



CNS NEWSLETTER
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CNSASU is a listserv targeted to social scientists, natural scientists and engineers, decision makers in the public and private sector, and other interested members of the community.

FIRST CNS-ASU SITE VISIT

August 24th and 25th were red-letter days for CNS-ASU as the National Science Foundation (NSF) conducted its first site visit since funding the Center last October. For your copy of our Briefing Book, see the [NSF Site Visit pages on our website](#).

NSF's site visit team was a highly skilled and experienced group including **James Rudd**, **Pris Regan**, and **Mark Weiss**. Before joining NSF, Dr. Rudd was Corporate Director of Technology for Dexter Corporation, a Fortune 500 specialty materials company; he is now Program Manager in NSF's Small Business Innovation Research Program, a \$105 million grant program supporting small business development in advanced materials and manufacturing, biotechnology, electronics and information technology. Dr. Regan, currently on leave from George Mason University's Department of Public and International Affairs, is a Program Director in the Directorate for Social, Behavioral & Economic Sciences, Division of Social and Economic Sciences. Dr. Weiss, who recently served as Assistant Director for Social, Behavioral, and Educational Sciences in the White House Office of Science and Technology Policy, is Science Advisor in NSF's Directorate for Social, Behavioral and Economic Sciences.

The team had a very busy 24-hour visit during which CNS-ASU Director Dr. **Dave Guston** and the leaders of our four Real-Time Technology Assessment teams and our two Thematic Research Clusters presented progress reports on the Center, its governance, and its work.

Dr. **Phil Shapira** with Dr. **Alan Porter** (Ga Tech) covered RTTA 1 – Research Innovation Systems Analysis; Drs. **Dietram Scheufele** (U Wisconsin) and **Elizabeth Corley** discussed RTTA 2 – Public Opinion & Values; Dr. **Dan Sarewitz** reviewed RTTA 3 – Deliberation & Participation; Drs. **Kevin Corley** and **Anne Schneider** along with grad student **Aixa Garcia-Mont** talked about projects related to RTTA 4 – Reflexivity and Assessment; Dr. **Torin Monahan** and grad student **Tyler Wall** went over TRC 1 – Freedom, Privacy & Security; while Dr. **Jason Robert** discussed TRC 2 – Human Identity, Enhancement & Biology.

In addition, we presented information about many of our education and outreach efforts—the upcoming undergraduate Learning Community (Dr. **Neal Woodbury**); the cross-disciplinary InnovationSpace (Dr. **Prasad Boradkar**); pre-college teacher training through CRESMET’s Project Pathways (Dr. **Marilyn Carlson** and Dr. **Ira Bennett**); the public outreach program called Science Cafe (**Quinn Spadola**); a 2007 conference reaching out to under-represented groups called “Technological Enhancement of Humans?” (Dr. **Tony Garcia** and **Michael Sullivan** from the Hispanic Research Center); and several special courses –Perspectives (Dr. **Rama Ramakrishna**) and Science, Technology and Social Outcomes (Dr. **Jamey Wetmore**).

CNS-ASU also showed off its post-doctoral, graduate, and undergraduate talent, as evidenced during presentations to the site visit team. Post-doctoral research associates (Dr. **Cynthia Selin**, Dr. **Erik Fisher** and Dr. **Ira Bennett**) and graduate and undergraduate students studying natural and social sciences, law, engineering, and more gave brief talks about the work they have been doing to support CNS-ASU. The graduate students were **Roxanne Wheelock**, **Azra Panjwani**, **Shannon DiNapoli**, **Cynthia D’Angelo**, **Manual Garay**, **Quinn Spadola**, **Jason Lappe**, **John Parsi**, **Walter Valdivia**, and **Risto Karinen**. Undergrads were: **Derrick Anderson**, **Brian Young**, **Taylor Jackson**, **Kalil Abdullah**, and **Zach Pirtle**.

SCIENCE CAFÉ BEGINS AT CHANGING HANDS BOOKSTORE

CNS-ASU kicks off this year’s Science Café series with a new format, location and time! The first Science Café will be at Changing Hands Bookstore from 4 to 5pm on Sunday, 24 September. We’ve found a two-person dialogue to be very informative and will use it again. The two experts will be **Stephen Johnston**, Director of the Center for Innovations in Medicine and **Joan McGregor**, Director of the Bioethics, Policy, and Law Program who will talk about the interaction between their two fields and the implications for society of emerging technology. The [bookstore](#) is located in the plaza at the southwest corner of McClintock and Guadalupe next to Wildflower Bread Company. The Science Café is free and open to the public.

SPANISH SCIENCE CAFÉ KICKS OFF AT FRIENDLY HOUSE

Reaching out to Spanish-speakers in the valley, CNS-ASU is planning its first Spanish Science Café. The speaker will be ASU chemist Ana Moore, whose research into artificial photosynthesis with other ASU researchers has the potential to create a new Silicon Valley in Arizona. The Science Café will be held in September at [Friendly House](#)’s charter school, Academia Del Pueblo at 201 E. Durango Street in Phoenix. Call us for details.

2006-07 CNS-ASU SPEAKER SERIES

The 2006-07 CNS-ASU Speaker Series is called “**Studying the Future of Nanotechnology: Establishing Empirical and Conceptual Foundations.**” The papers resulting from the Series will be published in a *Yearbook of Nanotechnology in Society*, to be published by Springer in 2007.



15 September. Christine Peterson, “Thinking Longer Term about Technology.” 11 a.m.-12:30 p.m. in the Biodesign Auditorium. Peterson is a founder of Foresight Nanotech Institute, the leading nanotech public interest group in the US. She writes, lectures and briefs the media on coming powerful technologies, especially nanotechnology. She is Vice President of Public Policy at Foresight, whose mission is to ensure the beneficial implementation of nanotechnology. Foresight educates the public, technical community and policymakers on nanotechnology and its long-term effects.

REVIEW OF INTERNATIONAL RESEARCH ON BRAIN COMPUTER INTERFACES

A Workshop Report by **Jason Scott Robert**, School of Life Sciences, ASU

On 21 July 2006, the National Science Foundation hosted a workshop to release the results of the [World Technology Evaluation Center \(WTEC\)](#)-organized [Review of International Research on Brain Computer Interfaces](#). This workshop followed upon one held in [February 2006](#) at which the review panel established the pulse of ongoing research in North America, so as have a baseline for comparing international progress. The review panel was led by **Theodore Berger** of the University of Southern California, and involved visits to labs and research centers in nine European countries (a visit to labs in Asia is planned for Fall 2006). As co-leader of the Human Identity, Enhancement, and Biology Thematic Research Cluster, I attended the July workshop on behalf of CNS-ASU.

The panelists were especially impressed by the breadth and quality of research in the labs and research centers they visited. Panelists reported on progress in many domains, including developments in biotic-abiotic interfaces, sensor technology, modeling and signal processing relevant to advances in robotics, rehabilitation, communication, and even the innovation of “cognitive and emotional prostheses” (Berger’s particular area of interest). While this research is not always directly related to nanotechnology, there is a widespread sense that nanotechnology innovations will enable significant advances in brain-computer/brain-machine interface research.

I will note four observations that, from a societal and ethical perspective, struck me as particularly interesting. The first is that the character and motivation for these sorts of endeavors is not always clear or coherent. For instance, stated motivations include: the desire to guide US investments in particular directions; to compare the US research portfolio with advances elsewhere; to justify the R&D enterprise in the US; to identify good ideas; and to seek out opportunities for collaboration. Funders included: the National Science Foundation (which now has a senior advisor in the Office of the Director focusing specifically on the neurosciences); the National Institutes of Health; the US Army Telemedicine & Advanced Technology Research Center; and the National Institute of Disability and Rehabilitation Research of the US Department of Education. These disparate funders— and disparate motivations— can sometimes be in conflict in interesting ways, raising issues about the relationship between basic and applied research, therapies and enhancements, and civilian and military applications of advances in science and technology.

The second observation is that, by contrast with many of their American counterparts, European researchers appear to have access to research funds through innovative, interdisciplinary, international, and long-term partnerships that facilitate the cultivation of investigator-initiated but strategically targeted research programs. This may help to explain the success of European researchers in these and other domains, despite their having less per-capita research funding.

The third observation is that animal-welfare considerations in the EU have tended to restrict the scope of research to relatively non-invasive brain-computer interface research in non-human animals, without thereby restricting the quality of the research or the pace of advance. Though many members of the review panel were impressed by the latter, Berger, the chair of the panel, expressed great dismay that animal rights “crazies” had diminished the prospects for advances by European scientists. Indeed, at the end of an otherwise civil and very productive workshop, Berger used the microphone to make an impassioned plea to not let these crazies ruin American science. These comments came, alas, after hours of presentations on the wonderful course of European science! Moreover, they seemed specifically designed to rule out of bounds any ethical commentary on the course of American research on brain-computer interfaces. This brings me to my fourth observation: there was no attempt, in the presentations or the ensuing discussion, to engage any ethical or societal considerations related to this exciting but controversial domain of scientific and technological research. No member of the review panel had any evident interest in these issues, and such considerations simply were not part of the WTEC process. A pity, really.

CNS-ASU NEWS

- **Gary Marchant** helped prepare briefing papers for the EPA on Innovative Regulatory Approaches for nanotechnology and regulation of nanotechnology under the Clean Air Act. These were part of a series of seven briefing papers drafted by over 100 lawyers in the American Bar Association's Section on Environment, Energy and Resources. The briefing papers can be downloaded from <http://www.abanet.org/environ/nanotech/>.

CNS-ASU WELL-REPRESENTED AT THE 4TH GORDON RESEARCH CONFERENCE (GRC)

The GRC on Science and Technology Policy was held in Big Sky, Montana 13-18 August 2006. CNS-ASU senior investigator **Brad Allenby** chaired and contributed too a session entitled **“Schumpeter’s Next Wave: Convergence of Nanotechnology, Biotechnology, Information Science, and Cognitive Science.”** The panelists included **Tom Karas**, from Sandia National Laboratories (who collaborated with CNS and CSPO on the Human Cognitive Enhancement Workshop), **Clint Andrews**, from Rutgers University and the IEEE, and **Barbara Karn**, from the Woodrow Wilson International Center and the EPA.

A session on **“Science Policy Directions and Advice: Biotech vs. Nanotech”** included presentations by **Evan Michelson**, also of the Wilson Center, and **Celia Merzbacher** of the Office of Science and Technology Policy and its National Nanotechnology Coordinating Office.

Dan Sarewitz, CNS-ASU co-PI and associate director, discussed **“Policy Perspectives”** at the meeting’s penultimate panel, **“Meta-Analysis: Emerging Themes in Science Policy.”**

CNS-ASU PI and director [Dave Guston](#) presented a talk entitled “**Anticipatory Governance of Emerging Technologies**” at the concluding panel on “Decision Making in World of Uncertainty.” CNS-ASU senior investigator [Roger Pielke, Jr.](#), chaired the panel and discussed “**Uncertainty in Science, Uncertainty in Politics.**”

Poster presentations also featured CNS-ASU members, including new ASU assistant professor [Jamey Wetmore](#), who presented a poster on “**Religious Forays into Nanotechnology Policy**” and [Erik Fisher](#), now a CNS-ASU post-doctoral fellow, who presented a poster entitled “**From Upstream Engagement to Midstream Modulation: Shaping Technology from Within,**” which was based on his dissertation research that CNS-ASU supported at the University of Colorado, Boulder.

Other nano-related posters included those by: [Ann Johnson](#) (University of South Carolina) on “**Research Practices and Road Maps in Nanostructured Materials Research,**” [Evan Michelson](#) on “**Measuring the Merger: Examining the Onset of Converging Technologies,**” and [Ruben Rodrigues](#) (Northeastern University) on “**Effectively Applying Nanotechnology and Nanomanufacturing to the Needs of Developing Nations.**”

Guston served, along with [Rachel Ankeny](#) (University of Sydney, Australia) as GRC conference co-vice chair. They will rise to become the co-chairs for the next meeting, also to be held in Big Sky in August 2008. (Because GRC proceedings are off-the-record, see hyperlinks to contact individuals for information regarding their posters or presentations.)

CRESMET DIRECTORS SHARE IDEAS ON LEARNING COMMUNITIES, TOUR SCHOOLS IN CHINA

At the China-U.S. Education Leadership Conference held 27-30 June in Beijing, People’s Republic of China, **Marilyn Carlson** and **Pat Thompson** delivered a presentation drawn from their recent research on professional learning communities. Their presentation, “**The Emergence of Professional Learning Communities for Secondary Mathematics Teachers,**” drew from research that is among the first to examine what effect strongly content-focused communities can have on teachers’ capacity to analyze their own instruction of specific mathematical concepts. In projects funded by the NSF, Carlson and Thompson have worked for three years with Phoenix-area high school teachers to deepen their understanding of the mathematical concept of function.

NANO AND BIO IN SOCIETY (NABIS)

A Conference Report by **Jason Scott Robert**, School of Life Sciences, ASU

Two NABIS Conferences took place in Chicago this year, the first on [29 March](#) and the second on [9-10 August](#). The smaller March meeting had more the flavor of the ethical and societal dimensions of nano and bio in society, whereas the broader August meeting was focused as well on scientific, technological, and business themes. As co-leader of the Human Identity, Enhancement, and Biology Thematic Research Cluster at CNS-ASU, I participated in several capacities in both meetings. In March, I presented an overview of CNS-ASU activities in a presentation entitled “**Integrating nanotechnology innovation with the humanities & social sciences.**” In August, I presented some of my own research in progress on “**Controversial science, controversial scientists?,**” and also co-organized, with **Michele Mekel** of the [Center on Nanotechnology and Society](#) at Kent College of Law and Illinois Institute of Technology, a plenary town-hall-style meeting on some societal and ethical aspects of nanotechnology. Another CNS-ASU participant, **Gregor Wolbring** of

the University of Calgary, gave an interesting talk on governance of nano-bio-info-cogno-synbio, and participated in the town hall meeting.

The theme of all NABIS Conferences is “building bridges between science, business, and society”, and the presentations, panels and discussions tend to cover all aspects of this theme. Given the importance and breadth of this theme and the location of the meeting in Chicago, one would hope to draw a large audience from the academic, legal, civil society, and business sectors though both of these meetings were lightly attended. (A public draw should be a future goal of the NABIS conferences.) Even so, the participants tend to be enthusiastic and representative of a broad sampling of their respective communities, so the discussions are almost always interesting, balanced and constructive. NABIS will sponsor two meetings again in Spring and Fall of 2007.

OTHER PRESENTATIONS AND PAPERS

- **Gary Marchant** gave a presentation on “**Nanotechnology Regulation: The United States Approach**” at Monash University’s Conference on New Global Regulatory Frontiers: Evaluating what will work for Nanotechnology in Melbourne, Australia on July 18th. The papers presented at this conference will be published in a book on Nanotechnology Regulation to be published by Edward Elgar in 2007.
- “**Socratic Engagement of Nanotechnology: A Case Study in Ethics Policy.**” **Erik Fisher** will present a lecture, Thursday, 7 September 2006 at the University of North Texas, Department of Philosophy and Religion Studies.
- **Alan Porter, Jan Youtie, and Phil Shapira** at Georgia Tech have produced a briefing paper on the key undertaking for CNS-ASU – refining in specific bibliometric terms the definition of nanotechnology. The paper, “[Refining Search Terms for Nanotechnology](#),” assesses the evolving nanotechnology research and innovation system in the US and internationally.

UPCOMING NANO-RELATED EVENTS

- **NanoTX**, September 27-28, 2006, Dallas Convention Center. **David Guston** will speak about the Center for Nanotechnology in Society. <http://www.nanotx.biz/>
- [International Congress of Nanotechnology 2006](#), 30 October 30-2 November, 2006
- **3rd Nano & Giga forum in Arizona, Nano and Giga Challenges in Electronics and Photonics From Atoms to Materials to Devices to System Architecture Symposium and Spring School (Tutorial Lectures), ASU**. March, 2007. The organizers invite and welcome the support of sponsors and the help of volunteers in organizing the conference. If you are interested in helping the organization or know of student volunteers who may be interested in helping, please contact [Stephen Goodnick](#) , [Herb Finkelstein](#), or [Anatoli Korkin](#).

EDUCATION

Fall Semester includes two fascinating courses with direct ties to nanotechnology in society.

- “[Perspectives in Nanotechnology](#)” will take you to the syllabus for last spring’s course. This course focused on entrepreneuring and taught by **B.L. Ramakrishna**, connects undergraduates with venture capitalists and the nanotech industry.
- “**Studies in the Transhuman: Genetics, Robotics, Information Technology, Nanosciences, Biopolitics and the Human Future(s)**” is the title of **Paul Privateer**’s class

that critiques the human/transhuman in terms of their profound historical, scientific, economic, political and ideological implications.

Spring Semester will offer more undergraduate and graduate educational opportunities. More information will be posted as it becomes available.

- **Kenneth Abbott, Doug Sylvester and Gary Marchant** will be offering a new course at ASU's law school entitled **“Nanotechnology, Law and Policy.”** Although intended primarily for law students, there will be a limited number of spots available in the course for graduate students from other ASU academic units.
- **InnovationSpace. Prasad Boradkar.** InnovationSpace is an entrepreneurial joint venture among the College of Architecture and Environmental Design, the Ira A. Fulton School of Engineering, and the W. P. Carey School of Business at Arizona State University. The program involves faculty and students from business, engineering, industrial design and graphic design in a hands-on product-development laboratory. At least three of the next sessions of InnovationSpace will include a nanotechnology-related product.

CNS-ASU is implementing the **“PhD plus”** which allows nanoscale science and engineering doctoral students to include, as an element of their dissertations, a chapter on the societal context of their research. Students will be matched with a mentor, drawn from the network's social scientists or humanists, who will also serve on the student's dissertation committee.

NANOLINKS

- <http://cns.asu.edu/>
- For more on the Nano and Giga Conference: <http://www.AtomicScaleDesign.net/ngc2007>

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