documenting and understanding NSE capacities to participate in responsible innovation through collaborative social scientific engagement. STIR has trained and coordinated the “laboratory engagement studies” (Fisher, 2007) of over two-dozen doctoral students, who implement a “decision protocol” (ibid.) that is designed to both facilitate collaborative “midstream modulation” (Fisher and Schuurbers, 2013) and improve understanding of the conditions and capacities for “socio-technical integration” (Fisher & Miracle, 2014; Fisher et al., 2014). STIR provided proof of concept for the integrative portion of the Center’s mission of anticipatory governance.
(See Education section for a list of the 24 participating STIR students and 4 post-docs by institution.)

STIRers are trained to implement various tools and techniques developed by Fisher over the course of each 12-week study in the attempt to conduct socio-technical collaborations, study the social and cultural conditions that enable and constrain them, and assess the policy dimensions of their outcomes. STIR laboratory engagement studies have been completed in over half a dozen ASU laboratories and in 22 additional laboratories around the world, bringing the number of labs in the STIR network to 28. Previously, we reported on several individual STIR studies, preliminary findings from an aggregated assessment of 30 coordinated STIR studies, and Fisher’s testimony before the President’s Bioethics Commission, and the development of a comparative framework for socio-technical integration. Major activities in YR 11 include launching the STIR Cities project, other adaptations of the STIR approach, and international events and trainings regarding socio-technical integration scholarship.

Individual STIR studies

In past years we reported on individual STIR project studies conducted by, e.g., assistant professor Shannon Conley (James Madison University), assistant professor Steven Flipse (TU Delft), postdoc Cecilie Glerup (Copenhagen University), Presidential Management Fellow Cameron Keys, and others. This year, we report on individual studies that adapt and apply the STIR approach in new settings.

The Tidal Energy project adapted STIR for the sake of enhancing the sustainability of engineering design activities by integrating the socio-environmental dimensions of the system into tidal renewable energy research on tidal turbine devices. Design convergence has not yet been reached for tidal turbine devices, so incorporating social and environmental considerations with technical and economic parameters may be effective in influencing design. This project used STIR as one way to reach this goal, exploring the flexibility of the semi-structured protocol as a basis for situated dialogue and reflection. What sets this STIR study apart is that the STIRer, Kaylie McTiernan, a masters student in the School of Marine and Environmental Affairs at the University of Washington, was more than an ‘embedded humanist,’ as she became part of the future visioning component of the tidal energy research project. McTiernan collaborated as a member of the team with a Mechanical Engineering professor who directed the future visioning research project. Both the STIR and the future visioning projects began at the same time and were initially kept separate, as it was assumed they would influence each other indirectly. During use of the STIR decision protocol, McTiernan asked the professor about any decisions he was making - a broad scope, highly technical, and influenced by many other people’s decision making. More than half way through the study, however, and after some frustrations with the process, the pair decided to exclusively focus their STIR discussions on the joint future visioning research. Once STIR and future visioning were combined, both areas of research improved as a result. The STIR conversations became less rigid, more natural, and more applicable to expanding values. Not only did the STIR study improve, but the future visioning research became much bigger in scope and more influential than initially conceived. STIR allowed the conversation to slow down, deepen, and evolve over time. Expanding considerations was beneficial for content and perspective, expanding alternatives opened up options rather than narrowing down to one design, and the research plan became more inclusive of diverse stakeholder perspectives. Initially
compartmentalizing STIR and future visioning limited both, and only by integrating them could their full potential be realized.

Also in YR 11, associate professor Miklos Lukovics of the University of Szeged, Hungary conducted two STIR studies as part of a Hungarian STIR Pilot that sought to explore whether and to what extent approaches associated with Responsible (Research and) Innovation (RRI) function in an Eastern European setting similar to the way they have been deployed in developed countries. While science-based technological innovation is a core element of efforts to improve the competitiveness of a company or a territorial unit and, as a consequence, to increase welfare, innovators are rarely trained to reflect on the societal and environmental dimensions of innovation in a systematic and multi-disciplinary manner. In order to address this challenge, the notion of RRI has emerged within policy discourses worldwide. Implementing RRI concepts and practices in daily innovation decision-making, however, has received less attention in the scientific community and requires addressing the multidisciplinary nature of the innovation process. While STIR is one such established means of such implementation at the laboratory level, it has only been tested in developed countries (for purposes of comparison this study considers China, where several STIR studies were conducted, as a developed country), raising questions about how well the method works in other settings. Since there is a relatively low knowledge of RRI in South-East European (SEE) countries, this project was motivated by the question of whether and how RRI could be institutionalized in South-East European countries. As a first step, the project team focused on whether and how the STIR method could be adapted to research and innovation decision-making in these countries. In order to answer these questions, we tested STIR in two natural science research groups at the University of Szeged. The results show that STIR can be adapted for use in SEE countries, but that certain preparatory steps would help modify the approach in accordance with the unique innovation features of these countries.

**STIR Trainings**
In addition to the CNS Winter School sessions on Integration, Fisher conducted STIR training workshops and methods seminars at ASU and at the University of Twente, both for social science researchers who are part of the Science, Technology, and Policy Studies (STePS) unit and for NSE and other natural science and engineering researchers at the MESA+/MIRA research institutes, during YR 11.

**STIR and Communities of Integration Workshops**
In past years, we described the first two “Communities of Integration” workshop, which brought together an international network of research communities studying various aspects of socio-technical integration and led to follow-up research and presentation activities, including a comparative framework that identifies four idealized modes of socio-technical integration. A third such meeting is planned for May 2016 at Cardiff University. During YR 11, Fisher co-organized the *What's Next in Socio-technical Intervention Approaches?* workshop at the University of Twente, which brought together STIR and Constructive Technology Assessment (CTA) researchers from about half a dozen countries in order to compare and contrast integrative approaches. He also co-organized a roundtable at the 2015 Society for the Study of Nanotechnology and Emerging Technology (S.NET) conference entitled “Building an agenda for socio-technical integration approaches” in Montreal that featured an international cast of science studies participants who reflected critically on the normative and methodological variations of socio-technical integration.
**STIR Cities Project**
The STIR Cities project (NSF #1535120) is a collaboration among Fisher (PI), ASU assistant professor Jen Richter (Co-PI), and Portland State assistant professor Thaddeus Miller. It adapts and applies STIR techniques and methodology beyond the laboratory and from the standpoint of broader socio-political landscapes. Whereas the STIR project coordinated a series of laboratory engagement studies, STIR Cities explores the possibility and utility of social science engagements with emerging technological orders in the context of two urban settings. To do so, it comparatively investigates the development of smart energy systems, how they are imagined to create social and technological order, and whether engagements with diverse technical experts foster reflexive learning and deliberation over broader emerging contexts. The project thus explores the relationship between sociotechnical imaginaries - collectively imagined forms of social life that are “almost always imbued with implicit understandings of what is good or desirable in the social world writ large”; technological system design, understood as situated performance of these imaginaries; and expert engagement studies within a distributed network of technical experts constructing smart energy systems in the two culturally and geographically different urban centers of Phoenix, Arizona and Portland, Oregon. The three-year project seeks to engage a diversity of expert energy sites, beginning with laboratories and extending to include a handful of non-lab sites that could be drawn from government offices, utility companies, private companies, and/or civil and professional associations.

**STIR Cities: Phoenix Energy System**
Fa 2016 activities for STIR Cities in Phoenix have focused on identifying and characterizing key actors and institutions relevant to the management and transformation of the regional electricity grid. As part of these activities, and the overall goal of the STIR Cities project, the Phoenix team has collected documentation relevant to the operating cultures and practices of identified key actors through various media and technical publication sources, as well as identified salient moments of contestation between technical expert institutions (e.g., utilities, city agencies) and the larger Phoenix social body. Data has been collected from secondary and grey literature for content and discourse analysis. The results of this data collection has been a database of international, national, state, and local documents across a variety of sectors including government, NGOs, utilities, knowledge corporations, and media outlets. Our database is constantly being updated to reflect new developments in smart energy systems in both Portland and Phoenix. Analyzing these documents will provide points of comparison to the practices and forms of knowledge making employed by expert actors in Phoenix. In addition, these documents will form the basis for a study that will explicate how performances of sociotechnical imaginaries, through modes of authorization (capital, licensing, etc.), explicate how imaginaries are operationalized into active exercises of local, regional, or national power. This analysis will serve to address one objective of STIR Cities: to explore the question of linkages between expert activities (as explored in the STIR exercises) and local, regional, and sociotechnical imaginaries.

**Phoenix STIR Cities Sites**
Currently, ASU doctoral student Abraham Tidwell in Phoenix is finishing his first site engagement in a “sustainability” focused energy system research laboratory at a local university. This laboratory, with its focus on addressing the “socio-technical” dimensions of interconnected water-energy-transportation systems, represents a highly reflexive group of technical experts currently intervening in developing visualization and modeling techniques
for addressing system disruptions. For this study, Tidwell employed the STIR protocol exercise with a participating doctoral student in the laboratory. This participant, a highly reflexive individual explicitly concerned with linking the technical dimensions of electricity grid operations during emergencies with the social/organizational networks that operate the larger interlinked systems surrounding grid management, primarily experienced the interaction as an opportunity to articulate clearly what the important elements of the research was for the participant’s overall goals and objectives. Over the course of the interactions via the STIR protocol and other formal and informal interactions, the participant began to clearly articulate that operating within the constraints of the academy meant that requirements to meet milestones towards graduation superseded, at least for the moment, the overall intent to produce research that would effectively integrate the social and technical dimensions of electricity grid management during crises. These results indicate a need to explore further the influence of structural concerns on how experts integrate the social dimensions of energy systems with their technical work, as well as attend to the specific politics of each industrial sector actors are situated within.

The next phase of the STIR Cities project in Phoenix will, pending final approvals by each organization, at the following sites: an engineering design unit with a major local utility, a university research laboratory focused on small-scale power distribution systems, and nuclear engineering reactor design firm.

**Portland STIR Cities Site 1: PSU Power Engineering Laboratory**

Over the last 6 months, PSU doctoral candidate Anthony Levenda has conducted field research in the Portland State University Power Engineering Laboratory. The Lab has several applied research projects that involve smart grid technologies. Specifically, Levenda has worked with a team of engineers and engineering students designing and conducting a field demonstration of a residential battery energy storage system (ResBESS) for the project partner, the local utility, Portland General Electric. STIR engaged research activities have included interviews, observation, and STIR protocol exercises with key team members. This initial STIR study has revealed several areas in which integration research could be utilized to more effectively manage the development of smart grid innovations and their implementation into society. One key finding of this study points to the complexity of standardizing smart grid technologies. This has several dimensions including, but not limited to, standards for communications between devices on the electricity networks, standardization of size and siting of ResBESS technologies in different contexts of deployment, and management of the electrical flows with ever-increasing decentralized energy generation and storage technologies from a variety of companies with differing, un-standardized product specifications. Another key finding relates to the integration research itself. This initial STIR Cities study has found that although engineering research is applied to “real-world” settings, there seems to be a division between engineering work focused on technological development and social scientists’ work on how to deploy these technological developments in the real-world. This points towards an epistemological divide in which engineers take into account societal “context” but not as an integral part of their work, which for example, might shape outcomes of technical design.

**Research Program, Accomplishments and Plans, RTTA 4/3: Integrative Co-curricular Activities**

(See Education section for an account of the DC Summer Session and the Certificate in Responsible Innovation.)
Research Program, Accomplishments and Plans, RTTA 4/4: Integration Policy and Responsible Innovation Studies

RTTA 4/4 conducts a number of policy studies that characterize, map and assess socio-technical integration into nanotechnology R&D prioritization, allocation and delivery processes in the US and around the world.

Integration and Responsible Innovation Policy Studies

In previous years, we reported on the increasing role that socio-technical integration has played in European R&D system; the lack of efforts devoted to socio-technical integration at the research prioritization in the US and UK nanotechnology programs in the wake of novel policy initiatives for responsible innovation; international efforts aimed at responsible innovation in terms of multi-level dynamics; and ASU initiatives related to Responsible Innovation, including the Virtual Institute for Responsible Innovation (VIRI; #1257246; Guston, PI; Fisher, Co-PI), the Journal for Responsible Innovation, and the NSF-funded, associated Workshop on Research Agendas for Societal Aspects of Synthetic Biology.

VIRI Workshops
In YR11, VIRI held its first two of three planned annual workshops, at member institutions Science Policy Research Unit (SPRU) at the University of Sussex, UK, and also at San Sebastian, Spain.

Governing Emerging Technoscience
In Fa 2015, Fisher presented an invited paper on the governance of emerging technoscience at the Munich Center for Technology in Society at the University of Munich. Based in part on work under review elsewhere, this paper argues that, as seen in the case of evolving nanotechnology policy in the US, state policy makers are reimagining the relations between science, technology and society, in the process creating both practical and symbolic shifts in governance models and mechanisms. These shifts—including possibilities for more deliberative and interactive roles for scientists, social scientists, and public citizens—are themselves situated within a technoscientific frame, meaning that they potentially open up more distributed, situated and diverse opportunities for participation in the social processes that shape technological emergence, while at the same time organizing these very roles within more broadly coordinated attempts at governmental control and frame them in terms of a imaginary of collectivized innovation and sociability. The paper, which has been submitted to the Yearbook Sociology of the Sciences, considers the potency and limitation of governing emerging technoscience in society as well as political implications for state legitimacy, scientific autonomy, and democratic values.

RTTA 4 Continuing Integrative Outcomes

In addition to conducting ongoing integrative studies and engagements, RTTA 4 involves various socio-technical collaborations. In previous years, we reported on Fisher’s participation at two meetings of the Association for Managers of Innovation, and on collaborations between Fisher and Woodbury, Fisher and Seager, and other RTTA 4 ongoing
collaborations. In YR11, Fisher, Woodbury and ASU associate professor Diana Bowman wrote an article on precision medicine that is currently under review.

Contribution to “ensemble-ization” or other center-wide activities

RTTA 4 continues to work with RTTA 2 and 3 in several projects. Center-wide activities reported in past years included public engagement events organized in the Netherlands that combined elements of RTTA 4 and 3 and Fisher’s work with Seager at the Sonoran SciComm workshop in Arizona that explored the interplay of empathy and creativity in collaborative teamwork. In YR11, Fisher continued working with Reinsborough and Radatz on the Center impact assessment that combines efforts of RTTA 2 and 4.

Photo: Hungarian STIR Pilot project.


**TRC 1: Equity, Equality and Responsibility**

**Personnel – faculty and senior participants**

Susan Cozzens, TRC 1 co-leader (GA Tech, professor, Public Policy, Vice-Provost for Graduate Education & Faculty Development, TPAC)
Jameson Wetmore, TRC 1 co-leader (ASU, Associate Professor, School of Human Evolution & Social Change, CSPO)
Matthew Harsh, Assistant Professor, Concordia University
Ogundiran Soumonni, Assistant Professor, University of Witwatersrand, South Africa
Thomas Woodson, Assistant Professor, Technology and Society, Stony Brook University

Other Personnel: graduate students (2)
Rafael Castillo (GA Tech)
Michael Bernstein (ASU)

Goals: over the past several years the TRC 1 team has been focused on determining whether and how nanotechnology can be used to help the disadvantaged. Much of this work has been centered on South African and US initiatives to develop “pro-poor” nanotechnology. More recently the team has been developing and disseminating best practices for building technologies that can best meet the needs of disadvantaged communities.

**Research Accomplishments and Plans, TRC 1**

*Community Engagement Workshops*

During its research, the TRC 1 team found several examples of attempts to create pro-poor technologies that struggled greatly or failed completely because the scholars involved did not understand the context of the depressed regions they were trying to improve. In a modest effort to help remedy that problem, TRC 1 created and hosted a series of short workshops that introduce scientists and engineers who want to engage with the developing world to basic steps they can take early on to increase the possibilities for success.

To date the team has tested components of the workshops three times – at the 2014, 2015, and 2016 CNS Winter Schools – and run four full workshops in three countries. The workshops were held at Georgia Tech in March 2014, the University of the Western Cape, South Africa in April 2014, Concordia University in October 2014, and November 2014 at ASU. Over 50 students have successfully completed the program.

The program was assessed through a questionnaire and concept mapping exercise filled out by the participants. Participants were assessed on whether their approach to engaging communities would involve “analyzing the context” “listening to the local people,” and “empower the communities.” Based on a pre and post survey we found that students recognized the importance of each of those concepts more strongly after the program,
especially the importance of analyzing context. This, coupled with the enthusiasm of the
students who participated in the program demonstrates that the community Engagement
Workshops are an effective way to advance key lessons in technology for development. An
article based on this research, written by Matthew Harsh, Michael Bernstein, and Jameson
Wetmore, will be submitted to a journal in the next two months.

Graduate Student Updates

The last two graduate students affiliated with TRC 1 have successfully defended their PhDs.
Rafael Castillo, who was instrumental in organizing several of the workshops, will complete
his dissertation on the impact of nanotechnology on employment later this year at the
Georgia Institute of Technology. Michael Bernstein, who did much of the analysis of the
workshops as well as the Science Outside the Lab program pioneered by CNS-ASU in 2007
and 2009, successfully defended his dissertation in April and will be awarded a PhD in
Sustainability in May. Bernstein will begin a post-doctoral fellowship with a DOE-funded
project with CENTSS.

Nano Around the World Card Game Update

The Nano Around the World Card Game continues to be played around the world. It is used
by museum professionals not only in their outreach, but in their training as well. A recent
NSF-funded research project to develop museum materials on the topic of Synthetic
Biology is sponsoring the development of at least two card games that were at least
partially inspired by the nano game. There is also an effort from researchers at McGill
University to develop a variation of the game to foster communications between children
with terminal brain cancer and their parents.

Technology in Developing Countries Spinoff Project

The TRC 1 work on technology in developing countries, especially South Africa, has also
helped to form the foundation for a 2-year (plus one year extension) NSF grant that was
awarded in September 2013 to Wetmore (PI), Harsh (Co-PI), and CSPO professor of
practice Gregg Zachary (Co-PI). This grant, “Capacity Building in Computer Science as a
Driver of Innovation,” seeks to understand how African computer scientists in Kenya and
Uganda are developing uniquely African solutions to African problems. Some of the
connections Harsh made in the CNS project helped him to ultimately get invited to
conferences in South Africa on computing in Africa. The Capacity Building project
completed field trips to Kenya and Uganda in the summers of 2014 and 2015, presented
their work at S.NET in 2015, and has produced a short film on the topic. This summer the
full research team will present their work at a briefing in Washington, DC, and returns to
host 1-2 day workshops in both countries.

Peer reviewed journal articles

Peer reviewed book chapters


Presentations


**TRC 2: Urban Design, Materials, and the Built Environment (“Nano and the City”)**

**Personnel – faculty and senior participants:**
Arnim Wiek, TRC 2 leader (ASU, associate professor, School of Sustainability)
Sander van der Leeuw, TRC 2 co-leader (ASU, professor, School of Sustainability)
Rider W. Foley, TRC 2 co-leader (UVA, assistant professor, Center for Engineering and Society)
David H. Guston (ASU, professor of politics and global studies; director, CNS-ASU)
Darren Petrucci, senior participant (ASU, professor of design)

**Other personnel:**
Graduate students: Michael Bernstein (School of Sustainability)
Undergraduates: Abigail Howell, Brooke LaBranche (UVA), Emma Price (UVA), Zihan Ni (UVA), Evan Taylor

**Goals**

The TRC2 research team addresses the question: How can nanotechnology be innovated and governed in responsible ways and with sustainable outcomes? Our studies employ system analysis, scenario construction, sustainability assessment, and intervention research methods to refine theories of anticipatory governance, sustainability, and responsible innovation. We focus on metropolitan Phoenix, a top-thirty nano-district and a top-twenty innovation hub in the U.S. In the final two years of CNS-ASU, TRC2 expanded its research activities to include other national (Washington DC) and international (Montreal, Canada) sites through partnerships with other CNS-ASU research themes.

**Key Findings**

Sustainability science offers a theoretical and methodological framing for engaging urban stakeholders with the issues and implications of emerging technologies. TRC2 worked on integrating sustainability science and responsible innovation through the advancement of concepts and methods that can be shared beyond the sunset of CNS-ASU. Wiek, Foley, Bernstein, and Guston (2016) argue that describing and analyzing business-as-usual governance is insufficient to advance responsible innovation and achieve sustainable outcomes from technology investments. This perspective is supported by our research conducted in 2011–2014. The work is further supported by an intervention research approach to design, execute and evaluate how to “move the needle” on responsible innovation. Experiments in intervention research were first launched by graduate student Bernstein. He conducted a series of studies that analyzed and assessed outcomes from: the Science Outside The Lab program (designed by Bennett as part of CNS-ASU education and outreach program), and the Community Engagement Workshop series (designed by TRC-1 co-leaders Wetmore and Cozzens and employed in Johannesburg, South Africa, Montreal, Canada, and Phoenix, Arizona). The approach taken by TRC2 demonstrates how those research programs impacted participants and built their capacity for responsible innovation. TRC2 expanded the scope of sustainability science to consider science and technology studies, bringing the explicitly normative values and systematic approach from sustainability into science and technology studies. Further, TRC2’s work on the Science Outside the Lab program and the Community Engagement Workshop series demonstrates the ways CNS-ASU contributes not only to knowledge generation but also education and training of scientists and engineers for responsible innovation.
TRC 2 co-leader Wiek welcomes the participants and introduces the walking audits in front of the Gateway Community College to a ‘Collaborative On-site Technology Exploration’ that brought together a diversity of stakeholders to explore what could be done differently.

Detailed Findings

Detailed research questions of TRC-2 included: How is nanotechnology currently innovated and governed in the urban environment? How well does the current governance and innovation regime perform against principles of risk, sustainable, and anticipatory governance (responsible innovation)? What could be future implications if the current innovation and governance regime continues, in contrast to alternative models? and What are necessary changes to innovate and govern nanotechnology in responsible ways?

Current State Analysis – Governance of Nanotechnology in Phoenix

Our case study research in Phoenix finds the dominant actors are academic, industrial, and government funding agencies (i.e. triple helix) with the shared objective to deploy profitable commercial or military products. This actor network is divided along product-sectors with few cross-sector linkages. Lack of cross-sector linkages limits opportunities for collaboration, coordination, and joint learning. The actor network in Phoenix pays little attention to risk mitigating organizations (e.g., insurers, government regulators, NGOs). The nano-enhanced city may offer benefits to a privileged few yet, city officials, civil engineers, NGOs, and citizens, who participate in urban development, are unlikely to have the opportunity to deliberate on the effects of nanotechnologies before they are deployed. There is novelty in the products’ functionality, ranging from solar technology to personalized medicine; but there is little evidence in Phoenix of novelty in its innovation and governance processes. Actors, activities, as well as constraining and enabling factors, follow market-oriented or closed-collaboration (military) models of innovation and governance with little attention paid to adverse effects or broader public values. These characteristics stand in stark contrast to state-of-the-art governance in technology development.

Nanotechnology in City Environments (NICE) Database

Continuing work begun in previous years, five undergraduate students and one graduate student continued efforts to support and expand 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 NICE database was used by Foley two UVA courses (Societal Dimensions of Nanotechnology and Science and Technology Policy). Students contributed to the database and used the existing information in a modeled simulation of how science policy decisions are made with the National Nanotechnology Initiative. The NICE database has been used as a resource for other CNS-ASU in multiple projects, including the FutureScape City Tours as a reference tool for partners and participants, for TRC2 scenario study and for an assessment of the current
state of nanotechnology. The website reaching out to interested scholars, professionals, and the general public. In the most recent reporting year 14,631 unique visitors accessed the website from March 16, 2015 to March 16, 2016. Visitors log on over 1,000 cities around the world. The database has been continuously updated and built out during this time period. (Also see Section 12 Outreach and Knowledge Transfer).

Anticipatory Life-Cycle Assessment

Anticipatory LCA builds off real-time technology assessment to explore environmental uncertainties through structured interdisciplinary collaboration, specifically identifying the synergistic contributions of social, physical, environmental, and decision sciences that can inform LCA modeling decisions. The results of such aLCA models may inform research and development decision-makers of broader environmental and stakeholder value-derived criteria for technology assessment. CNS researchers partnered with the NSF-funded Quantum Energy and Sustainable Solar Technology (QESST) Engineering Research Center at ASU, as well as industry collaborators at General Electric and the non-profit organization EarthShift LLC to publish this novel approach as the cover story in the 16 September 2014 issue of Environmental Science and Technology. The cover featured an image from the short film “Phoenix 2050,” created as part of a graduate studio course taught by co-leader Wiek and senior personnel Petrucci. This article, along with its artwork, demonstrates the unique ability of the Center to foster interdisciplinary research spanning three sectors and five different schools within ASU.

To move the aLCA agenda forward with international collaborators, CNS researchers hosted an workshop entitled “Advancing Life Cycle Assessment for Responsible Research and Innovation” concurrent with the 6th annual meeting of the Society for the Study of Nanoscience and Emerging Technologies (S.NET) in Karlsruhe, Germany. The workshop connected European and US researchers (n~30) involved in LCA and other technology assessment methods, featured plenary presentations on anticipatory and prospective LCA methods, and engaged participants in a series of small group activities. Following the workshop, a smaller cohort of researchers gathered at the 2015 CNS Winter School to reflect and summarize findings in a published workshop report and book chapter in 2015.

Scenario Study – The Future of the Nano-Enhanced City

Our participatory scenario study suggests that two dominant models of nanotechnology innovation and governance (market-oriented, and closed-collaboration military model) might amplify the lack of social cohesion, livelihood opportunities, as well as resource depletion and large-scale contamination. Society might get further divided along people’s socio-economic status and means. Social tensions and outburst of violence might get mitigated with even greater dominance, surveillance, and other control mechanisms (employing suitable nanotechnologies). In contrast, we explore governance models with high levels of public participation or open-source activities that could expand beyond the ‘triple helix’ of innovation, linking public agencies, risk mitigating actors, and civic society. Society might develop a unique practice of collectively addressing urban sustainability problems. This could lead to transformational solutions, including particular types of nanotechnologies that alleviate stresses on people, economy, and environment. The scenarios support an earlier study that highlighted the critical need to complement nanotechnology innovation with non-technical interventions. Nanotechnologies in the current governance regime have limited potential to positively affect urban sustainability challenges, such as water contamination, energy use, or childhood obesity. Embedded in more comprehensive transition strategies, however, they could play a critical role in making progress towards urban sustainability.

Co-leader Wiek guided a design studio that explored the scenarios constructed by TRC2 in partnership with director Guston and senior participant Petrucci from the ASU Design School. Graduate students developed 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 students reimagined the urban design impacts of various types of nanotechnology. Place-specific renderings were overlaid with audio to create a 'movie' that visually depicts the mutual interactions between nanotechnology and society. Based on this work, Petrucci and Foley presented the scenario movie in Washington, DC at the Consortium for Science, Policy and Outcomes offices for science policy advisors and interested guests. This research project yielded publications in Issues in Science and Technology and Futures, which included numerous images from the studio. One image generated in the studio was featured on the cover of Environmental Science and Technology. Another was featured on the cover of the March 2015 edition of ASU Magazine with a portrait of Petrucci as part of a feature story on the role of the arts and design in science, technology, engineering and mathematics (STEM).

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.

Experiments in Intervention Research

TRC2 identified approximately 50 potential interventions, focusing on nanotechnology innovation and governance in metropolitan Phoenix, partnership with colleagues in CNS and across the U.S. TRC2 selected exemplary interventions to pilot in participatory, real-world experiments. Our selection criteria included, among others: a link to at least one specific normative responsibility; an accessible partnership is available; the transformation potential is high. For example, as part of a collaboration with ASU's Consortium for Science, Policy and Outcomes (CSPO), where CNS-ASU is based, we evaluated the effects of an immersive educational program, Science Outside the Lab (SOTL). The SOTL program takes PhD students and candidates from across the physical and natural sciences and engineering to Washington, DC to meet with science policy advisors, lobbyists, decision-makers, business persons, and nongovernmental organization representatives. The program introduces the participants to the pluralism of interests shaping science policy related to nanotechnology and other national interests. Assessment of SOTL entailed a pre-, post-, and follow-up surveys of student beliefs about science and society interactions, as well as a pre-post concept map exercise to elicit student understanding of science policy. Students leave SOTL questioning the exclusive hold of scientific expertise in science and engineering policy; skepticism toward reductionist ideas of how scientific advances benefit society; and a deeper, more nuanced understanding of the social implications of and forces affecting the development of emerging technologies.

Ongoing project goals and avenues for further investigation

Award #0937591

Sept. 1, 2015 - Aug. 31, 2016
Members of TRC2 are currently working to connect the fields of sustainability science and science and technology studies and publish theoretical, methodological and empirical studies from their years of research. Further projects are being considered for further investigation including continued partnerships between TRC1 and TRC2 to conduct research on water decontamination technologies that use nanosilver, developed at UVA, and field trails in South Africa (the selected study site for TRC1). Other partnerships include the assistance the undergraduate researcher Abigail Howell and graduate student Bernstein offered to RTTA3 as part of a series of scenario workshops conducted in 2015 and 2016. Also, the early collaborations between TRC2 and RTTA4 ultimately yielded a successful grant by Fisher, STIR Cities. Co-leader Foley and Youtie (RTTA1) are discussing further investigations into geoengineering and how bibliometrics and sustainability science can be used in another emerging technology context. The design studio with Petrucci is being considered as a model for exploring intersections of science, technology, engineering, and mathematics (STEM) and design as part of a workshop led by Guston, Petrucci and others.
TABLE 2: NSEC Program Support  
(NSF Grant #093791)

<table>
<thead>
<tr>
<th>Projects</th>
<th>(1) Current Year 9/1/15 - 9/1/16 Budget (NSF)</th>
<th>(2) Current Year 9/1/15 - 9/1/16 Budget (Cost-share)</th>
<th>(3) Current Year 9/1/15 - 9/1/16 Budget (Other Support)</th>
<th>(4) Summary 1-3 Current Year Total Budget (Combined)</th>
<th>(5) Next Year 9/1/16 - 9/1/17 Budget (NSF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTTA 1</td>
<td>$219,481</td>
<td>$0</td>
<td>$495,788</td>
<td>$715,269</td>
<td>$0</td>
</tr>
<tr>
<td>RTTA 2</td>
<td>$111,472</td>
<td>$0</td>
<td>$218,454</td>
<td>$329,926</td>
<td>$0</td>
</tr>
<tr>
<td>RTTA 3</td>
<td>$42,581</td>
<td>$0</td>
<td>$50,653</td>
<td>$93,234</td>
<td>$0</td>
</tr>
<tr>
<td>RTTA 4</td>
<td>$27,481</td>
<td>$0</td>
<td>$58,416</td>
<td>$85,897</td>
<td>$0</td>
</tr>
<tr>
<td>TRC 1</td>
<td>$30,808</td>
<td>$0</td>
<td>$265,584</td>
<td>$296,392</td>
<td>$0</td>
</tr>
<tr>
<td>TRC 2</td>
<td>$95,723</td>
<td>$0</td>
<td>$18,925</td>
<td>$114,648</td>
<td>$0</td>
</tr>
<tr>
<td>Seed Projects</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>TOTAL Projects</td>
<td>$527,546</td>
<td>$0</td>
<td>$1,107,820</td>
<td>$1,635,366</td>
<td>$0</td>
</tr>
<tr>
<td>Education</td>
<td>$148,602</td>
<td>$0</td>
<td>$68,385</td>
<td>$216,987</td>
<td>$0</td>
</tr>
<tr>
<td>Administration</td>
<td>$45,611</td>
<td>$0</td>
<td>$158,000</td>
<td>$203,611</td>
<td>$0</td>
</tr>
<tr>
<td>Equipment</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Knowledge Transfer</td>
<td>$0</td>
<td>$0</td>
<td>$11,220</td>
<td>$11,220</td>
<td>$0</td>
</tr>
<tr>
<td>Indirect Costs</td>
<td>$176,761</td>
<td>$0</td>
<td>$706,348</td>
<td>$883,109</td>
<td>$0</td>
</tr>
<tr>
<td>Subtotals</td>
<td>$898,520</td>
<td>$0</td>
<td>$2,051,772</td>
<td>$2,950,292</td>
<td>$0</td>
</tr>
<tr>
<td>Total Budget</td>
<td>$898,520</td>
<td>$0</td>
<td>$2,051,772</td>
<td>$2,950,292</td>
<td>$0</td>
</tr>
<tr>
<td>Uncommitted</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
</tbody>
</table>

* Please note: Seed Projects have been included in the individual research program to which they are relevant.

David H. Guston, Director, CNS-ASU  
April 15, 2016
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. We report results for Table 3B and 4B, but percentages of US minorities tend to rise if Table 3A and 4A are used, as many reported Asian participants are not US citizens.

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 10 review, two women serve among the five renewal PIs (Corley, Youtie) and five women serve among twelve RTTA and TRC research program leaders (Corley, Cozzens, de Ridder-Vignone, Selin, Youtie), for a total of five of fifteen Center leaders (33%). 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 associate director for anticipation; Youtie began as a faculty researcher and is now a research program leader and co-PI; de Ridder-Vignone joined the Center as a doctoral student, advanced to a post-doc position, and is now a faculty member at James Madison University in the Integrated Science and Technology program.
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 equivalent to 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%) faculty and professional collaborators. YR 8 and YR 9 participation rates were lower, as we did not co-sponsor three major conferences, as we had in YR 7. In YR 11, participation of faculty and professional participants was 230 total individuals, with 92 women (40%)

The Center has also increased the ethnic diversity of faculty and professionals involved in Center research (non-leadership). The Center faculty initially included 5 Asian Americans (of 31, 16%) and zero from underrepresented groups (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 11, participants included 1 Pacific Islander, 1 African American, 22 Asians, and 8 Hispanic totaling 32 (of 214, 15%) faculty and professionals.

Overall, the diversity of the Center faculty and professional participants stayed roughly the same in the past year. 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. During the reporting period of YR 11, 3 out of 3 postdoctoral researchers at the Center were women and, over the entire course of the Center, 12 were women (of 18, 66%). 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 4 (of 16, 25%) in YR 10; the Center had 1 Hispanic postdocs (of 16, 6%). 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 exceeds 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%). As of the YR 11 report (Table 4A), 8 of 25 current graduate students were Asian (32%). In total, the Center has had 80 women (of 170, 47%), 51 Asian or Asian American (of 170, 30%), two African American (of 170, 1%), and 18 Hispanic (of 170, 11%) graduate students among its researchers. In addition, in YR11, Center degree programs and certificate / training programs (Table 3A) involved 34 women (of 55, 62%), 2 African American (of 55, 4%), 19 Asians (55, 34%), and 1 Hispanic (of 55, 2%) students. These levels indicate increased participation from women, African Americans and Asians from previous years and decreased participation from Hispanics.

The percentage of women graduate students involved in Center research is marginally 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 (24/68, 35%, Table 3A; 53/170, Table 4A), collectively, is above the share of under-represented minorities among social science graduate students nationally (22%, NSF Table 3-1).

Undergraduates: The Center no longer funds undergraduate students through the Innovation Space program but is implementing a Broadening Participation program for underserved minority undergraduates as explained below.

Plans Going Forward
While the Center has performed strongly on diversity during its first nine years, meeting and, in many cases, exceeding relevant national percentages, there are still opportunities in the remaining time of the Center to improve. 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 year 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. Identify other areas of engagement beyond the Hispanic Research Center. The Center has had a relationship with the Hispanic Research Center (HRC) at ASU, through which the Center has built a growing number of contacts with students from African American and Hispanic backgrounds. In YR 7, 8 and 11, CNS taught a course on technology 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, after each instance several of the students following up and participating in Science Outside the Lab, Chemistry 501, led by Bennett and Wetmore, and other Center activities.

2. In YR10 we specifically targeted PhD students and post-docs at from under represented minority groups, offering 3 full Winter School packages (including fees and transportation). This recruitment was successful, so successful in fact that we ended up awarding 4 packages.

3. In YR 10 we began to develop and implement targeted recruiting efforts for the new Graduate Certificate in Responsible Research and Innovation. Two of the three students in that cohort are from under represented minority groups.

4. In YR 9, we successfully recruited in collaboration with the School of Social Transformation for a visiting assistant professor in science, technology, and social transformation. This person is teaching relevant courses in this area focusing on race and social justice around emerging energy technologies, which are strengthening recruiting into Center educational programs. In the coming year, she will be serving in Guston’s stead as the social scientist working with the SUN IGERT program. She has since joined the faculty as a tenure-track assistant professor in SPIS.

Program to Broaden Participation in Science Studies Fields; While many career opportunities exist at the intersection of science and society, undergraduates may not know about them, especially if they are first-generation college students. To help increase participation by underrepresented minorities in science policy and science and technology studies (STS) fields, NSF awarded a supplemental grant to CNS-ASU in 2014 (NSF#1451205) to develop a program to give a select group of undergraduate students a better understanding of the careers available and the educational paths to those careers.

The program created a cohort of 25 students—the Policy, Science, Technology & Society (POSTS) Scholars—from 9 universities across the US. We targeted sophomores and juniors who have already shown an interest in STS and science policy fields, the program includes mentorship and guidance from an STS or science policy faculty member, a personalized research experience, and two summer workshops in Washington, DC, to introduce students to the complexity of the science policy process. This program received 55 applications to participate.

In the first summer participants spent a week in Washington DC learning about various types of career paths that one can have with a degree in science studies. Through out the following academic year students took two courses, picked with guidance from their on campus mentor, in the science studies area. This upcoming summer the participants will return to Washington DC to spend two-weeks in a more intensive policy immersion and research methods focused experience. Finally the mentors will work with students to help prepare applications for graduate school if that is the path the student chooses to take.
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 recognized as a national leader in two particular areas of education. First, building on activities like co-sponsoring the “Congress on Teaching the Social and Ethical Implications of Research” in Nov 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 seen as a leader in educating scientists and engineers in the societal aspects of their work. In recent years, CNS scholars and educators have hosted visits and extended conversations about such interdisciplinary teaching and training with colleagues including Christine S. Jones (Colorado State University), Janet Kourany and Kathleen Eggleson (University of Notre Dame), Megan Palmer (SynBERC/Stanford), Mary Sunderland (Berkeley), and Erik Aarden (Aachen University/Harvard). Some of this work has been international, including a Sp 12, collaboration among TRC 2 co-leaders van der Leeuw and Wiek with six universities from Canada, Mexico, South Africa, Germany, Sweden, and Japan to disseminate the teaching and research of sustainability scientists across the globe and a Fa 10 UK ESRC funded trip by Edinburgh researchers Jane Calvert and Emma Frow to investigate the Center’s variety of training programs (followed up by subsequent visits by Guston in Fa 10 and Wetmore and Harsh in Su 11. Wetmore and Bennett also spent time at Edinburgh in 2012 disseminating CNS education programming and holding a workshop about science and society content in museums. Wetmore and Bennett were also involved in panels (at AAAS and 4S) that culminated, in collaboration with an NSF ESEE grant (Herkert, PI), the National Nanotechnology Infrastructure Network (NNIN), and NISE Net, in a Congress on Teaching the Social and Ethical Implications of Research. The response by the participants – more than 100 of them – was overwhelmingly positive, and the Center continues to contemplate how to bring the community together again, including through a proposal project to NSF to bring together STS, science policy and ethics scholars with science museum professionals to find new ways of talking about science with public audiences.

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 post-doctoral scholars in the reporting year Lauren Withycombe Keeler (PhD, ASU) and Hannah Rodgers (PhD, Cornell). Researchers Barben (Free University-Berlin, Political Science & Sociology), Bennett (ASU, Chemistry), Conz (ASU, Sociology), Davies (Durham,
Science Communication), de Ridder-Vignone (Cornell, STS), Fisher (Colorado, Environmental Studies), Foley (ASU, Sustainability), Halpern (Cornell, STS), Harsh (Edinburgh, STS), Reinsborough (Belfast, Sociology), 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 Fujimura on former TRC 2).

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

- Halpern has begun a tenure-track position at Michigan State University in the Department of Communication.
- Bennett and Wetmore started a new research center as part of CSPO in Nov 14. The Center for Engagement & Training in Science & Society builds on much of their work from CNS.
- de Ridder-Vignone began a tenure-track position at James Madison University in the Department of Integrated Science and Technology, and has now become the director of the Duke Energy Center for Innovation in South Carolina.
- Foley began a tenure-track position at University of Virginia in the Department of Science, Technology and Society.
- Eight others are now in tenured or track positions: Barben at Alpen-Adria-Universität Klangenfurt (Austria) in a tenured position; Wetmore, now tenured, at ASU in the School for the Future of Innovation in Society; Fisher is tenured in the School for the Future of Innovation in Society; Delborne in a track position at North Carolina State University; Wang in a track position at Florida International University in Public Administration; Slade in a track position at the Hull College of Business at Augusta State University with an affiliation with the Medical College of Georgia; Selin in a track position shared between ASU’s School for the Future of Innovation in Society and the School of Sustainability; and Harsh in a track position at the Center for Engineering and Society at Concordia University.
- Bennett has been promoted as an associate clinical professor at the School for the Future of Innovation in Society.
- Conz was promoted into a research faculty position at ASU in CSPO, and also as a lecturer in ASU’s Bachelor of Interdisciplinary Studies program. He is now deceased.
- Gatchair is a lecturer at the University of the West Indies, Mona; Rajagopalan is a post-doctoral scholar at Wisconsin; Reinsborough is a research associate at King’s College, London (UK); Sarah Davies is an assistant professor and Marie Curie Research Fellow at the University of Copenhagen (Denmark).
- 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 is assistant director for education and leads the DC Science Outside the Lab Policy Workshop.

- Three have obtained additional external support for CNS-associated activities:
  - Fisher is PI on the two socio-technical integration research (STIR) awards, one that extends the Center’s integration agenda that Fisher pioneered as a CNS-funded doctoral student at Colorado and another that focuses on implementing the STIR protocol within the city to study smart grid technologies. Fisher was also PI on a National Nanotechnology Infrastructure Network (NNIN) award that sought 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. Wetmore is also PI on a recent $280K NSF award (with Harsh and Zachary), derived in part from TRC 1 fieldwork in Africa, on the emergence of computer science in Africa. He was also the social science lead for the NG-NNIN proposal led out of Stanford. He is co-PI/Deputy Director on the NNCI-SW grant awarded to ASU in Sept, 2015 and is also co-PI (focusing on Social and Ethical Implications for the network) for the NNCI Coordination award based at Georgia Tech.
  - Selin is co-PI on a recently awarded NUE with Seager and others ($200K) to investigate the societal aspects of nanotechnology through Lego serious play. During the reporting year, she finished a Marie Curie Fellowship ($400K) at the Danish Technical University.

Many of the activities encompassed by 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, six doctoral students:
Bernstein (funded, SOS), who has been working with TRC 2 and designing tools to evaluate societal interventions in science and engineering;

Trinidad (funded - VIRI; HSD), who has been assisting Guston with VIRI activities, particularly curriculum development;

Kim (Public Affairs), who is working on his dissertation for RTTA 2;

Sadowski (HSD), who has been working with Guston on the associated award, “Anticipatory Governance of Complex Engineered Nanomaterials” and on the associated Frankenstein Bicentennial Project;

Brundage (HSD), previously funded by VIRI and by the SUN-IGERT and who serves as an editorial assistant for the Journal for Responsible Innovation; and

Altamirano-Allende (HSD), who worked closely with FCT in its implementation and its follow-on research and who assisted Halpern with Emerge and is leading one of its publications.

- Current updates on earlier ASU students include:
  - Gano completed her dissertation in December 2014 and has accepted a research/research administration position at University of California-Berkeley; and
  - Conley, who defended her STIR-informed dissertation in April 2014, began her tenure-track position at James Madison University.

At Wisconsin, 20 doctoral students (Binder, Dudo, Ho, Dalrymple, Shih, Hu, Hillback, Akin, Cacciatore, Choi, Doroshenko, Kim, Li, Liang, Liu, Runge, Simis, Su, Spartz, and Yeo) in Life Sciences Communication and Communication Arts have been working with RTTA 2 data. Several of these students have received Center Support through graduate research assistantships. Seven of this group have 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 Nanyang 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;
  - Cacciatore, who finished his dissertation in 2013, is an assistant professor at the University of Georgia;
  - Yeo, who finished in 2014 is a tenure-track assistant professor at the University of Utah; and
  - Spartz, who finished in 2014 is a tenure-track assistant professor at Unity College
  - Leona Yi-Fan Su will defend her diss based partly on CNS data this summer and has accepted a tenure track position at U of Utah.

Other doctoral students trained at Wisconsin include: Li and Akin began postdoctoral fellowship positions at the Annenberg Public Policy Center at the University of Pennsylvania in July 2015. Leung, who completed his PhD in Sociology (2008) using CNS data, is now an assistant professor at SUNY Albany; 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, and many include graduate students as lead-authors. Faculty members and graduate students at Wisconsin have formed a research group – named “Science, Media and the Public” or “scimep” – that meets weekly to discuss research progress. This group includes members of not only RTTA 2, but members of the NSEC at Wisconsin. The meetings have helped foster collaborative work between the two NSF-funded grants (e.g., the recent publication by Runge and co-authors in the Journal of Nanoparticle Research).

In Su 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. Using grants from the Holtz Center for Science and Technology Studies and the Division of Continuing Studies at WU totaling about $100,000, Scheufele developed two versions of this course, that currently enrolls students from five different colleges at UW and serves more than 220 students annually, including 90 in an online-only summer version offered for the first time in July/August 2015.

At Georgia Tech, three doctoral students (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.

Doctoral student Carley graduated in Sp13. 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.

The Manchester International Summer on Emerging Technologies, June 8-13, 2014 was organized by Shapira (and colleagues at the Manchester Institute of Innovation Research); YouTie was one of the faculty. The Summer School provided advanced training, researcher development, and networking opportunities for early career researchers interested in real-time research and innovation systems assessment, new methods, frameworks of responsible research and innovation, and policy development for transformative emerging technologies. Among the emerging technologies considered: graphene and synthetic biology. The Summer School was attended by 29 doctoral and early career researchers.
(selected from more than 80 applicants) from 20 different universities and 11 countries, including developed and emerging countries. Funding came from the ESRC (Project on Emerging Technologies, Trajectories and Implications of Next Generation Innovation Systems Development), in collaboration with the Manchester-Atlanta-Beijing Innovation Co-Lab. Additional sponsorship for the Summer School was provided by the European Forum for Studies of Policies for Research and Innovation (Eu-SPRI) and by the Manchester Institute of Innovation Research (MIOIR).

TRC 1 at Georgia Tech has supported four graduate students. Graduate students Rodrigo Cortes and Ogundiran Soumonni both finished their dissertations last year. Cortes is co-directing a Masters Program in Technology Management from his position at the Universidad de Chile and Soumonni is at the University of Witwatersrand in Johannesburg, South Africa. Previous CNS graduate student Thomas Woodson is now an assistant professorship at Department of Technology and Society at SUNY Stony Brook.

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 a Science and Technology Fellow with the Department of Energy and Barandarian is a tenure-track assistant professor in Global and International Studies at the University of California, Santa Barbara.

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 two (24) doctoral students (13 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; Cecilia Glerup, Copenhagen Business School; Birgitte Hansen, Copenhagen Business School; Cameron Keys, ASU; Byoungyoon Kim, Rensselaer Polytechnic Institute; Anthony Levenda, Portland State University; 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; Abraham Tidwell, ASU; 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. In connection with their STIR-related work, Fisher also served/serves on graduate committees of Altamirano, Brundage, 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 four PhD+ students: Troy Benn (Environmental Engineering; Westerhoff lab); Jason Lappe (Chemistry and Biochemistry; Woodbury lab); Quinn Spadola (Physics; Lindsay lab) and Tomasz Kalinowski (Biodesign; Halden lab). Spadola is now an AAAS fellow at the National Nanotechnology Coordination Office.

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 and graduated with a PhD in Fall 15. 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, leading multiple publications on “anticipatory Life Cycle Assessment.” Wender along with Foley developed and delivered a session at the 2013 Winter School on interdisciplinary collaboration, and they also organized a meeting in parallel with the 2014 Winter School on anticipatory LCA. In the current year, Wender competed successfully for a Mirzayan Fellowship at the National Academy of Sciences. New CNS-Biodesign and CNS-FSE Fellows for this year include Kaitlin Vortherms (Civil and Environmental Engineering Seager lab), Camilla Jensen (Civil and Environmental Engineering Seager lab) and Alizee Jenck (Biodesign; Halden lab). Vortherms won the 2014 Miss Phoenix crown with a platform of social and emotional intelligence in STEM education and a talent in reading a monologue from the STEM-related play, “Proof.”

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 in Science, Engineering and Society.” The Certificate, begun in Fall 13, graduates its first student, Caitlin Troyer, with a master of science in biology and society. Troyer matriculated at Berkeley Law School for Fall 2014. The current Certificate cohort is one engineering PhD student.

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 has been 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 as a CNS-Biodesign Fellow.
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 or Wetmore nearly every semester for the past six 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. 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. Reifschneider successfully defended her dissertation in Oct 13 took a post-doc position with in CSP0 funded by the NNIN and then moved to the Government Accountability Office (GAO) as an analyst in the Office of the Chief Scientist.

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.

Developed and taught by Wetmore and Bennett and held in Washington, DC, “Science Outside the Lab: A Policy Dis-Orientation” for graduate students 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 masters degree programs – one a Masters in Science & Technology Policy and one a Professional Masters in Solar Energy 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 15, CNS-ASU conducted six 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 was one session dedicated to each of them. The first session focused on solar energy policy. The second session was tailored to the needs of the PSM in Science and Technology Policy and included natural scientists and engineers. The third session was populated with science and engineering students. The forth and fifth sessions were populated by the undergraduate-serving Program to Increase Diversity in Science and Technology Studies and Science Policy Fields, funded as a supplement to CNS-ASU. The sixth program last summer was targeting Latin American science and engineering graduate students and focuses on Science and Diplomacy. Summer 16 will have a similar set of programs with the exception of the two Program to Increase Diversity in Science and Technology Studies and Science Policy fields will be combined into one giant 25 person cohort as well as a new program focusing on nanotechnology policy with funding from the National Nanotechnology Coordinated Infrastructure. In Summer 16 we will pilot the first franchise model of Science Outside the Lab with previous faculty Harsh leading a program in Ottawa and Montreal on Canadian Science Policy.

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.” One related outcome of this collaboration is that Youtie has been invited to organize a societal research presence on GA Tech’s proposal to the NNCI.
In 2007, 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 since 2008.

In 2011, 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 thirteen graduate courses at ASU:

- In Spring 15, Arizona 2050: Sustainability and the Past, Present, and Possible Future of Arizona was taught by faculty closely tied to CNS-ASU using CNS research as the basis. As a rapidly growing state in one of the world’s hottest and driest regions, Arizona faces incredible sustainability challenges over the coming decades. In the course, students learned about past and present attempts to understand the future of Arizona, then worked both individually and in teams to conduct research and use that knowledge to shape a variety of narrative visions for our shared future. The course started in its first week with a discussion of design research conducted by CNS-ASU researchers Foley, Petrucci and Wiek on scenario development, sustainability, nanotechnology, storytelling, and the future of Phoenix – specifically, their article “Imagining the Future City” in Issues in Science & Technology.

- In Spring 13, TRC 2 co-leader Wiek and Darren Petrucci, former director of the Design School, offered “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 brought together fourteen graduate students to redesign the architecture and urban form of Phoenix to reflect four scenarios generated by 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. The resulting product from the studio – a short film – has been shown in many diverse venues, including Phoenix Biosciences High School and CSPO’s “New Tools” seminar in Washington, DC.

- 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 were trained either in ethnographic methods or observational media documentation and applied 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 spent 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 achieved a novel synthesis of analytic and communication approaches and explored 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, AY13-14, and AY 14-15.

- 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 13 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 online 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

New this year is the CNS-ASU Program to Increase Diversity in Science and Technology Studies and Science Policy of Emerging Technologies, is designed to attract sophomore level undergraduates from under represented minorities into science studies fields. For more on the program, see Section 10 Diversity.

CNS-ASU organizes a variety of undergraduate education and research training experiences. 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.

CNS has supported undergraduate student interns in conjunction with the TRC 2 Nano in City Environments database project: Sarah Hoke, and Evan Taylor. It has also supported Daniel Escolin in videography support, including the videotaping and editing of all presentations and special projects.

Nano Ethics at Play (NEAP) is a CNS-associated NSF NUE project 026913-001 for $200K that started November 2013 and continued through October 2015. It employs a method called “LEGO Serious Play®” to help interdisciplinary cohorts of students explore the social, ethical and environmental dimensions of nanotechnology. Students are presented with nano-related content from different disciplines and researchers across ASU campus. Students then build metaphorical models using LEGO® bricks to illustrate their thoughts and create a hands on dialogue about the nano-based content. In addition to the development and execution of the workshops, the course has provided students with an interactive and unconventional learning experience. Some students discovered that some ideas must be developed through hands on building and that their ideas literally emerged before their eyes during the building process. One student mentioned that, “… having the opportunity to experience new technology and discuss its potential use was a great experience”. The course seeks to improve literacy in the impact of emerging technologies on social and environmental systems while simultaneously improving the way students communicate across disciplinary boundaries.

NEAP is directed by CNS-affiliate Camilla Jensen, currently pursuing a PhD in the Herberger Design School, and supported by a cadre of CNS-ASU faculty, students and fellows, including Selin, Wetmore, Bernstein, Wender and Kaitlin Vortherms. The NEAP curriculum leverages products previously developed by researchers at CNS-ASU, including components of the “Community Engagement Workshop” and the “Nano Around the World” card game. The course supports the mission of CNS-ASU by helping students and researchers create and engage in broad-reading dialogue regarding the promise, perils, and societal dimensions of emerging technologies while using LEGO Serious Play® to improve retention and communication of such abstract and complex concepts.

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 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 has been offered each Spring by other CSPO faculty. In Spring 14 CNS Post-doc de Ridder-Vignone developed this course into an online course and taught it.

CNS-ASU has had a long-standing relationship with InnovationSpace. 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 13-14, the students developed nano-enabled products for autistic children. While the Center did not formally support any InnovationSpace teams in the current year, several members of the Center continued to interact with the students (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.

Scheufele teaches a course in “Science, Media, and Society,” which has been offered jointly to undergraduates by the Department of Life Sciences Communication and Science and Technology Studies. This new curriculum offering was informed heavily by the last 8 years of CNS-related work at UW, and has become a required course for all Life Sciences Communication majors at UW, one of the fastest-growing majors in the College of Agricultural Sciences. The course currently enrolls students from five different colleges at UW.

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 built upon existing relationships held by co-leader Wiek and faculty at the school. In previous years, 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. Faculty from Bioscience have also served as speakers at the monthly Science Café Series (see Outreach section). Additionally, CNS personnel offered presentations to the entire sophomore class on the M52 Superfund Site. Bioscience High School then committed to taking on the M52 Superfund Site as its 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 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 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 has not offered the course in several years, although Bennett continues to be involved in some more ad hoc high school outreach derived from contacts at that time. 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 had 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. This mechanism for attracting the attendance of teachers became less important over time, however, as the state of Arizona changed the requirements for continuing education, allowing teachers to gain credit through simple online activities. In other work oriented toward pre-college audiences, 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) also reaches K-12 audiences, and 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 had 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 that occurred conjunction with NISE Net to train museum staff in how to facilitate conversations about nanotechnology and society. In fall of 2014, CNS-ASU hired Rae Ostman, who previously worked for NISE Net and was instrumental in helping develop the collaboration between the two institutions, into a part-time professor of practice position that has since moved into state funding with the new Center for Engagement and Training in Science and Society. NISE Net is currently transitioning from a nanotechnology
focus to become the National Informal STEM Education Network, this newly conceived entity will be managed as a partnership between Museum of Science Boston, Science Museum of Minnesota and Arizona State University. Further 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. Post-doc Reifsneider is currently attempting to follow up with the various NNIN sites to see explore the possibility of conducting an evaluation of this program.

While the video remains on the NNIN website for use at some sites, after much deliberation NNIN 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 translated into French.

Winter School

In Winter 16, CNS-ASU hosted the fourth Anticipatory Governance of Emerging Technologies Winter School at the Saguaro Lake Ranch in Mesa Ariz. It was attended by 13 early career scholars (graduate students or PhDs fewer than three years out) and by faculty
from the RTTAs and TRCs as well as the assistant and associate directors and director. The student participants represented 11 institutions from 9 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. This year, CNS charged participants a modest fee to begin moving the Winter School to a revenue neutral model like the Science Outside the Lab program. Based on feedback from this session and other comments CNS will conduct another Winter School in Jan 17. Highlights for the participants included their interactions with Board of Visitors attendees, as well as participants of a workshop on potential connections between STS scholars and science museum professionals led by Wetmore.
Table 3A: Education Program Participants, Irrespective of Citizenship

<table>
<thead>
<tr>
<th>Student Type</th>
<th>Gender</th>
<th>Race</th>
<th>Mixed-incl. Mixed</th>
<th>Not Provided</th>
<th>Other Non-US</th>
<th>*Ethnicity</th>
<th>Disabled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrolled in full degree programs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduate</td>
<td>25</td>
<td>6</td>
<td>19</td>
<td>1</td>
<td>6</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>Masters</td>
<td>9</td>
<td>6</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Doctoral</td>
<td>46</td>
<td>15</td>
<td>31</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>28</td>
</tr>
<tr>
<td>Enrolled in NSEC Degree Minors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctoral</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enrolled in NSEC Certificate Programs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctoral</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practitioners taking courses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enrolled in NSEC Programs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctoral</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practitioners taking courses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K-12 (Pre-college) Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>27</td>
<td>53</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td>47</td>
</tr>
</tbody>
</table>

Award #0937591
Sept. 1, 2015 - Aug. 31, 2016
## Table 3B: Education Program Participants, U.S. Citizens or Permanent Residents

<table>
<thead>
<tr>
<th>Student Type</th>
<th>Total</th>
<th>M</th>
<th>F</th>
<th>NA</th>
<th>PI</th>
<th>AA</th>
<th>C</th>
<th>A</th>
<th>NA,PI,AA</th>
<th>C,A</th>
<th>Not Provided</th>
<th>Other</th>
<th>*Ethnicity</th>
<th>Non-US</th>
<th>Hispanic</th>
<th>Disabled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrolled in full degree programs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduate</td>
<td>25</td>
<td>6</td>
<td>19</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td>13</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masters</td>
<td>8</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctoral</td>
<td>26</td>
<td>9</td>
<td>17</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>21</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Enrolled in NSEC Degree Minors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctoral</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enrolled in NSEC Certificate Programs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctoral</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practitioners taking courses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enrolled in NSEC Programs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctoral</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practitioners taking courses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K-12 (Pre-college) Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>59</td>
<td>20</td>
<td>39</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td>40</td>
<td>8</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Award #0937591
Sept. 1, 2015 - Aug. 31, 2016

124
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. 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 2015, we accelerated the transition to post-CNS, which began in 2014 with the hiring on state funds of informal science education and citizen science personnel and the creation of a new Center for Engagement and Training in Science and Society (CENTSS) that will sustain much of the outreach activities that CNS-ASU started. Because many of the engagement and outreach programs have achieved a high level of success, in part because they were nurtured and developed within a cohesive center, we decided that they should be spun off into their own center. The goal is to continue to develop the synergies between these programs and further their increasingly national and international reputation. Assistant Director for Education Bennett and Associate Director for Engagement Wetmore pioneered a number of these programs, and they have been named co-directors of the new center. CNS served not only as a way to incubate these new programs, but also as a way for the scholars involved in them to develop new communication and leadership skills.

The new center has proven extremely successful so far. In the year and a half since its founding, it has secured over $2.5 million in new grants to carry out a wide array of programs, including the following:

- **Sustainability in Museums** – This project, funded by the Walton Sustainability Solutions Initiative, draws on the skills developed through the CNS-ASU NISE Net partnership. The Center is developing, prototyping, and testing a series of table top demonstrations to facilitate conversations about sustainability for science museums and other informal science education venues.

- **Participatory Technology Assessment of NASA’s Asteroid Initiative** – NASA funded this recently completed effort to get public input into its decision on which plan the asteroid initiative should pursue. With the help of ECAST, the Center facilitated two workshops – one at the Arizona Science Center and one at the Museum of Science, Boston. When the director of NASA proposed a “mission downselect,” he cited the data gathered in the CENTSS efforts. President Obama’s 2016 budget request highlights the project as a milestone for NASA.

- **Community Engagement for Environmental Literacy** – This project, another participatory technology assessment project, is being funded by NOAA to improve resilience and decision making. CENTSS will be organizing a series of 8 workshops at science museums across the country over the next year.

- **Participatory Engagement for Energy Policy Planning and Decision Making** – After hearing about the success of the Asteroid Initiative project, a few officials at the Department of Energy became interested in receiving similar public input into policy decision. This
project will involve another series of workshops to get public input into consent-based siting of high level nuclear waste.

**Space and Earth Informal STEM Education (SEISE) project** – NASA recently completed a call for proposals to radically revamp its STEM education programs. CENTSS applied as a subcontract with NISE Net and was awarded a major grant to develop space-related K-12 informal educational materials to be distributed across the country. CENTSS faculty member Rae Ostman is leading the Content and Audience Planning of SEISE. Wetmore and Bennett serve on its advisory committee.

**National Nanotechnology Coordinated Infrastructure** – The activities and relationships built up under the CNS–ASU grant has put CENTSS in an excellent position to coordinate “Societal and Ethical Implications” work in association with NSE labs. ASU has been awarded one of the NNCI sites (called Nanotechnology Coordinated Infrastructure-Southwest, or NCI-SW). As part of its SEI activities, CENTSS will run a yearly, one week Science Outside the Lab on nanotechnology, as well as create a user facility for visiting SEI researchers. The proposed SEI user facility will modularize many of the tools developed at CNS and offer small stipends to scholars who want to travel to Tempe to learn how to integrate them into their own work. Wetmore has also recently been asked to serve as Deputy Director of NCI-SW. CENTSS was also invited by Georgia Tech to join its proposal to serve as coordinator of the entire network. In March 2016 that proposal was accepted and Wetmore also serves as Associate Director for SEI for the NNCI Coordinator’s office. RTTA1 coordinator Jan Youtie serves as head of SEI at Georgia Tech.

**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 a good working relationship.

In April 15 CNS and NISE Net collaborated on two workshops in Tempe. The first aimed to expand the number of social science scholars at ASU that partner with museum professionals to give their research a wider audience. This workshop took the lessons learned by CNS researchers to see if the CNS/NISE Net partnership can serve as a model for other scholars who have important findings that should be presented to the public. Ten museum professionals from 6 museums and 7 scholars spent a day brainstorming ways for their research to be packaged into informal science education programming. Thanks to a supplement to CNS-ASU, a second meeting was held in January 2016 – interacting with the CNS Winter School – with participation from the Exploratorium, Museum of Science, Boston, Science Museum Minnesota, and the Lawrence Hall of Science.

The success of those two meetings has led to additional developments. First, the team is developing a new proposal for a creating a series of partnerships between STS scholars and science centers.

The idea would be to provide funding for teams to travel between their respective museums and
universities to foster new collaborations. In March 2016 Wetmore, Ostman, and Bennett spent two
days on the floor of the Exploratorium working with a number of their staff to develop new
programs around “science and society.” The collaborative team will next be developing a new
pedagogy around the learning goals in this area and is currently working on a grant proposal to
fund these efforts.

**Collaborations with the Arizona Science Center**

Continuing partnership

Over the past several years, 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. The Science Center has also opened its doors as a place for CNS scholars to develop and test
new projects and to work collaboratively on sponsored research. Last year CENTSS sponsored
“Science and Society” prizes for the Arizona Science and Engineering Fair that the Arizona Science
Center runs. Wetmore and Trinidad served as judges and chose 4 winners out of the 1000+ entries.

The strength of this relationship has led ASU to designate CNS assistant director of education
Bennett as the faculty member in charge of the partnership between the university and the Arizona
Science Center. The ASU administration viewed the relationship and projects that were created by
CNS with the Arizona Science Center as exemplary and has entrusted CNS researchers to propagate
that model across the university. This partnership has led to the development of an internship
program where undergrads and graduates from schools across the ASU campus are given a chance
to work at the Science Center for a semester to learn concepts and practices behind informal
science education. In the first two semesters we have sponsored three participants.

**Other Museum Collaborations**

**Frankenstein Bicentennial Project**

Guston and assistant professor Ed Finn, who directs ASU’s Center for Science and the Imagination
(CSI), launched the Frankenstein Bicentennial Project in 2014, to recognize and celebrate the theme
of creativity and responsibility in Mary Shelley’s gothic novel, *Frankenstein, or The Modern
Prometheus*, first conceived in 1816 and published in 1818. This project develops and extends CNS
attention to anticipatory governance and responsible innovation and helps the Center to transition
to other emerging technologies, historical (electricity) and contemporary (synthetic biology,
robotics and AI, tissue engineering). Together with co-PI Helms-Tillery, Finn (PI) and Guston (co-
PI) received a small award from NSF to host an interdisciplinary, cross-sectoral workshop to
explore new ways of collaborating and set new project agendas around the project themes. The
workshop took place 28-30 April 2014. Outputs and outcomes of the workshop include: the
integration of the Frankenstein theme into the campus-wide *Emerge* event in 2017, the creation of a
monster-themed fellowship program at ASU’s Institute for Humanities Research (IHR), which
Guston addressed in March 2016; the planned development of a monster-themed exhibition in
ASU’s library space derived in part from work produced by the IHR fellows; the contract for and
submission for review of a new edition of *Frankenstein*, targeted at science and engineering
students, by Guston, Finn, and Robert for MIT Press; public presentations on Frankenstein, synthetic biology and responsible innovation by Guston at the Seattle International Film Festival and at the Philadelphia’s Mutter Museum, sponsored by Drexel University; a peer-reviewed journal article in press with a special issue of the Bulletin of Science, Technology and Society on “Science & Science Fiction;” and a planned volume on Frankenstein for CSPO’s Rightful Place of Science print-on-demand book series. These latter two activities were led by CNS-ASU post-doctoral fellow Megan Halpern.

Beyond the $50K NSF workshop award, the project has expended or had pledged or committed approximately $450K from various ASU sources; Finn and Guston have also led a $3M follow-on proposal to NSF’s Advances in Informal Science Learning program to develop and evaluate the impact of a citizen-curated virtual museum of Frankenstein and other transmedia elements. The underlying hypothesis for the learning research in the proposal is derived from results from CNS-ASU’s National Citizens’ Technology Forum (NCTF), especially the finding that participants were likely to increase their feelings of internal efficacy but decrease their feelings of external efficacy through their participation in NCTF. The proposal hypothesizes that less dialogic and more hands-on activities – the kind of material deliberation pioneered by RTTA 3 and already embraced in science museums through table-top demonstrations, the NanoDays kit, etc. – will improve feelings of external efficacy as well. Museum and other informal education partners in this proposal include the Bakken Museum, the Rosenbach of the Free Library of Philadelphia, the Chemical Heritage Foundation, and others. CNS post-doc Halpern was also intimately involved in the production of this proposal, as was Rae Ostman, formerly of NISE Net and recently hired by CENTSS.

Broader Engagement Programs and Activities

New Tools for Science Policy

CNS-ASU is leveraging the CSPO DC office to reach out to policy audiences. In YR 11 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. In October, Bennett and his colleagues presented their recent participatory technology assessment work in a talk entitled: “From Asteroids to Oceans: Using Public Engagement to Inform Policy Decisions.” In April 2016 the TRC 1 Spin off Computer Science Project will be presented.

CHM 501

Bennett and Wetmore continue to teach a Chemistry 501 course every spring to train PhD level chemists in how to engage with broader publics. Over the course of the spring 2016 semester students were challenged to develop plans for new citizen science projects that could simultaneously address environmental injustice concerns and empower the communities that suffer from them. Students looked for ways to remediate nitrate pollution, noise pollution near airports, and radioactive materials on the Navajo reservation.

ECAST
In Apr 2010, 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 it forwards a proposal to create the ECAST network – Experts and Citizen Assessment of Science and Technology ([www.ecastnetwork.org](http://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 regular 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 of Technology’s World Wide Views (WWV) on Global Warming (which overlapped substantially with NCTF sites), the WWV on Biodiversity held in September 2012 (which also had some overlap), and the WWV on Climate and Energy, which took place in June 2015. ECAST has also been heavily involved in the NASA, DOE, and NOAA projects described in the CENTSS section above.

*Emerge: Artists and Scientists Design the Future*

In Spring 2015, for the fourth consecutive year, CNS helped support the annual *Emerge* festival at ASU, one of the university’s major town-gown initiatives. CNS post-doc Halpern served as the director for collaboration and research for the festival and deployed a cadre of five graduate students (Trinidad, Altimirano-Allende, Fuller, Burnam-Fink, and Connelly) to perform ethnographies of the activities. Highlights from the CNS perspective included several of the participatory “visitations” derived from CNS activities such as Future Fairy Tales with Legos (after the Lego Serious Play NUE project) and the Future Design Studio (in the mode of material deliberation), as well as the performance-based follow-on to the design studio, Future Design Studio Improv Hour, in which one of the objects designed in the studio was chosen for performance by a troupe of trained improvisation actors. Major collaborators on Emerge at ASU included the Ira A. Fulton Schools of Engineering, the Herberger Institute for Design and the Arts, the Julie Ann Wrigley Global Institute of Sustainability, the Center for Science and the Imagination, and others, as well as the ASU Art Museum, Scottsdale Public Art, KJZZ, and the Arizona Sci-Tech Festival, for which *Emerge* was a signature event. The role of Halpern and the students means that in addition to the high point of a public festival, research in the form of a manuscript for under revision for the 2016 Participatory Design Conference, run by the Association for Computing. Halpern has also turned the Future Design Studio into a new NSF proposal from and her and colleagues at Michigan State University, where she is now faculty.

CNS will help support the 5th annual Emerge festival, focused on the future of sport, at ASU on April 29. The CNS team is led by post-doc Rogers, who is heading up the effort to reach and analyze the outcomes of the project. At present, five research experiences (Climate Sports, AI Cheerleader, Biofeedback Game, Future Sports with Girls, and Draft Part 2040) have been planned for the event. Research protocols have been developed for each and publication plans are underway. Each research experience uses a novel approach for collecting data and offering participants an interactive experience. A post-survey for audience members to receive following the event has been designed.
Presentations to Public Audiences
Beyond those mentioned above, highlights in YR 11 include:

Presentations to Policy and Professional Audiences
Beyond those mentioned above, highlights in YR 11 include:

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.

Research Integration Presentations
Beyond those mentioned above, highlights in YR 11 include:

Collaborations with Academic Colleagues

Society for the Study of Nanoscience and Emerging Technologies (S.NET)
In the recent academic year, the new School for the Future of Innovation in Society hired Michael Bennett as a research associate professor. In October, he was elected president of S.NET. Along with Co-PI Diana Bowman, Bennett received NSF funding in early 2016 on a project entitled “Workshop: Building Better Futures-Junior Scholar Support for the 2015 Annual Meeting of The Society for the Study of Nanoscience and Emerging Technologies (October 18-21, 2015).” The funds will be used to enable participation of students, postdoctoral researchers, junior scholars and independent scholars who have minimal travel and lodging funds to attend, and fully participate in, the 2015 S.NET meeting in Montréal. The award will support the professional development of junior science and technology studies scholars, as well as students and researchers from underrepresented groups.

Gene Drive Workshop
CNS-ASU board of visitors member Jennifer Kuzma is the principal investigator for an NSF workshop grant that funded Roadmap to Gene Drives: A Deliberative Workshop to Develop Frameworks for Research and Governance. Hosted and organized by a committee based at NC State’s Center for Genetics and Society, CNS-ASU and the Synthetic Biology Engineering Research Center (SynBERC) also provided personnel to the committee and some support. CNS sponsored the participation of Jim Collins and Emma Frow as members of the workshop organizing committee, Jenny Brian in her role as an organizing committee member of a related workshop held at ASU in November 2014 (http://cns.asu.edu/synbio); and David Gillum as an ASU PhD student with research and professional interests in gene drives. All four participants from ASU participated in the full 2.5-day workshop.
The motivation for this workshop was to begin an interdisciplinary conversation around gene drives that might help guide the development of a research and policy agenda for the field. Approximately 75 participants, including about 20 graduate students, attended, bringing with them perspectives representing different disciplines (including molecular biology and genetics, ecology, agricultural science, modeling, political economy, STS, ethics) as well as different institutional settings (including academia, industry, federal agencies, non-profit organizations). The workshop format comprised plenary presentations and discussions, as well as several smaller breakout sessions. The breakout discussions revolved around four case studies addressing different key application areas for gene drives (agricultural pest management; invasive rodent eradication; mosquito engineering for human health; molecular technology types). Groups worked to develop systems maps that started to draw out connections across policy, economic, sociocultural and ecological dimensions of the technological application areas outlined in the case studies. The focus then turned to identifying key gaps in our current knowledge and in governance frameworks applicable to gene drives.

The meeting deliberations made clear that gene drives are not a single, straightforwardly defined technology, but that they can be configured in a variety of ways, with different levels of precision and robustness. Much of the discussion focused on the tricky issue of containment – how to limit the scope of action of gene drives to only the desired range, particularly when gene drives are by definition a technology intended to spread. A parallel concern revolved around identifying appropriate stakeholder groups for gene drive technologies, again under conditions when the possible unintended spread of gene drives is a key concern. By starting to spell out different technical approaches to gene drives, and considering a range of sociotechnical systems in which they might be deployed, this workshop paved the way for further discussions about responsible innovation around gene drives – in particular, making explicit a variety of values and motivations for pursuing this technology, and helping to map out scenarios that might see gene drives develop along quite different paths.

The workshop provided a great catalyst for building an interdisciplinary community of researchers and practitioners around gene drives. Workshop outputs in preparation include:

1) A set of short, online videos from participants at the workshop, identifying key questions and viewpoints regarding gene drives for a more public audience.

2) A proposed special issue of the Journal of Responsible Innovation, to be co-edited by colleagues at NC State and Emma Frow at ASU. Ten working papers were prepared in advance of the workshop, and are currently being revised as prospective journal submissions; a further three articles have been invited by the special issue co-editors in response to a call for additional abstracts.

Governing the Use of Emerging Technologies: Law, Policy, and Ethics (GET)

CNS-ASU has been a major sponsor of the annual “Governance of Emerging Technologies: Law, Policy, and Ethics” meeting, organized by Marchant at ASU’s Sandra Day O’Connor College of Law. Guston has served on the program committee, along with board of visitors member Jennifer Kuzma, and organized and chaired a plenary panel in each year. In the reporting year, CNS-ASU involvement in the second annual meeting included: Guston’s chairing and commenting on a plenary lecture on inter-generational justice with Carolyn Raffensperger; doctoral student and VIRI supported student Denise Baker presenting a talk on the need for public discourse around the Internet of Things, VIRI supported visiting faculty Sujatha Raman presenting on governance of emerging anti-microbial technologies, RTTA 3 doctoral student Jathan Sadowski presenting on smart cities, and an entire concurrent panel dedicated to “anticipatory governance” with no CNS presenters on it. In the reporting year, Selin served on the planning committee. The meeting draws 80-100 attendees, mostly academics but some government officials and private sector participants.
CNS-ASU, Anticipatory Governance and the Structure of Large-scale Societal Research

In the reporting year, Guston participated in five activities that highlight how CNS is seen as a model for articulating a strong central vision and pursuing it in an interdisciplinary way. In summer 2014, he gave talks at both the nascent Science, Technology, Engineering and Public Policy (STEaPP) Department at University College, London and the well-established Science Policy Research Unit (SPRU) at the University of Sussex that focused on the connection between the organizational design and intellectual pursuits of the Center. In fall 2014 at ASU, he anchored a panel sponsored by the Office of Knowledge Enterprise and Development on organizing and conducting interdisciplinary research. In February 2015, he spoke at the University of California, Berkeley, to the Center for Science, Technology, Medicine and Society, in part to advise about CNS-ASU experience that might relevant to CSTMS's intention to create a new Center for Regulatory Science. That presentation led to a follow-up invitation from the new Berkeley Institute for Data Science to discuss similar issues.

Presentations to academic and professional audiences
Beyond those mentioned above, highlights in YR 11 include:


Collaborations/Interactions with Industry and Other Sectors

Journal of Responsible Innovation

In Aug 13, Guston signed a contract with Taylor & Francis to publish the Journal of Responsible Innovation (JRI) under their Routledge imprint – the world’s largest publisher of social science journals. The effort had started several years earlier, when Fisher and several European colleagues began to draft a proposal. They eventually brought Guston on board, and together they revised the proposal and offered it to several presses (MIT, Sage, Oxford) and finally found a partner in T&F. JRI has an internationally esteemed set of associate editors and members of its editorial board. Volume 1, issue 1 appeared online and in print in Feb 14 (http://www.tandfonline.com/toc/tjri20/current#.U0ID915tiCU); it will remain open access in perpetuity, and select and timely articles in future issues will be open access as well. The journal will also abide by the open access policy of the United Kingdom. As the reporting year closes, JRI has published three issues in each of its first two volume years. Because of his intensive service duties with the new School for the Future of Innovation in Society, Guston is stepping down and Erik Fisher is taking on the role of editor-in-chief for volume 3 and beyond.

Presentations to private sector/industrial audiences
Beyond those mentioned above, highlights in YR 11 include:

Documentary and Video/Television Projects

In 2013, CNS-ASU revamped its website (cns.asu.edu) with the goal 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 several 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.

*Fixed*

Regan Brashear, former CSPO filmmaker in residence, completed her film “Fixed: The Science/Fiction of Human Enhancement,” which generously credits CNS-ASU as assisting with the film. Over the course of making the film, she interviewed Center faculty including Guston and Miller, and the completed version includes significant footage of CNS collaborator Wolbring. Guston moderated a screening of the film at the S.NET annual meeting in Boston and it was scheduled to be shown at the upcoming EuroScience Open Forum in Copenhagen but appropriate arrangements could not be made. Guston moderated a CNS-sponsored screening at the 2nd Annual Conference on the Governance of Emerging Technologies meeting in May 2014. Fixed has also been screened and won awards at numerous film festivals – including best (full-length) documentary at the Picture This Film Festival 2014 – and it has been licensed by the United Nations for its work on the Convention for the Rights of People with Disabilities. In 2015, the film successfully ran on PBS via American Public Television, with over 1,600 telecasts on over 400 channels and stations in 45 states, potentially reaching 90% of U.S. households.

NSF Science Nation

In the fall of 2015, the National Science Foundation's *Science Nation* online magazine produced and released an episode entitled “How will nanotechnology impact you?” focused on CNS-ASU research and engagement efforts aimed at incorporating responsible innovation practices into the development of nanotechnology and other emerging technologies. “Science Nation” is a video series commissioned by the NSF Office of Legislative and Public Affairs. The series is distributed throughout the world, including to LiveScience.com and other media outlets on the Internet, local community TV stations in the U.S. via TelVue Connect Media Exchange, Voice of America for international broadcast distribution, the NSF STEM video portal Science360, the Knowledge Network video stream and Roku channel, and K-12 content distributors in the U.S. and abroad.
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), now the School for the Future of Innovation in Society (SFIS) – and sufficient capacity and flexibility to host visitors. To date, since beginning operation in Oct 05, and according to rigorous selection criteria, CNS-ASU has hosted numerous visitors including one hundred and nineteen (119) international scholars, students, and policy practitioners from twenty-six (26) countries. These numbers do not include dozens more international visitors to the Georgia Tech and University of Wisconsin-Madison sites, nor do they include some sixty-five (65) international visitors to the ASU Tempe campus who attended the 2011 S.NET conference and the 2013 Communities of Integration workshops. 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 CNS-ASU in Tempe. Thus, in past years, we have not counted Bowman (Northern Ireland) or twelve other international visitors who attended the fourth STIR project workshop or 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, as in past years, we do not count international visitors such as Gjeßen, who currently have appointments at another US institution. Third, we only count one member of each group of two or more 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 1-10, CNS-ASU was visited by one hundred and twelve (112) 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 11, the following eleven CNS-ASU visitors fit the three criteria specified above:

1. Andreas Huber, University of Natural Resource and life Sciences, Austria
2. Sean Low, Institute for Advanced Sustainability Studies, Germany (Canadian citizen)
3. Stefan Schäfer, Institute for Advanced Sustainability Studies, Germany
4. Poonam Pandey, Jawaharlal Nehru University, India
5. Shannon Spruit, Delft Institute of Technology, Netherlands
6. Shih-Hsin Chen, National Chiao Tung University, Taiwan
7. Robert Smith, University of Nottingham, United Kingdom

YR 11 CNS-ASU visitors consisted of seven students/researchers from seven countries, all of
whom 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. Several YR 11 visitors are developing research plans that grow out of their interactions with the Center.

In addition, during YR 11, several international visitors returned to CNS-ASU in Tempe, including Sally Randles (University of Manchester, U.K.) and Miklos Lukovics (University of Szeged, Hungary). Since they were counted in figures from previous years, these scholars have not been added to the overall count.

Sample publications or publishing activity in YR 11 by previous international visitors to the Center that stemmed from or were shaped by their interactions with CNS-ASU include the following articles and book chapters:


During YR 11, several instances of knowledge transfer, dissemination, and application occurred, including those mentioned in conjunction with the Center Assessment Study (RTTA4).

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), 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.

CNS-ASU staffing has turned over completely since the beginning of grant year 4. Staffing currently comprises Deron Ash, Program Manager starting in September, 2013 and Audra Tiffany, who replaced Patty Ryan, coordinator of administrative and event functions as of January, 2016. Jennifer Banks, 75% coordinator for communication for both CNS-ASU and VIDI, left in January, 2016.

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
RTTA 4: Erik Fisher, ASU; Elizabeth Corley, ASU

TRC 1: Jameson Wetmore, ASU; Susan Cozzens, GA Tech
TRC 2: Arnim Wiek, ASU; Rider Foley, UVA

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 and UVA and ASU for TRC2. A listserv dedicated to CNS-ASU affiliated personnel at all its institutions also facilitates communication.

Much of the interface among CNS personnel is driven by both the preparation for and the interactions that occur at the annual Winter School for the Anticipatory Governance of Emerging Technologies, as well as a series of other meetings which take place concurrently, at Saguaro Lake Ranch in Mesa, AZ. For 2016, these meetings included our annual Board of Visitors meeting and a workshop on science in society for informal education.

These overlapping meetings create a dynamic atmosphere during the Winter School and participants report that the opportunity to interact and collaborate with a variety of faculty/researchers during the week is one of the most positive aspects of the program.

Our planned “Advancing the Legacy of Anticipatory Governance GALA” – our final all-hands meeting – will attract more than 100 attendees in May 2016.
### Table 4A: NSEC Personnel, Irrespective of Citizenship

<table>
<thead>
<tr>
<th>Personnel Type</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
<th>NA</th>
<th>PI</th>
<th>AA</th>
<th>C</th>
<th>A</th>
<th>NA,PLAA</th>
<th>C,A</th>
<th>Not Provided</th>
<th>Other Non-US</th>
<th>Other Hispanic</th>
<th>Disabled</th>
<th>% NSEC Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Team Leaders</td>
<td>11</td>
<td>7</td>
<td>4</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admin &amp; Staff</td>
<td>7</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collaborators</td>
<td>214</td>
<td>127</td>
<td>87</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>186</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior Faculty</td>
<td>14</td>
<td>10</td>
<td>4</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junior Faculty</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research Staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visiting Faculty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry Researchers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post Docs</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctoral Students</td>
<td>24</td>
<td>17</td>
<td>7</td>
<td>17</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masters Students</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduate Students (non-REU)</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School Students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curriculum Development and Outreach</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior Faculty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junior Faculty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research Staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visiting Faculty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry Researchers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post Docs</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctoral Students</td>
<td>24</td>
<td>17</td>
<td>7</td>
<td>17</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masters Students</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduate Students (non-REU)</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School Students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SubTotals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REU Student</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REU students participating in NSEC research</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSEC Funded REU students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-college (K-12)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students (Total column only, no gender or race data collected for minors)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers – RET</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers – non-RET</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>282</td>
<td>168</td>
<td>114</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>243</td>
<td>33</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>12</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
### Table 4B: NSEC Personnel, U.S. Citizenship

<table>
<thead>
<tr>
<th>Personnel Type</th>
<th>Gender</th>
<th>Race</th>
<th>U.S. Citizen or Permanent Resident</th>
<th>Mixed-incl. Mixed</th>
<th>% NSEC Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>NA PI AA C A NA PL AA CA</td>
<td>Not Provided</td>
<td>Non-US</td>
</tr>
<tr>
<td>Director</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Team Leaders</td>
<td>11</td>
<td>7</td>
<td>4</td>
<td>0 0 0 11</td>
<td>1</td>
</tr>
<tr>
<td>Admin &amp; Staff</td>
<td>7</td>
<td>2</td>
<td>5</td>
<td>5 2</td>
<td>2</td>
</tr>
<tr>
<td>Collaborators</td>
<td>160</td>
<td>85</td>
<td>74</td>
<td>154 6</td>
<td>2</td>
</tr>
<tr>
<td>Research</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior Faculty</td>
<td>14</td>
<td>10</td>
<td>4</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Junior Faculty</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Research Staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visiting Faculty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry Researchers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post Docs</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctoral Students</td>
<td>24</td>
<td>10</td>
<td>5</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Masters Students</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduate Students (non-REU)</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>High School Students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curriculum Development and Outreach</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior Faculty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junior Faculty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research Staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visiting Faculty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry Researchers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post Docs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctoral Students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masters Students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduate Students (non REU)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School Students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SubTotals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REU Student</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REU students participating in NSEC research</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSEC Funded REU students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-college (K-12)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers – RET</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers – non-RET</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>228</td>
<td>119</td>
<td>99</td>
<td>209 10</td>
<td>7 0</td>
</tr>
</tbody>
</table>

**Award #0937591**
Sept. 1, 2015 - Aug. 31, 2016

**Citizenship Status**

- U.S. Citizen or Permanent Resident
- Mixed-incl. Mixed
- % NSEC Dollars
15. Publications, Patents and Press

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

Faculty level participants indicated in boldface.

Books


140
**Book Chapters**


10. Cortes Lobos, Rodrigo. 2012. "Nanotecnologia en Chile, Qu tan preparado se encuentra el pas para desarrollar esta disciplina." *Perspectivas sobre el desarrollo de las nanotecnologias en America*


33. ‡Gorman, Michael, Antonio Calleja-Lopez, Shanon Conley and Farzad Mahootian. 2013. "Integrating Ethicists and Social Scientists into Cutting Edge Research and Technological


of Equity, Equality and Development, ed(s). Susan Cozzens and Jameson Wetmore, New York: Springer.


86. ‡Subramanian, Vrishali, Thomas Woodson and Susan Cozzens. 2012. "Nanotechnology in India: Inferring Links between Emerging Technologies and Development." Making it to the Forefront:


**Peer Review Journal Article**


5. ‡Altamirano, Carlos and **Cynthia Selin.** 2015. “Seeing the City: Photography as a Place of Work.” Submitted to a special issue on “Public Engagement for Environmental Sustainability in a Technological Age.” *Environmental Studies and Sciences.* 1-10.

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


28. ‡Bhatti, Yasser, Lucy Kimbell, Rafael Ramirez and Selin, Cynthia. 2015. “Scenarios and Design: Scoping the dialogue space.” *Futures*. 74, 4-17.


82. ‡Flipse, Steven M., Maarten C.A. van der Sanden and Patricia Osseweijer. 2013. "Improving Industrial R&D Practices with Social and Ethical Aspects: Aligning Key Performance Indicators with Social and Ethical Aspects in Food Technology R&D." Technological Forecasting and Social Change. doi: http://dx.doi.org/10.1016/j.techfore.2013.08.009


85. ‡Foley, Rider W. and Arnim Wiek. 2014. “Scenarios of Nanotechnology Innovation vis-à-vis Sustainability Challenges” Futures 64, DOI.10.1016/j.futures.2014.09.005


183. Sadowski, Jathan and David H. Guston. Accepted pending minor revisions. "‘You Caught Me Off Guard’: Probing the Futures of Complex Engineered Nanomaterials." Journal of Nanoparticle Research.


200. ‡Selin, Cynthia, Lucy Kimbell, Rafael Ramirez, and Yasser Bhatti. 2015. "Scenarios and design: Scoping the dialogue space." *Futures* 74: 4-17.


258. ‡Yeo, Sara K., Xuan Liang, Dominique E. Brossard and Michael A. Xenos. In review. "Is the Online Environment Changing the Construction of Scientific Controversies?" Public Understanding of Science.


Trade Journal Article


7. ‡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.


Other Journal Article


**Periodical (popular magazines, newspapers)**


**Internet**


67. **Wetmore, Jameson.** December 3, 2012. "We're becoming a Bit More Amish." As We Now Think. http://aswenowthink.wordpress.com/2012/12/03/were-becoming-a-bit-more-amish/


83. **Wienroth, Matthias.** August 26, 2009. "Strategic Science: Research Intermediaries and the Governance of Innovation." CNS-ASU Occasional Speaker. [http://www.youtube.com/user/CNSCSPO#p/u/2/6xsBtM3Rdno](http://www.youtube.com/user/CNSCSPO#p/u/2/6xsBtM3Rdno)


**Report**


34. 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.


36. 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.


**Working Papers**


32. van der Leeuw, Sander, Arnim Wiek, J. Harlow and James Buizer. 2012. "How Much Time Do We Have to Fail? The Urgency of Sustainability Challenges vis-a-vis Roadblocks and Opportunities


**Thesis/Dissertation**


33. ‡Liang, Xuan. 2014. “Expressing political disagreement on online social networking sites and the impact of exposure to disagreement on public understanding of controversial science.” Doctoral Dissertation. Department of Life Sciences Communication. University of Wisconsin - Madison. Madison, WI.


69. Woodson, Thomas. 2014. "Emerging Technologies for Developing Countries: How nanomedicine and public private partnerships are used to address diseases of poverty?" Doctoral Dissertation. School of Public Policy. Georgia Institute of Technology. Atlanta, GA.


Presentations


24. Bennett, Ira. November 12, 2015 Engaging the public in STS: Exploring values, relationships, and systems with museum visitors, Making and Doing, 4S, Denver CO. With Rae Ostman and Jamey Wetmore


26. Bennett, Ira. September 18, 2015 Responsible Innovation, Atlanta Conference on Science and Innovation Policy, Atlanta GA. Session Chair


30. Bennett, Ira. November 15, 2014. "Science Outside the Lab: Teaching scientists how the government works and then to believe it might not be so bad.” Invited Presentation. American Chemical Society Midwest Regional Meeting, University of Missouri, Columbia, MO.


40. 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.


Nanotechnology Knowledge Gaps." Presentation. Annual Convention of the Association for Education in Journalism and Mass Communication, Denver, CO.


116. 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.


Stimulates Issue Participation during a Political Campaign. "Presentation. Annual Convention of the Association for Education in Journalism and Mass Communication, Boston, MA.


176. **Erik Fisher.** June 10, 2015. “Redesigning Research in the Lab, the University, and Beyond.” Faculty of Behavioural, Management and Social Sciences Colloquium. University of Twente. The Netherlands.


241. **Fisher, Erik.** November, 2006. "Reflecting on the Shape of Nanotechnology Research from Within." Presentation. 4S Conference (Society for Social Studies of Science), Vancouver, Canada.


266. **Foley, Rider W.** and Michael J. Bernstein. September 17-19, 2014. “Normative principals to guide the process of responsible innovation.” Presentation. European Association for the Study of Science and Technology. Turin, PL.


280. 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.


352. **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.


358. **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.


366. **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.


369. **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.


417. **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.


479. 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.


484. 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.


496. **Miller, Clark A.** March, 2006. "Nanotechnology in Society." Presentation. Ohio State University, Columbus, OH.


500. **Miller, Thaddeus R.** February 26, 2014. "Futurescape City Tours: Public Engagement in the City." Presentation. President’s Umbrella Tours. PSU.


513. **Porter, Alan L.** August, 2009. "Locating Nanotechnology among the Disciplines, Nano @ Tech."


Discovery in the Federal Context." Presentation. Workshop at the National Science Foundation, Arlington, VA.


575. **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.

576. **Sarewitz, Daniel.** March, 2007. "Connecting Research to Social Outcomes." Presentation. Presentation to the University of Nebraska Board of Regents, Lincoln, NE.


580. **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.


583. **Scheufele, Dietram A.** January 17, 2014. "Why Polarized Debates used to be Good for us." Presentation. TEDxUWMadison. Madison, WI.


592. **Scheufele, Dietram A.** May 9, 2013. "Barriers to Addressing Our Climate and Energy Challenges." Presentation. Panelist at Wisconsin Academy of Science, Arts & Letters. Madison, WI.


616. **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.


618. **Selin, Cynthia.** 2015. “Public Engagement through Material Deliberation.” Invited lecture, Department of Media, Cognition and Communication, University of Copenhagen.


689. **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.


693. **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.


of Science." Paper Presentation. The Annual Convention of the International Network on Public Communication of Science and Technology (PCST), Florence, Italy.


752. Wender, Benjamin A. April 2013. “Social and Technical Barriers and Burdens to TW-Scale PV.” Presentation. Graduates in Integrative Society and Environmental Research – QESST Sustainability Workshop. Tempe, AZ.


Presentation at the Gordon Research Symposium on Science and Technology Policy. Waterville Valley, NH.


792. **Wetmore, Jameson.** December, 2011. "Nano Equity Game: Whose Nano is it?" Presentation. Adult Night, Arizona Science Center, Phoenix, AZ.


794. **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 ESEE grants, and NISENets social implications group, Tempe, AZ.


816. **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.


819. **Wetmore, Jameson.** April, 2008. "What Do You Think About a Technology You Can’t Even See." Presentation. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.


823. **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.


826. **Wetmore, Jameson.** March, 2007. "Transferring Western Technology to Developing Countries: Good Intentions, Unexpected Outcomes." Presentation. CNS-ASU Science Cafe, Arizona Science Center, Phoenix, AZ.


836. **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.


909. **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.

910. **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**


57. **Queraltá, Ramón**. March 11, 2009. "[Note on first STIR project workshop]." *Boletín Interno de Noticias de la Universidad de Sevilla (BINUS)*.


59. ‡Reifschneider, Kiera. April 11, 2012. "'Speed Date a Scientist' Event Recap."


82. ‡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.

83. ‡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.


**Search and Mapping Tools and Thesauri**

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.

**Press**


4. Arizona State University News. March 1, 2010. ASU faculty, students present at world’s largest science meeting. [Link](http://asunews.asu.edu/20100305_AAASroundup)

5. Arizona State University News. October 19, 2010. ASU awarded $6.5 million to study nanotechnology in society. [Link](http://asunews.asu.edu/20101015_cnsrenewal)

   g) October 14, 2010 – Molecular Station. [Link](http://www.molecularstation.com/science-news/2010/10/arizona-state-university-awarded-6-5-million-to-study-nanotechnology-and-society/)


   a) February 1, 2013 – NPR. [http://www.npr.org/2013/02/01/170855378/preserving-science-news-in-an-online-world](http://www.npr.org/2013/02/01/170855378/preserving-science-news-in-an-online-world)


   a) May 2011 – Science Index.


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-b674-001a4b3f887a.html](http://eastvalleytribune.com/get_out/article_1a1fd71a-9304-11e1-b674-001a4b3f887a.html)


   f) July 26, 2011 – InterNano. [http://www.internano.org/content/view/555/251/](http://www.internano.org/content/view/555/251/)

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.


http://asunews.asu.edu/20101118_cnsyearbook2


36. **Fisher, Erik.** Causing a STIR. Center for Science and Technology Policy Research.  
http://sciencepolicy.colorado.edu/news/fisher.pdf

http://www.informaworld.com/smpp/content?content=a918038010&fulltext=713240928


   a) March 30, 2010 – NanoCEO. http://www.nanoceo.net/nanonews_03_30_10


57. 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


e) December 8, 2009 – InterNano. http://www.internano.org/content/view/325/95/


collaboration-boosts-nanotechnology-research/
www.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

97. 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

98. Tillery, Stephen Helms and Robert, Jason. May 2012. Thinking with the mind’s eye. ASU
Magazine


101. van der Leeuw, Sander. June 4, 2012. UN names ASU sustainability dean a ‘Champion of the
  a) June 4, 2012 – Eureka Alert!. http://www.eurekalert.org/pub_releases/2012-06/asu-
uns060412.php
  c) September 2012 – ASU Magazine


State University News. http://asunews.asu.edu/node/17370

Phoenix Business Journal.

106. Xenos, Michael A., Amy B. Becker, Ashley A. Anderson, Dominique Brossard, and Dietram A.
Scheufele. Stimulating upstream engagement: An experimental study of nanotechnology information
6237.2011.00814.x/abstract

286


**Invention Disclosure**


**Patents Awards or Filed**

16. Biosketches

There are no new investigators for this grant requiring biosketches.
17. Honors and Awards


Corley, Elizabeth. Promoted to Professor, May, 2015.


Fisher, Erik. Promoted to Associate Professor, August, 2015.


Halpern, Megan. Appointed Assistant Professor in the History, Philosophy, and Sociology of Science at Lyman Briggs College, Michigan State University

Li, Yin. Received a second place award in the 2016 Career Research Innovation Development Conference (CRIDC) paper competition, February, 2016.

Li, Yin. Won Best Doctoral Student award from the Georgia Tech School of Public Policy, April, 2015

Porter, Alan. Awarded the Medal of Excellence by the Portland International Center for Management of Engineering & Technology (PICMET), April, 2015.

Shapira, Philip. Elected American Association for the Advancement of Science (AAAS) Fellow, 2016.
18. Fiscal Sections

a. Statement of Unobligated Funds

CNS-ASU is projected to expend all $6,669,900 grant funds received (including one supplement of $172,900) by August 31, 2016, the end of the CNS-ASU grant for NSF Grant Award #0937591. There will be no projected residual.

In addition, CNS-ASU also received a supplement in 2014 for “Broadening Participation in the Social Studies of Emerging Technologies” in the amount of $237,498. The remainder of these funds will be also expended out by August 31, 2016. A final supplement received in 2015 in the amount of $250,000 for “Community-building Around Anticipation, Integration and Informal Education” was expended out by March 1, 2016 per agreement with the program officer.

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, 2015 through February 29, 2016.

ii. Projected budget expenses from March 1, 2016 through August 31, 2016.

c. Subaward Grant Budgets

Subaward budget reports and budget justifications are reported in this section as follows:

Georgia Tech

iii. Actual budget expenses from September 1, 2015 through February 29, 2016.

iv. Projected budget expenses from March 1, 2016 through August 31, 2016.

University of Virginia

v. Actual budget expenses from September 1, 2015 through February 29, 2016.

vi. Projected budget expenses from March 1, 2016 through August 31, 2016.
19. **Cost-Sharing**

The Arizona State University cost-sharing commitment for this grant were fully completed by August 31, 2015 in the total amount of $1,031,405.44.

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.
20. Leverage

The Center for Nanotechnology in Society at Arizona State University (CNS-ASU) has developed over its ten-plus years in operation relationships/partnerships with two hundred eighty-three (283) academic partnering institutions and two hundred thirty-seven (237) non-academic partnering institutions, both domestic and international. The partners are listed in Table 6, 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, 2015 and August 31, 2016.

Some successful partnerships include:

1. Consortium for Science, Policy and Outcomes (CSPO) – CNS-ASU receives support from CSPO that 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. CSPO also provides back-up for CNS-ASU staff.

2. Emerge: Artists and Scientists Redesign the Future is a special event held late each winter at ASU 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 create provocative and evocative stories, games, performances, and objects from which visions of our futures emerge. CNS-ASU has been involved since the first Emerge in 2013, with large contributions from the Sandra Day O’Connor College of Law, the School of Arts, Media and Engineering, the Center for Science and the Imagination, the Lincoln Center for Applied Ethics, the Ira A. Fulton Schools of Engineering, the Global Institute of Sustainability, the W.P. Carey School of Business and others.

3. InnovationSpace -- 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 ASU. 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. The Biodesign Institute – plays a critical role in advancing the research mission of ASU 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 US 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 – play 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. FSE ranks 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 FSE 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. Interactions beyond the NSF-funded lifetime of CNS will continue with FSE as one of the major hiring initiatives for SPIS will be lines shared with each of the schools of engineering.

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. Barrett students who have worked with CNS-ASU have gone on to win Fulbright fellowships and Presidential Management Fellowships.

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. CSI is also working with CSPO and CNS-ASU on the Frankenstein Bicentennial Project.
9. University of Notre Dame – and CNS-ASU collaborated on the “Anticipatory Governance of Complex Engineered Nanomaterials” project, including a Washington, DC workshop held in conjunction with the American Chemical Society, and a planned special section of the *Journal of Nanoparticle Research* with papers from that workshop, currently under review.

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 5: Other Support  
**NSF Grant #093791**

<table>
<thead>
<tr>
<th>Designation</th>
<th>Year 1 9/15/10-9/14/11</th>
<th>Year 2 9/15/11-9/14/12</th>
<th>Year 3 9/15/12-9/14/13</th>
<th>Year 4 9/15/13-9/14/14</th>
<th>Year 5 9/15/14-9/14/15</th>
<th>Year 6 9/15/15-9/14/16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other NSF</td>
<td>$0</td>
<td>$0</td>
<td>$172,500</td>
<td>$0</td>
<td>$237,498</td>
<td>$250,000</td>
</tr>
<tr>
<td>Other Federal</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>State</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Industry</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>University</td>
<td>$1,025,128</td>
<td>$1,723,232</td>
<td>$2,640,847</td>
<td>$2,775,665</td>
<td>$2,051,772</td>
<td>$1,957,272</td>
</tr>
<tr>
<td>Foreign</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Other Total</td>
<td>$1,025,128</td>
<td>$1,723,232</td>
<td>$2,813,347</td>
<td>$2,775,665</td>
<td>$2,289,270</td>
<td>$2,207,272</td>
</tr>
<tr>
<td>Name of Institution</td>
<td>Receives Financial Support from Center</td>
<td>Contributes financial support to the center</td>
<td>Minority Servicing Institution Partner</td>
<td>Female Serving Institution Partner</td>
<td>National Lab/govt. partner</td>
<td>Industry Partner</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------------</td>
<td>----------------------------------------</td>
<td>--------------------------------------------</td>
<td>----------------------------------------</td>
<td>-----------------------------------</td>
<td>--------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>1.a. Academic Partnering Institutions (ASU)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applied Learning Technologies Institute</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arizona Institute for Nano-Electronics (AINE)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arizona Technology Enterprises (AzTE)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arts, Media &amp; Engineering</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Axon Technologies</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barrett, The Honors College</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bodesign Institute</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Center for Biology &amp; Society</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Center for Innovations in Medicine</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Center for Law, Science and Innovation</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Center for Science and the Imagination</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Center for Solid State Electronics Research</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Center for Study of Institutional Diversity</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College of Liberal Arts and Sciences</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College of Public Programs</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College of Technology &amp; Innovation</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consortium for Science, Policy and Outcomes</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decision Theater for a Desert City</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foundation, ASU</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Global Institute of Sustainability</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate College</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hayden Library</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health Services</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herberger Institute for Design and the Arts</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic Research Center</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institute for Human Origin</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ira A. Fulton Schools of Engineering</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning Sciences Institute</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LightWorks</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mary Lou Fulton School of Education</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Interdisciplinary Arts &amp; Sciences</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office of China Initiatives and Strategy</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office of Knowledge and Enterprise Development (OKED)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office of Public Affairs</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office of the President</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office of University Initiatives</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office of Vice President and Provost</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupational Health and Safety</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phoenix Urban Research Laboratory</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOLS-Responsible Conduct of Research Program</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sandra Day O'Connor School of Law</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School of Earth &amp; Space Exploration</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School of Government, Politics, and Global Studies</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School of Human Evolution and Social Change</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School of International Languages and Cultures</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School of Letters and Sciences</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School of Life Sciences</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School of Mathematical and Statistical Sciences</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School of Philosophical, Historical, and Religious Studies</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School of Social Transformation</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School of Sustainability</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science Policy Assessment and Research on Climate (SPARC)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stanford Center</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology Based Learning Research</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transformative Healthcare Networks</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University Art Museum</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University Public Schools</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walter Cronkite School of Journalism and Mass Communication</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W.P. Carey School of Business</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.b. Academic Partnering Institutions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aarhus University, Denmark</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antwerp Institute of Denmark</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antwerp University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Austrian Academy of Science</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baylor College of Medicine</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beijing Institute of Technology, China</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biodiversity High School</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boise State University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bowling Green State University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brown University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>California State University, Sacramento</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Name of Institution</td>
<td>Receives Financial Support from Center</td>
<td>Contributes financial support to the center</td>
<td>Minority Servicing Institution Partner</td>
<td>Female Serving Institution Partner</td>
<td>National Lab/other gov't Partner</td>
<td>Industry Partner</td>
</tr>
<tr>
<td>---------------------------------------------------------</td>
<td>---------------------------------------</td>
<td>--------------------------------------------</td>
<td>----------------------------------------</td>
<td>-----------------------------------</td>
<td>---------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Cardiff University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carnegie Mellon University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case Western Reserve University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chandler Gilbert Community College</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chinese Academy of Sciences</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Claremont Graduate University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clark University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collins College</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colorado School of Mines</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Columbia College Chicago</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Columbia University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concordia University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copenhagen Business School, Denmark</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consthilli College</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cornell University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dalai University of Technology, China</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DeFi Technical University, the Netherlands</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DeVry University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dublin City University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Durham University, United Kingdom</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecoles des Mines, France</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ETH Zurich</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eugene Lang College the New School for Liberal Arts</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ewha Women's University</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Federal University of Paraná, Brazil</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Federal University Santa Catarina, Brazil</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flemish Institute of Science &amp; Technology</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Florida International University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>George Mason University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>George Washington University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Georgetown University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Georgia Institute of Technology</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glennade Community College</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grenoble Institute of Technology</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grove City College</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harvard University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Howard University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illinois Institute of Technology</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indiana University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institute of International Sociology of Gorizia</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institut d’Etudes Politiques de Grenoble, France</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iowa State University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>James Martin Institute for Science and Civilization, Oxford, UK</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Johns Hopkins University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Karlsruhe Institute of Technology, Germany</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Keble University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kings College, London</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Korea Institute of Science and Technology, Seoul, Korea</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kyoto University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kyung Hee University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lancaster University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leeds University Business School, UK</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lehig High University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Litchfield Elementary School District</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long Island University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maastricht University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Macalester College</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maricopa Community Colleges</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCell University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mesa Biotech Academy</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mesa Community College</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mesa High School</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Michigan State University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MIT SENSEable City Lab</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Montana State University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nagoya University, Japan</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Academy of the Sciences</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National University of Singapore &amp; Asia</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New York University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North Carolina State University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northeastern University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern Alberta Institute of Technology</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northwestern University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norwegian University of Science &amp; Technology, Norway</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSCECONS-University of California, Santa Barbara (UCSB)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ohio State University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Osaka University, Japan</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oslo Research Group</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Name of Institution</td>
<td>Receives Financial Support from Center</td>
<td>Contributes Financial Support to the Center</td>
<td>Minority Servicing Institution Partner</td>
<td>Female Servicing Institution Partner</td>
<td>National Lab/other gov't Partner</td>
<td>Industry Partner</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------------------------------</td>
<td>---------------------------------------------</td>
<td>---------------------------------------</td>
<td>-------------------------------------</td>
<td>---------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Pennsylvania State University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plymouth University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portland State University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purdue University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Queens University</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radboud University</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rensselaer Polytechnic Institute</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rhode Island School of Design</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rice University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rice University/ICON</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rio Salado College</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rochester Institute of Technology</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roger L. Putnam Vocational Technical Academy</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rutgers, The State University of New Jersey</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Said Business School, Oxford</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sapieza University of Rome</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scotland Community College</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simon Fraser University, British Columbia</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.I.W.S. N.R. Swamy College, India</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Mountain Community College</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stanford University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>State University of Campinas</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stony Brook University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tamkang University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical University of Delft</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical University of Denmark</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical University of Darmstadt</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tennessee State University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Texas State University, San Marcos</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Center for International Development, Harvard University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tokyo University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tsinghua University, China</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UCLA/Harvard/NBER: Collaborative Research; Personnel Exchanges</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UMC St. Radboud</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncamp University, Brazil</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University de Zacatecas, Mexico</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universidad del Pais Vasco, Spain</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universita Ca' Foscari Venezia</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University College London</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Albany</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Alberta</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Amsterdam</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Antwerp, Belgium</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Arizona</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Athens</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Basel</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Basque Country</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Bergen, Norway</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Bielefeld, Germany</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of British Columbia</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Calgary, Canada</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of California, Berkeley</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of California, Davis</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of California, Irvine</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of California, Los Angeles</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of California, San Diego</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of California, Santa Barbara</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Cambridge</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Cape Town</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Central Florida</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Chicago</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Colorado, Boulder</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Colorado, Denver</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Copenhagen</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Denver</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Edinburgh</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Exeter, United Kingdom</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Florida</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Geenva</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Georgia</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Gothenburg, Sweden</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Groningen, the Netherlands</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Illinois, Chicago</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Illinois, Springfield</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Illinois, Urbana-Champaign</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Iowa</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Jiangsu, China</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

311
<table>
<thead>
<tr>
<th>Name of Institution</th>
<th>Receives Financial Support from Center</th>
<th>Contributes Financial support to the center</th>
<th>Minority Servicing Institution Partner</th>
<th>Female Servicing Institution Partner</th>
<th>National Lab/other gov’t Partner</th>
<th>Industry Partner</th>
<th>Museum Partner</th>
<th>International Partner</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Lausanne, Switzerland</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Leeds</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Liege, Belgium</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Manchester, United Kingdom</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Maryland</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Massachusetts, Amherst</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Melbourne, Australia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Michigan</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Minnesota</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Montana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Nebraska, Lincoln</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Nevada, Las Vegas</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of New Hampshire</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of New South Wales, Australia</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of North Carolina, Chapel Hill</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of North Carolina, Charlotte</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of North Texas</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Notre Dame</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Nottingham</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Oslo</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Ottawa</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Oxford</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Padua</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Seville, Spain</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of South Carolina</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of South Florida</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Southern California</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Southern Indiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Sussex, United Kingdom</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Szeged, Hungary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Tennessee, Knoxville</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Texas, Austin</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Trieste, Italy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Twente, the Netherlands</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Turku</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Utah</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Victoria</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Vienna</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Virginia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Washington</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Waterloo</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of Wisconsin, Madison</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UT-Battelle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utrecht University</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vanderbilt University</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Villanova University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virginia Tech University</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VU University of Amsterdam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Washington University, Saint Louis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Chester University of Pennsylvania</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western Michigan University</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yale University</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>York University</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zvi Meitar Institute</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 6: Partnering Institutions (cumulative)**

**II. Non-academic Partnering Institutions**

<table>
<thead>
<tr>
<th>Name of Institution</th>
<th>Receives Support from Center</th>
<th>Contributes Support to the center</th>
<th>Minority Servicing Institution Partner</th>
<th>Female Servicing Institution Partner</th>
<th>National Lab/other gov’t Partner</th>
<th>Industry Partner</th>
<th>Museum Partner</th>
<th>International Partner</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agilent Technologies</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Airplayn</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alberta Centre for Advanced Micro Nano Technology Products</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alberta Innovates Technology Futures</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALD Nano Solutions</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alek Research</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Association for the Advancement of Science (AAAS)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Bar Foundation</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apriva ISS</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arizona Biotechnology Organization</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arizona Commerce Authority</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arizona Corporation Commission</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arizona Department of Education</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arizona Department of Health Services</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arizona Nanotechnology Cluster</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arizona Public Service (APS)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arizona Research Institute for Solar Energy</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arizona Science Center</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arizona Technology Council</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Name of Institution</td>
<td>Receives Financial Support from Center</td>
<td>Contributes Financial support to the center</td>
<td>Minority Servicing Institution Partner</td>
<td>Female Serving Institution Partner</td>
<td>National Lab/govt. partner</td>
<td>Industry Partner</td>
<td>Museum Partner</td>
<td>International Partner</td>
<td>Other</td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
<td>---------------------------------------</td>
<td>--------------------------------------------</td>
<td>----------------------------------------</td>
<td>-----------------------------------</td>
<td>---------------------------</td>
<td>------------------</td>
<td>----------------</td>
<td>------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Army Military Command</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australian Government</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bank of America</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bassetti Foundation</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biobiodiversity Organization of Southern Arizona</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boussairens and Associates</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BrazilGov</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brilliant Concepts, LLC.</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>British Embassy</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buckeye Express</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burton Barr Central Library</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cambridge Public Health Department</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carnegie Mellon</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CB Richard Ellis</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEA-Saclay</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell Publishing</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Center for Business Models in Health Care</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Center for Naval Analysis</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Center for Responsible Nanotechnology</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changeist, LLC.</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemical Heritage Foundation</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children's Museum of Phoenix</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City of Apache Junction</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City of Edmonton</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City of Phoenix</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City of Scottsdale</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complex Global Risks</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corgan Associates</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Council of Scientific and Industrial Research</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Danish Board of Technology</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>David Crowley gallery</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decker Yeadoon LLC</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Denise Meridith Consultants, Inc.</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department of Energy (DOE)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department of the Treasury</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department of Transporation</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depave</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Describe, LLC.</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desert Botanical Garden</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital Thinking Network</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Downtown Phoenix Journal</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecological Society of America</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EIRbLATEK Engineering</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E.L. Smith Water Treatment Plant</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emerging Leaders in Science &amp; Society (ELISS)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering &amp; Physical Sciences Research Council (EPSRC)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Protection Agency (EPA)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equus Development Corporation</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eureka</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>European Commission</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exploratorium, San Francisco</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Federal Aviation Administration Office of Environment &amp; Energy</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FBI Weapons of Mass Destruction</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food and Drug Administration (FDA)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foundation for Genomics and Population Health</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gallagher and Kennedy</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Dynamics</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Genev Centre for Biosafety</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Genome British Columbia</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>German Parliament</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Global Business Network</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gould Evans</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gordon Research Conferences (GRC)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greenwall Foundation</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground Work Portland</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helen City University</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HDR Architecture</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Healsync Labs</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helae</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home Depot</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iconic Architecture</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ikologi</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INSERM</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institute for Agriculture and Trade Policy</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institute for Ecological Economy Research, Germany</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institute for the Future</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institute of Technical Assessment &amp; Systems Analysis</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intel</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Name of Institution</td>
<td>Receives Financial Support from Center</td>
<td>Contributes Financial Support to the Center</td>
<td>Minority Serving Institution Partner</td>
<td>Female Serving Institution Partner</td>
<td>National Lab/other Gov't Partner</td>
<td>Industry Partner</td>
<td>Museum Partner</td>
<td>International Partner</td>
<td>Other</td>
</tr>
<tr>
<td>---------------------------------------------------------</td>
<td>---------------------------------------</td>
<td>--------------------------------------------</td>
<td>--------------------------------------</td>
<td>-----------------------------------</td>
<td>---------------------------------</td>
<td>-----------------</td>
<td>---------------</td>
<td>----------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Intelligent Information Services Corporation (IISC)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>International Nanotechnology in Society Network (INSN)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>International Research Center</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ira Domsky Environmental</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Italian National Research Council, Turin, Italy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ivy Consulting, Inc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jennings, Strous and Salmon PLC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaiser Permanente</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kolbe Corp.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kristine Wilcox Consulting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Las Vegas-Clark County Library District</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laserf, Inc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lawrence Livermore Lab</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leathers Milligan &amp; Associates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loka Institute</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>London Science Museum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Luxe Ventures</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lyman and Merrie Wood Museum of Springfield History</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mabelson Law Group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mapping &amp; Planning Support (M.A.P.S) Alberta Capital Region</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max Chandler Robot Art</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mayo Clinic-Scottsdale</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meridian Institute</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metacurrency Project</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microchip</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MUS Designs, Inc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modern Insights</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Museum of Life &amp; Science, North Carolina</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Museum of Science, Boston</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nano-Alberta</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nanoscope Informal Science Education Network (NISE Net)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Academy of Engineering</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Advisory Committee on Aeronautics (NASA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Building Museum</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Geographic Society</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Institute of Standards and Technology (NIST)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Institutes of Health (NIH)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Nanomanufacturing Network (NNN)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Nanotechnology Coordinating Office</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Nanotechnology Infrastructure Network</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Research Council</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Research Council of Canada</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Science Foundation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nature.com</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nature Publishing Group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Haven Independent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norwegian Institute</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nothing but NET</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NRG Energy, Inc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuclear Waste Review Board</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office of Naval Research</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oregon Museum of Science &amp; Industry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCHPR</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pennin PR</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pennsylvania Bio Nano Systems</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phoenix Public Library</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phoenix Rising</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phoenix Spokes People</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phoenix Zoo</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physician Services Group</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ping Inc.</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pioneer Valley Transit Authority</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planetary One</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portland Bureau of Environmental Services</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practical Action</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presidential Commission for the Study of Bioethical Issues</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantum Technologies Inc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>QuantTera</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rathenau Institute</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RGI Surveys, Inc.</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research Center Berlin</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research Council of Norway</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research Councils U.K. (RCCUK) in the U.S.</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ReMax Fine Properties</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research Media Ltd.</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Richard + Bauer Architecture</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rockefeller Foundation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 6: Partnering Institutions (cumulative)

<table>
<thead>
<tr>
<th>Name of Institution</th>
<th>Receives Financial Support from Center</th>
<th>Contributes financial support to the center</th>
<th>Minority Servicing Institution Partner</th>
<th>Female Servicing Institution Partner</th>
<th>National Lab/other gov’t Partner</th>
<th>Industry Partner</th>
<th>Museum Partner</th>
<th>International Partner</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rose Community Development Corporation</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rutgers and Posch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Myler Carlock &amp; Applewhite</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salt River Project</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Sandia National Laboratory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Savage Film</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science &amp; Technology Policy Institute</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sciencecenter, New York</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Science Foundation of Arizona</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science Museum of Minnesota</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>SciStarter</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SciTech Strategies, Inc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Scottsdale League for the Arts</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Search Technology</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SETI Institute</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shannon and Wilson, Inc.</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SmithGroup</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Snell and Wilmer Law</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Sciences and Humanities Research Council of Canada</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sokolov, Sokolov, Burgess Solutions (SSB)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South of Market EcoDistrict</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spirit of the Senses Labon</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Springer Publishing</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SRI Institute</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Startup Edmonton</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strategic Advantage, Inc.</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sundt Construction, Inc.</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Synthetic Biology Engineering Research Center (SynBERC)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SySTEM Schools, Inc.</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Targeted Genetics Corporation (TGen)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Teach America</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>TEC Edmonton</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telerelative</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Telus World of Science</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tempe Festival of the Arts</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Testani Design Trouble, Inc.</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>The Eliminati, LLC</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>The Embryo Project</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>The Energy and Resources Institute (TERI)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>The Foresight Institute</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>The Galaxy Organization</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>The Geek Group of Western Massachusetts</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>The Rockefeller Foundation</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>The Royal Society</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>The Washington Post</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Translational Genomics Research Institute (TGEN)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TraskBritt Intellectual</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>TRIME</td>
<td>Transportation</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underwood Bros., Inc.</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Unicorn Media, Inc.</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>U.S. Government Accountability Office (U.S. GAO)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S. Green Building Council</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>U.S. Department of Agriculture</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>U.S. Department of Homeland Security</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>U.S. Department of Transportation</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>U.S. DOE/Center for Integrated Nanotechnology (CINT)</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Venezuelan Institute for Scientific Research</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Western Massachusetts Electric Company</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Will Bruder &amp; Partners Ltd.</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Winnipeg Art Gallery</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Woodrow Wilson International Center for Scholars</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

237 Total Number Non-academic Partners: