

Advisory Committee for Environmental Research and Education (AC ERE)

April 18-19, 2018 Meeting

NSF Room E3410, 2415 Eisenhower Ave, Alexandria, VA 22314

Committee Members Present: Anthony Janetos (Chair), Pedro Alvarez, Ray Arnaudo, Tina Bahadori, David Blockstein, Ann Bostrom, Kate Brandt (remote – Day 2), Andres Clarens, Maria Carmen Lemos, Rich Loft, Meg Lowman (remote – Day 1), Patricia Matrai, Diane Pataki (remote), Julia Parrish, Anu Ramaswami

NSF Staff: Bill Easterling (AD GEO – Day 1), Suzi Iacono (Head, OIA), Dawn Tilbury (AD ENG – Day 2), Leah Nichols (Staff Associate OIA, Executive Secretary for AC ERE), Oluseyi George (Program Specialist, OIA), Catherine Malone (AAAS Policy Fellow, BIO), Chris Washington (AAAS Policy Fellow, OIA), JP White (IT Specialist, OIA), Michal Ziv-El (AAAS Policy Fellow, CISE)

Wednesday – April 18, 2018

9:30 – 9:45a Welcoming Remarks

Tony Janetos and Suzi Iacono welcomed the committee. Dr. Janetos outlined the aims of the meeting, which included: a) discussion of the pending launch of the committee's request for information letter, b) a conversation with Amanda Greenwell, the Head of NSF's Office of Legislative and Public Affairs, c) exploring potential action items on the topics of Actionable Science and Cyberinfrastructure, and d) a joint session with NSF's Advisory Committee for Polar Programs. Dr. Iacono briefed the committee on some of NSF's most recent activities, including NSF's new Strategic Plan, the NSF 2026 Idea Machine, and Growing Convergence Research.

9:45 – 10:15a Budget Update

Tony DiGiovanni (Acting DD, BFA) briefed the committee about the FY2018 appropriation and the FY 2019 budget request. The committee asked about how NSF balances investments in core disciplinary programs and interdisciplinary, cross-directorate programs, noting that the interdisciplinary ERE programs have a 15+ year history. Tony DiGiovanni explained that both disciplinary and interdisciplinary programs continued to receive substantial support in FY 2018.

10:15 – 11:00a Discussion with Amanda Greenwell (Head OLPA)

Amanda Greenwell gave the committee an overview of the work of NSF's Office of Legislative and Public Affairs (OLPA). She described OLPA's new approaches to public communication including NSF's new Transforming the World Publication, Quick Reads, a significant social media presence, and its outreach to states via NSF Days events. She also discussed how OLPA's Congressional Affairs Team communicates with Congress. The committee highlighted how much of the work at other agencies would not be possible without NSF science, discussed how citizen diplomats could talk about the value of science, and asked about what the committee could proactively do to assist NSF in communicating about science.

Amanda Greenwell recommended that the committee continue to reach out, emphasize the value of science, and highlight the role of NSF science in community successes.

11:00 – 11:45p Discussion with Anne Kinney (AD MPS) and Joanne Tornow (Acting AD BIO)

The committee then had a conversation with Anne Kinney and Joanne Tornow, NSF's newest Assistant Directors. Anne Kinney and Joanne Tornow each introduced themselves and spoke about their vision for the MPS and BIO Directorates, respectively. Tony Janetos provided an overview of the committee's current activities and interests. The committee inquired about how ERE can be connected more broadly across MPS – e.g. to Mathematics and Physics, given ERE's need for modeling and forecasting of complex socio-environmental systems. Discussion also focused around NSF's interests in and the challenges of ensuring scientists have the needed depth in many fields. The committee also discussed the NSF's Dynamics of Coupled Natural and Human Systems program.

11:45 – 12:45p Working Lunch: Actionable Science

Maria Carmen Lemos led the committee in a discussion focused on the production of useful, actionable science – an important aspect of NSF's ERE portfolio – and whether the committee should provide advice on this topic. A key portion of the conversation focused on the challenge of maintaining the boundary between science and policymaking and committee suggested that research consider the role of boundary organizations (i.e. think tanks and other groups that help translate fundamental science into policy-useful forms) in this milieu. Also discussed were NSF's inclusion of broader impacts in the merit review criteria and how NSF's Growing Convergence Research Big Idea might provide an opportunity for exploring innovative new ways to encourage the production of actionable science. The committee decided that the topic of actionable science is worth further consideration and asked Maria Carmen Lemos to propose an action plan at the next meeting for how the committee might further advance the topic.

12:45 – 1:45p Guest Speaker: Budhendra Bhaduri, Oak Ridge National Laboratory

Budhu Bhaduri gave a well-received presentation entitled "Landscape Dynamics, Geographic Big Data, and Scalable Computing; the Oak Ridge Experience" in which he provided several in-depth examples of how his group at Oak Ridge is integrating multiple, large-scale, and heterogeneous data streams to advance understanding of complex urban systems. He also discussed the importance of machine learning algorithms and robust cyberinfrastructure to this work. The committee was impressed with the presentation. The subsequent discussion focused on the potential applications and benefits of such work, though the committee also expressed concern for the potential abuse of these kinds of datasets and the need for privacy protections and to secure the data.

1:45 – 2:15p Cyberinfrastructure for ERE Rich Loft

Rich Loft then gave a presentation that outlined a need for updating and improving cyberinfrastructure for ERE. The rapid digitization and expansion of streaming sensor data through the internet of things provides new opportunities to study complex socio-environmental systems and advance methods for

data-driven discovery. NSF's Cyberinfrastructure 2030 report emphasizes a need for places to collectively store, share, and analyze data. NSF Big Data program has new partnerships with Google, Amazon, and Microsoft for cloud resources. Machine learning and other new algorithms also provide opportunities for advancing ERE. The committee decided that this topic should be considered further and asked Rich Loft to propose an action plan at the next meeting for how the committee might further advance the topic.

2:30p – 3:00p Coasts and People

Amanda Adams (GEO) and Jennifer Wade (GEO) briefed the committee about NSF's interest in developing an interdisciplinary program to continue advancing scientific understanding of coastal systems. They highlighted the importance of coastal systems (e.g. 40% of US cities are coastal) and discussed NSF's prior investments in Coastal SEES, Hazard SEES, and PREEVENTS. GEO is leading this effort and is already collaborating with ENG and SBE and looking to also collaborate with BIO and CISE. In the ensuing discussion, the committee made the following suggestions:

- Intentionally incorporate an educational component;
- Consider partnerships with other agencies (e.g. NOAA, USGS, DoD) and other programs (e.g. Sea Grant, RISA, Gulf Research Program) in this space;
- Ensure meaningful community involvement in the research projects;
- Consider the recommendations outlined in the AC ERE Sustainable Urban Systems report in this context.

3:00p – 3:30p INFEWS Assessment

Rebecca Kruse (OIA) and Tom Torgersen (GEO) gave a brief presentation that outlined some of the findings from NSF's mid-course evaluative assessment of the INFEWS program.

3:45 – 5:00p Joint Session with AC OPP

The AC ERE then joined the AC OPP for a joint session. After introductions were made the joint committees first focused on NSF's Navigating the New Arctic (NNA) Big Idea. Diane McKnight (OPP) updated the committees about a NNA Dear Colleague Letter that was released in February 2018 and the NNA awards made through the 2017 Convergence Dear Colleague Letter. The committees discussed the need to consider the people living in the Arctic and the importance of incorporating social sciences and ensuring appropriate engagement with communities and private partners in NNA. Tony Janetos then outlined AC ERE's interests in the intersections of environmental science with economic competitiveness and national security. The AC OPP noted that environmental changes in the Arctic are transforming security and economic landscapes in the Arctic region, elevating the importance of these topics.

Thursday – April 19, 2018

9:00 – 10:00a Environmental Research in China

Nancy Sung (Head, NSF Beijing Office), speaking remotely from China, gave a presentation that described the current scientific landscape of China, highlighted the environmental issues of most interest to China that are driving Chinese environmental science, and discussed both NSF's engagement in China and NSF's new international strategy. The committee asked questions about: NSF's new international strategy, China's interests in Arctic research, and about the flow of students between China and the US.

10:00 – 10:45a AC Liaison Reports

Pedro Alvarez (liaison with AC ENG)
Diane Pataki (liaison with AC BIO)
Meg Lowman (liaison with AC ISE)

Pedro Alvarez briefed the committee about AC ENG's current activities and interest. He noted that the AC ERE's Sustainable Urban Systems report was very well received by AC ENG. They recommended a focus specifically on urban resilience. AC ENG is also undertaking some visioning work to identify high impact problems and have discussed the growing importance in engineering education of a focus on value creation.

Diane Pataki spoke about AC BIO's current interests and activities. AC BIO is putting together a subcommittee to track the usage of the National Ecological Observatory Network (NEON). They are also interested in graduation education and training students for non-academic careers. She noted that the BIO Directorate is moving toward a no-deadlines model for proposal submission to core programs. This model could benefit interdisciplinary research.

Meg Lowman gave a brief presentation about the AC ISE. She discussed how the AC ISE is interested in how best to communicate NSF messages to international audiences and how to strategically plan for international scientific engagement. She also noted that the AC ISE is interested in AC ERE's Request for Information Letter on Economic Competitiveness and National Security and how they could help consider the international components of these topics. She also discussed NSF's new international strategy.

10:45 – 11:15a Prepare for discussion with NSF Leadership

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

11:30 – 12:30p Discussion with Joan Ferrini-Mundy, NSF's Chief Operating Officer

Tony Janetos welcomed Joan Ferrini-Mundy to the committee meeting and provided a brief overview of the committee's current work, including the recent publication of the AC ERE's Sustainable Urban Systems Report and the pending release of a Request for Information letter seeking community input on

an environmental research that can contribute to economic competitiveness and national security. Dr. Ferrini-Mundy highlighted NSF's work on Renewing NSF and some of the Big Ideas. The ensuing discussion focused on a variety of topics including: the production of actionable science, NSF's new international strategy, and investments in environmental research and education.

1:00 – 2:30p Committee Business and Planning Discussion

The committee first discussed plans to manage the analysis of the input received through the pending request for information letter on economic competitiveness and national security. They decided to establish a small subcommittee to do the initial analysis and then seek to add expertise to the subcommittee as needed to develop a report. The committee also discussed the successful roll out of the Sustainable Urban Systems report and decided additional actions were not needed.

2:30p Adjourn