

## **Advisory Committee for Environmental Research and Education**

October 30-31, 2017

NSF Room E2303, 2415 Eisenhower Ave. Alexandria, VA 22314

**Committee Members Present:** Dr. Anthony Janetos (Chair), Dr. Pedro Alvarez, Dr. Tina Bahadori, Dr. David Blockstein, Dr. Ann Bostrom, Dr. Andres Clarens, Dr. Charles Isbell, Dr. Rich Loft, Dr. Maria Carmen Lemos, Dr. Patricia Matraj, Dr. David McGinnis, Dr. Julia Parrish, Dr. Anu Ramaswami

**NSF Staff:** Dr. Scott Borg (Acting, Deputy Assistant Director GEO – Day 2), Dr. Kelly Falkner (Head, OPP – Day 1), Dr. Suzi Iacono (Head, OIA – Day 2), Dr. Jim Olds (Assistant Director, BIO – Day 1), Dr. Leah Nichols (Staff Associate OIA, Executive Secretary for AC ERE), Mr. Steven Buhneing (Communication Specialist, OIA), Ms. Oluseyi George (Program Specialist, OIA), Dr. Gregory Meyer (AAAS Policy Fellow, ENG), Dr. Chris Washington (AAAS Policy Fellow, OIA), Dr. Michal Ziv-El (AAAS Policy Fellow, CISE)

### **Thursday – October 30, 2017**

#### **9:00– 9:30a Welcoming Remarks**

Drs. Janetos and Olds welcomed the committee. Dr. Janetos explained that the goals of the meeting included: (a) planning outreach around the nearly complete Sustainable Urban Systems (SUS) report, (b) program updates and discussion of the Convergence Big Idea, and (c) continued planning for gathering input on the intersections of ERE with national security and economic competitiveness. Dr. Olds updated the committee on some of NSF's most recent activities, including the status of the fiscal year 2018 budget and NEON.

#### **9:30 – 10:30a AC ERE Business / Sustainable Urban Systems Report**

The committee then approved the minutes from the August 2017 teleconference and discussed Dr. Janetos' proposal to add a Vice Chair position. The committee agreed that a 2-person leadership team would serve the committee well and approved adopting a Vice Chair/Chair/Past Chair rotation. The committee then discussed the role and planning processes of the committee. It tabled the discussion of the SUS report until lunch time.

#### **10:45 – Noon Disasters and Economic Competitiveness**

Dr. Virginia Burkett (US Geological Survey – remote)

Guest Speaker Dr. Burkett gave a presentation titled *Disasters and Economic Competitiveness*. She discussed (a) the economic significance of disasters – both in terms of damages and the costs of reducing risks; (b) the challenges in understanding the economic and non-monetary costs of disasters; and (c) lessons learned from recent hurricanes. She also outlined some key science issues and research needs in this area, including:

- Understanding and quantifying linkages among environmental, social, and economic systems

- Predictive modeling of how socio-environmental systems respond and interact when perturbed by extreme events and disasters
- Methods and case studies for assessing full costs of disasters – including non-monetary and indirect impacts
- Understanding drivers of disparity
- Methods for assessing the economic value of ecosystem services and the role of ecosystems in disaster risk reduction
- Building capacity and environmental literacy focusing on the socio-environmental and economic linkages of disaster impacts and risk reduction

The subsequent discussion by the committee focused on the science and education needs in this area. Some additional science needs identified by committee members included: understanding how extreme events affect marine ecosystems; incorporating more social-cultural theory, in addition to economic theory, into predictive models; and understanding how restoration processes following a disaster increase resilience to future extreme events. The committee also noted that disasters and communities' response to disasters create natural opportunities for experimentation, innovation, and adaptive management. They also commented on the importance of education and capacity building in this area. One committee member asked whether the i-Corps program could be adapted to help scientists increase the broader impacts of non-commercializable innovations.

**Noon – 12:30p Natural Disasters and RAPID Science**

Robin Dillon-Merrill (Program Director, ENG)

Dr. Dillon-Merrill gave a presentation that provided an overview of NSF's hazards and disasters research portfolio. She also discussed how the NSF uses the Rapid Response Research (RAPID) proposal type for quickly receiving proposals and awarding funds to collect perishable data that is created following an unexpected event or disaster. During the subsequent question and answer period, the committee noted that it is important to continue ensuring new researchers and early-career scientists can get involved in the established structures Dr. Dillon-Merrill described and asked about how the NSF synthesizes and integrates across the diversity of programs.

**12:30 – 1:30p Working Lunch – Sustainable Urban Systems Report**

(NSF Advisory Committee Liaison Reports were rescheduled to lunchtime on day 2)

The committee discussed the near final draft of the SUS report. In addition to some minor suggested edits, the committee agreed that an executive summary should be added.

**1:30 – 2:45p Strengthening the Ecosystem for Convergence Science**

Dan Stokols (University of California Irvine)

NSF Updates: Leah Nichols (OIA)

Guest speaker Dr. Stokols gave a presentation that focused on how to build capacity for successful convergence science. He described a multi-level ecosystem for convergence science, ranging from the abilities of individual team members to the institutional contexts within which convergence research is conducted. To facilitate and accelerate convergence, one must (a) build the competencies of scientists

for working in teams and doing transdisciplinary research; (b) put in place team-level supports for doing convergence science; and (c) provide financial and institutional incentives for building transdisciplinary partnerships.

The committee then discussed how the NSF might implement some of the ideas articulated in the presentation. Committee members were enthusiastic about the educational aspects of building core competencies for convergence in the workforce. They also noted that the NSF should take the lead in conveying that the ecosystem for convergence is multi-scale and that alignment across the scales is necessary for successful convergence science. The committee also noted that the AC ERE is well-situated to provide advice regarding the processes of convergence.

Dr. Nichols then provided an update on NSF's Growing Convergence Research Big Idea.

**3:00 – 3:30p International Science and Engineering**  
Sam Howerton (Deputy Office Head, OISE)

Dr. Howerton gave the committee an overview of NSF's Office of International Science and Engineering (OISE). He noted that the office has multiple roles, including: (a) the provision of foreign policy advice for NSF staff, (b) programmatic support to build international partnerships and give students global research experiences; and (c) leveraging international investments to develop international research networks. The Advisory Committee for International Science and Engineering (AC ISE) works to identify areas where NSF can be a leader in international science. The AC ERE then discussed possible topics for a collaboration with the AC ISE, including environmental security, disasters, resilience, and human well-being.

**3:30 – 4:00p NSF Programs**  
Innovations at the Nexus of Food, Energy, and Water Systems  
Tom Torgersen (Program Director, GEO)  
Dynamics of Coupled Natural Human Systems  
Rich Yuretich (Program Director, GEO)

Drs. Torgersen and Yuretich each updated the committee on the status of NSF's Innovations at the Nexus of Food, Energy, and Water Systems (INFEWS) and Dynamics of Coupled Natural Human Systems (CNH) programs, respectively.

**4:15 – 5:00p Discussion with Bill Easterling (AD GEO) and Dawn Tilbury (AD ENG)**

The committee had a conversation with Drs. Easterling and Tilbury, NSF's newest Assistant Directors. Drs. Easterling and Tilbury each introduced themselves and spoke about their vision for the GEO and ENG Directorates, respectively. Dr. Janetos provided an overview of the committee's current activities and interests.

**Tuesday, October 31, 2017**

NSF Senior Hosts: Scott Borg (Acting DAD GEO) and Suzi Iacono (OH OIA)

**9:00 – 9:45a ERE and the Data Revolution**

Chaitan Baru (Senior Advisor, CISE) & David Corman (Program Director, CISE)

Dr. Baru gave a short presentation that outlined NSF's Harnessing the Data Revolution (HDR) Big Idea. Dr. Corman spoke about NSF's Smart and Connected Communities (S&CC) program. The committee was enthusiastic about S&CC's model of community engagement and the need for broader data science education.

**9:45 – 10:15a NSF Programs**

Prediction of and Resilience Against Extreme Events (PREEVENTS)

Eric Itsweire (Program Director, GEO)

Critical Resilient Interdependent Infrastructure Systems and Processes (CRISP)

Bob O'Conner (Program Director, SBE)

Drs. Itsweire and O'Conner each updated the committee on the status of NSF's Prediction of and Resilience Against Extreme Events (PREEVENTS) and Critical Resilient Interdependent Infrastructure Systems and Processes (CRISP) programs respectively.

**10:15 – 10:45a Prepare for Discussion with NSF Senior Leadership**

The committee discussed possible questions and discussion topics for NSF Senior Leadership.

**11:00 – Noon Discussion with Dr. Joan Ferrini-Mundy, NSF's Chief Operating Officer**

Dr. Ferrini-Mundy welcomed the committee to NSF's new headquarters and highlighted NSF's progress on several of the Big Ideas, including Growing Convergent Research, Rules of Life, and Window on the Universe. The ensuing discussion focused on a variety of topics, including: how the committee can be most useful to the agency, convergence and the importance of education and capacity building, broader impacts and community engagement, and the committee's pending SUS report.

**Noon – 1:00p Working Lunch – Liaison Reports**

Ann Bostrom (AC SBE liaison)

Charles Isbell (AC CISE and CEOSE liaison)

Rich Loft (ACCI liaison)

Dr. Bostrom gave a brief presentation to update the committee on the current activities and interests of AC SBE. She highlighted AC SBE's interest in the future of federal statistics and survey research, a new report by the Commission on Evidence-Based Policymaking titled *The Promise of Evidence-Based Policymaking*, and a new National Academies report titled *The Value of Social, Behavioral, and Economic Sciences to National Priorities: A Report for the National Science Foundation*.

Dr. Isbell discussed AC CISE's interest in a new National Academies report commissioned by CISE that will examine the importance of computer science in our increasingly connected world. He also provided an overview of CEOSE's most recent report titled *Accountability for Broadening Participation in STEM: CEOSE 2015-2016 Biennial Report to Congress*.

Dr. Loft gave a brief presentation on the ACCI's review of the input it received through the Cyberinfrastructure 2030 Dear Colleague Letter. He noted that the bulk of the white papers received through this DCL came from the environmental and geoscience communities. Collaboration between the ACCI and AC ERE on this topic may be possible.

**1:00 – 2:30p    Planning Discussion: National Security and Economic Competitiveness**

The committee members first discussed outreach strategies for distributing the SUS report. They decided to develop a 1 to 2-page briefing statement, identify venues for speaking about the report, and explore the possibility of publishing a piece about the report in a peer reviewed journal. The committee also decided to develop a general communications plan for use in rolling out the SUS report and other future reports.

The committee members then discussed plans for activities to advance the interest in the intersection of ERE with national security and economic competitiveness. They decided to draft a dear colleague letter to solicit input from the broader scientific, security, and economic policy communities.

**2:30p            Adjourn**