

Advisory Committee for Environmental Research and Education (AC ERE)

NSF Room E2020, 2415 Eisenhower Ave, Alexandria, VA 22314

October 24-25, 2018 Meeting

Committee Members Present: Anthony Janetos (Chair), Pedro Alvarez (Day 1), Raymond Arnaudo, Lora Billings, Ann Bostrom, Andres Clarens, Peter Huybers, Charles Isbell, Jr. (Day 1), Maria Carmen Lemos, Rich Loft (remote), Paty Matrai, Julia Parrish, Benjamin Preston, Anu Ramaswami (Day 2), Lisa White (remote)

NSF Staff: Suzi Iacono (Head, OIA), Jim Kurose (AC CISE – Day 2), Dawn Tilbury (AD ENG – Day 1), Joanne Tornow (Acting AD BIO – Day 1), Leah Nichols (Staff Associate OIA, Executive Secretary for AC ERE), Oluseyi George (Program Specialist, OIA), Glenda Valdez (Science Assistant, EHR – Day 1), Sandra Del Rio (Intern, EHR – Day 2)

Wednesday – October 24, 2018

9:30a – 10:00a Welcoming Remarks

Tony Janetos, Suzi Iacono, and Joanne Tornow welcomed the committee. Dr. Tornow gave a brief presentation on the Directorate for Biological Sciences (BIO) that highlighted some of BIO's investments in Environmental Research, provided an update on the status of the National Ecological Observatory Network (NEON), and outlined BIO's involvement in the Big Ideas. The committee noted the importance of continuing to think about the cultural differences between scientists that produce and use data.

10:00 – 11:00a Environmental and Security Research and the U.S. National Security Community

Geoff Dabelko (Ohio University)

Guest speaker Geoff Dabelko gave a presentation entitled *Environment and Security Research and the U.S. National Security Community*, which outlined the objectives and results of a recent workshop that he organized and led on this topic. He first explored how the concept of security is not simply a narrow focus on violent conflict but also encompasses a more general definition of human security – inclusive of water, food, and ecosystem security and the security of economies, institutions, and infrastructure; all of which can be undermined by environmental change (e.g. droughts, sea level rise) and extreme events (e.g. hurricanes, wildfires). He then discussed and provided examples of how disciplinary and interdisciplinary research and increased connection between scientists and security practitioners can contribute to and advance US national security.

The subsequent discussion by the committee focused on how increased interaction between scientists and security practitioners could benefit both. There is a need to better understand the relative value of different types of scientific information with respect to priorities and possible responses. Dr. Dabelko noted that place-based research is important because the security community is organized by geography. The committee also observed that the conversation about the need for more interaction between scientists and practitioners is relevant in many sectors, not just in the security context. The committee asked if there might be a way to increase such interactions more broadly across the sciences.

11:00 – 11:30a National Security and Economic Competitiveness Subcommittee

Tony Janetos (AC ERE Chair)

Dr. Janetos informed the committee that its Request for Information Letter did not receive many responses and noted that many reasons may exist that explain the dearth of responses, including the lack of an established community focused on the intersection of environmental science and security. The committee then discussed how to foster or create discussions between the academic and security communities, including workshops, summer schools, and partnerships with other agencies. The committee decided that the established subcommittee would develop a short report that outlines a research agenda in this area and recommends strategies for fostering appropriate connections between the environmental science, education, and security communities.

11:30 – Noon Dynamics of Coupled Natural Humans Systems

Liz Blood (BIO)

Dr. Blood gave the committee an overview of the Dynamics of Coupled Natural and Human Systems (CNH) program and presented some results from the program’s recent self-study. In the ensuing discussion, the committee noted that CNH has a well-established community, with some researchers identifying themselves as CNH scholars. They also discussed the broader impacts of the program and noted the importance of engaging stakeholders in CNH projects.

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

Ray Arnaudo AC OPP
Ann Bostrom AC SBE
Charles Isbell AC CISE/CEOSE

Mr. Arnaudo updated the committee on the activities of the AC OPP, which include a focus NSF’s Navigating the New Arctic Big Idea and strategic planning for polar activities. Dr. Bostrom provided an update on the activities of the AC SBE, noting its discussion of a workshop on implicit bias, a continuing National Academies’ study on Reproducibility and Replicability, and NSF’s interest in fostering external partnerships. She also noted that SBE has a new Assistant Director. Dr. Isbell updated the committee on the activities of AC CISE and CEOSE. He noted that AC CISE expressed some concern about how NSF intends to differentiate between the Sustainable Urban Systems activities and the Smart and Connected Communities program. CEOSE’s third report on broader impacts is anticipated in 2019, which will emphasize the importance of including community voices in science.

**1:00 – 2:00p Urban Systems
Smart and Connected Communities
Coastlines and People
Sustainable Urban Systems**

Leah Nichols (OIA)
David Corman (CISE)
Amanda Adams (GEO)
Bruce Hamilton (ENG)

Dr. Nichols informed the committee that the NSF has established an ‘umbrella group’ to help coordinate across the existing programs and emerging activities that emphasize studies of or related to urban systems. Dr. Corman updated the committee on the activities of the Smart and Connected Communities (S&CC) program, highlighting specifically projects that supported environmental science components.

Dr. Adams provided an overview of the NSF's current work on the emerging Coastlines and People (CoPe) initiative. She summarized the results of 4 workshops held in September 2018 that involved over 600 researchers and practitioners in a discussion of the research needed to address coastal challenges. Dr. Hamilton informed the committee that the AC ERE's Sustainable Urban System's report was very well received and that a working group had been formed to explore means of implementing some of the report's recommendations.

Committee members noted that the community is very interested in and excited about the CoPe activities and encouraged NSF to show how the results of the workshops are used to develop a future program's solicitation. They also asked whether S&CC projects are investigating any potential unexpected externalities or unintended consequences of smart cities. The committee was very pleased by Dr. Hamilton's news about their report.

2:15 – 3:30p	NSF Big Ideas	
	Mid-Scale Infrastructure	Jim Ulvestad (OD)
	NSF 2026	Deb Olster (SBE)
	Growing Convergence Research	Leah Nichols (OIA)
	Convergence Accelerators	Dawn Tilbury (ENG)

Drs. Ulvestad, Olster, Nichols, and Tilbury each gave a short presentation about the status of 4 of NSF's Big Ideas. The committee asked some clarifying questions.

3:30 – 4:00p Discussion with Arthur Lupia (AD SBE)

The committee then had a conversation with Dr. Arthur (Skip) Lupia, NSF's new Assistant Director for SBE. Dr. Lupia introduced himself and discussed his vision for SBE. He noted that he is very interested in seeing science serve society and wants to engage stakeholders, develop partnerships, and better communicate the value proposition of fundamental science. The committee discussed its interests in and work on actionable science.

4:00 – 5:00p	SEES Evaluation	Jessica Robin (OISE)
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Dr. Robin gave an overview of the recently completed evaluation of the NSF's Science, Engineering, and Education for Sustainability (SEES) Initiative. Dr. Anand Desai and Dr. Cynthia Phillips from NSF's Evaluation and Assessment Capabilities Section were also present and answered some of the committee's questions about program evaluation in general. The committee noted that interdisciplinary research is significantly disadvantaged if the burden of evaluation is always on the new and rarely on the core. They also discussed the challenges of evaluating the longer-term effects of the SEES programs on careers and workforce development.

Thursday – October 25, 2018

NSF Senior Hosts: Suzi Iacono (Head OIA) & Jim Kurose (AD CISE)

8:30 – 9:00a Welcoming Remarks

Dr. Janetos provided a brief recap of the previous day's activities. Dr. Kurose welcomed the committee and gave some remarks about CISE's interests in ERE. He highlighted S&CC, noted CISE interests in SUS and CoPe, and discussed the intersections of CISE's interest in data and cyberinfrastructure with ERE. The committee asked questions about data discoverability and developing computational ability across the scientific workforce.

9:00 – 9:30a Discussion with Karen Marrongelle (AD EHR)

The committee then had a discussion with Dr. Marrongelle, NSF's new Assistant Director for Education and Human Resources. Dr. Marrongelle discussed her interests in and experience with environmental science and education, especially as they relate to broadening participation, as Dean of Portland State's College of Liberal Arts and Science. Dr. Marrongelle and the committee then discussed innovating in the ways in which students are involved in the scientific discovery process; engaging the public; a need to re-skill the scientific workforce to do interdisciplinary, actionable science; and public-private partnerships. The committee also gave her brief updates on its work on environmental science and security, and actionable science.

9:30 – 10:00a Actionable Science – Planning Discussion

Maria Carmen Lemos

Dr. Lemos opened this session by noting: a) NSF is interested in producing science that is used by society; b) a very large literature on the science of science use exists; and c) other funders are moving in this direction, often requiring partnerships and stakeholder engagement. The committee then discussed what actions it could take to encourage NSF to promote the production of actionable science. The ensuing discussion brought out some of the benefits and challenges of engaging stakeholders in the scientific process.

10:00 – 10:45a Prepare for Discussion with NSF Leadership

The committee discussed possible questions and discussion topics for their meeting with NSF's Chief Operating Officer.

11:00a – Noon Discussion with NSF Chief Operating Officer – Fleming Crim

Dr. Crim introduced himself, provided a summary of the status of NSF's budget, highlighted the Office of Management and Budget's and Office of Science and Technology Policy's memo on the Administration's R&D priorities, and outlined the 4 components of NSF's Renewing NSF Initiative. Dr. Janetos provided a brief overview of the Advisory Committee's meeting, highlighting the committee's work on environmental science and security, the SEES evaluation, actionable science, and cyberinfrastructure. The ensuing discussion included questions about NSF's budgets for ERE and NSF's 10 Big Ideas,

especially NSF 2026. Dr. Crim and the committee also discussed use-inspired science, how to move NSF science into the hands of science users, and the importance of public-private partnerships in this context.

Noon – 1:00p Working Lunch: ERE and Cyberinfrastructure – Planning Discussion Rich Loft

Dr. Loft first provided a brief overview of the ACCI activities including its discussions of results from a recently completed computing and software survey of NSF PIs and Co-PIs; and the publication of a new ACCI Report, *CI2030: Future Advanced Cyberinfrastructure*. Dr. Loft then gave a short presentation that outlined a need for the AC ERE to develop a strategic roadmap for ERE cyberinfrastructure. The committee noted a need not to duplicate work already done by the ACCI and ensure that ERE needs well represented in NSF's cyberinfrastructure programs and plans. The ensuing discussion then focused on ERE data needs. The committee decided that it would explore the topic further by incorporating mini-workshops on this topic into future committee meetings.

1:00 – 2:00p Next steps and wrap up

The committee members used the remaining time to identify action items. They decided to expand their environmental science and security subcommittee to develop a report on this topic. They also decided to task two committee members with putting together a plan for addressing the topic of actionable science. The committee also expressed interest in exploring the topic of environmental education further and decided to focus a future meeting on this topic.

2:00p Adjourn