

Advisory Committee for Environmental Research and Education (AC-ERE)

September 20 & 21, 2022

Summary Minutes

Committee Members in Attendance: Lora Billings, Andrés Clarens, Vicki Grassian, Kimberly Jones (Chair), Diane Pataki, Raina Plowright, Robin Leichenko, Amanda Lynch, Benjamin McCall, and Claire Monteleoni. Committee Members Absent: Cathy Whitlock, Daniel Wildcat.

NSF Staff: Arnoldo Valle-Levinson (GEO, Executive Secretary for AC ERE), Alicia Knoedler (OIA), Steve Meacham (OIA), Bruce Hamilton (ENG), Brandi Schottel (ENG), Una Alford (OIA), Ashley Pierce (ENG), Michelle Bushey (MPS), Amanda Haes (MPS).

Tuesday, September 20th, 2022

11:00 - 11:15 am Welcoming Remarks

Dr. Jones welcomed everybody to the meeting and provided an overview of the meeting for the next two days. She pointed out that the two topics of emphasis were going to be Environmental Equity and Broadening Participation.

Dr. Alicia Knoedler then presented an overview of the meeting agenda and introduced two new members of the AC-ERE: Daniel Wildcat, from Haskell Indian Nations University in Lawrence, Kansas; and Cathy Whitlock, an Emeritus Professor from Montana State University. Dr. Knoedler then presented President Biden's Budget Request for FY2023.

Dr. Knoedler highlighted the main themes from the Budget Request for 2023, among which "Equity for Underserved Communities" was noteworthy. She mentioned that NSF continues to provide most of the Federal Support (61%) for Environmental Sciences. Dr. Knoedler noted the two main topics of emphasis in this meeting's agenda and the influence they would have on the engagement of a diversity of people, institutions, and geography. She concluded with two examples of NSF-funded Convergence Research that are related to climate resilience and how decarbonization could improve well-being of communities. She pointed out that this convergence research is the result of AC-ERE recommendations.

11:15 - 11:45 am Update from programs at NSF

National Science Foundation Research Traineeship (NRT) Program, Daniel Denecke, Program Director (EHR/DGE)

Dr. Denecke talked about the NRT program. He mentioned that he would like to receive feedback from AC-ERE. The NRT program was inspired by IGERT and had a funding of \$65M last year, distributed in 22 awards. The program has supported over 130 research institutions to support convergence science, combined with innovative models for graduate education. Core to the NRT

program is the concept of Convergence Research. The next proposal deadline is September 23rd, 2023, for FY 2024.

Dr. Denecke explained that the Architecture of an NRT involves Research and Training, Professional Development, and Inclusive Workforce Development. He mentioned that each solicitation (each year) has distinct priority areas and outlined the current priority areas (AI, Quantum Information, Data Revolution Harnessing, Work at the Human Technology Frontier, Windows to the Universe, Navigating the New Arctic, Understanding the Rules of Life). These priorities were for the Sep 2022 deadline, but NRT is open to any theme of national importance.

Dr. Denecke described prototypes of Training and Professional Development Models. Dr. Denecke concluded by requesting AC-ERE input on priority themes, outreach strategies and potential new partnerships.

In the discussion that followed the committee noted that there might be opportunity of synergy with DOE and suggested that environmental research and equity could be future priority areas.

Update on new policy guidance for access to federally funded research - Martin Halbert, Science Advisor for Public Access, NSF

Dr. Halbert provided an overview on the memorandum from the White House Office of Science Technology Policy (OSTP), the Nelson memorandum, which provided guidance on the development of federal policy to ensure free, public, and equitable access to information. This updated public access policy is anticipated by February 2024. Its release will be preceded by an opportunity for the public to comment on the draft policy on 2023. The advisory committee noted the importance of a financial model for open-access publications and cited a UK model as an example.

12:00-01:00 pm Committee Business

Approval of minutes of April 2022 meeting

The committee accepted the minutes of the April meeting.

Update on ERE-MPS collaboration

Lora Billings, Montclair State University &
Vicki Grassian, University of California San Diego, AC-ERE Members

Dr. Billings and Grassian provided an update of collaborations with MPS. Dr. Grassian suggested that a Workshop on the intersection of MPS and ERE research be held. MPS staff that October MPS Advisory Committee meeting will include a session on Oct 26th at which some ERE members will meet with the MPS committee.

Discussion: Minimizing impacts of environmental research on the environment

Diane Pataki, Arizona State University &
Ben McCall, University of Dayton, AC-ERE Members

Dr. Pataki started the session, introducing the topic of socio-environmental impacts of research with examples from Ecology and Urban Ecology. Dr. McCall considered the impacts of the environmental community on the climate system, e.g., research in polar systems, electricity

consumed by computer models, air travel, etc. Some disciplinary groups are also looking at this issue (e.g., Astronomers for Planet Earth).

Drs. Pataki and McCall then invited committee discussion of the topic. The committee highlighted several potentially important goals, such as reducing the energy used in computer calculations, specifically AI and climate modeling, in travel to field sites, and in travel to scientific meetings. The committee indicated that, like NSF, DOE asks researchers to fill out a questionnaire intended to gauge the potential environmental impacts of a research project.

The committee considered whether it wanted to explore this topic further with a goal of developing recommendations that could encourage, develop, or implement best practices that mitigate the environmental impacts of research.

There was a consensus that the AC-ERE should continue to explore this topic.

1:00-2:00 pm Break

2:00 – 2:15 pm Update from programs at NSF, continued

GRANTED, Alicia Knoedler, Head, Office of Integrative Activities, NSF

Dr, Knoedler talked about NSF engagements with the research community noting the opportunity to do more to lower barriers and enable more people to engage in research and to gain access to NSF-supported activities.

Dr, Knoedler provided an overview of NSF funding to minority-serving institutions (MSIs) and organizations in EPSCoR jurisdictions, then introduced NSF's GRANTED activity.

GRANTED (Growing Research Access for Nationally Transformative Equity and Diversity) focuses on strengthening the Nation's research enterprise (expanding who participates in research) by focusing on research development, research administration, technology transfer, corporate relations, research compliance, student training, research policy, and research leadership. One goal is to reduce barriers to competitiveness and enhance research capacity at emerging and underserved research institutions. In FY2023, GRANTED will focus on growing the research enterprise at minority serving institutions. The activities to be supported include: the enhancement of research administrative support; supporting research administration leadership; and partnering with national and regional professional societies.

Dr, Knoedler emphasized that in helping emerging research institutions, well-resourced institutions will have much to offer.

2:15-3:15 pm Considering Equity in Environmental Research and Education

Moderator: Kimberly Jones

NSF Activities, Arnoldo Valle-Levinson, GEO/OCE

Dr. Valle-Levinson gave examples of several programs that support research that involves environmental equity: Navigating the New Arctic (NNA), Dynamics of Integrated Socio-Environmental Systems (DISES), and Sustainable Regional Systems Research Network (SRS RNs).

Environmental Equity: Partnerships and Collaboration, Nancy Love, University of Michigan

Dr. Love talked about creating equity-centered research opportunities and bringing them into the classroom. She mentioned the importance of taking time up front to create a statement of principles and values with students and collaborators. She warned that we should be prepared to move outside our comfort zone but be honest and clarify our motives and objectives before engaging in such an activity. She also cautioned against overextending oneself.

Dr. Love discussed the demographics of water occupations and the decision makers on water issues. Concerns of people in the US about water quality are high, but research indicates that nonwhite people are more worried about the quality of the water they drink than white people. However, the field of water supply and utilities is dominated by a relatively homogeneous decision-making population. There is an opportunity to recruit more diverse decision-making personnel in water issues.

Environmental Equity in the context of environmental research and education, Robin Leichenko, AC ERE

Dr. Leichenko noted that the concept of *environmental equity* is derived from the idea of environmental justice. She pointed out that there is growing public awareness on environmental equity after many recent disasters that affect different people distinctly, and the number of papers on climate justice has increased. She stressed that equity should be woven through the research life cycle, from research team formation and research problem formulation, to the research activities themselves.

Dr. Leichenko described recommendations from New York City's Panel on Climate Change. Among them, she mentioned the ideas that multiple forms of equity should be reflected in climate and environmental research efforts, and that researchers need to work side-by-side with communities at the outset to co-design and co-implement neighborhood-based research projects. She remarked that equity is key for addressing environmental challenges.

3:15-3:30 pm Break

3:30-4:30 pm Considering Equity in Environmental Research and Education, cont'd

Committee Discussion

This session began with questions related to terminology. There was agreement that the term "equity" is relative. Discussions centered on what this committee might do. How and what type of product could be produced? Rather than writing another report, there was a suggestion that the committee consider a workshop. The committee agreed to form a subcommittee to address the topic of environmental equity and justice.

4:30 pm Dr. Jones declared adjourned the first day of the AC-ERE meeting.

Wednesday, September 21st, 2022

11:00- 11:15 pm NSF's Strategic Plan -- Steve Meacham

Dr. Meacham outlined the main themes for the President's FY 2023 Budget Request. Then he talked about the CHIPS & Science Act and the need to invest in Geographic Diversity and in Emerging Research Institutions (An institution is an emerging research institution if, on average, it has less than \$50 million in federally funded research expenditures annually).

One of the budget themes is Equity for Underserved Communities to which programs like the REU, HBCU EiR, GRANTED and EPSCoR contribute, along with a number of others.

Dr. Meacham finished by mentioning NSF's investment portfolio for broadening participation and showing the 4 NSF's Strategic Goals: 1) Empower STEM talent, 2) Create new knowledge about universe, world and ourselves, 3) Benefit society by translating knowledge into solutions, and 4) Excel at NSF operations and management.

11:15 - 12:45 pm How can NSF and the Research Community work together to Broaden Participation in Environmental Science and Education?

Dr. Kimberly Jones moderated this session, which began with an introduction to NSF's Agency Priority Goal (APG) by Dr. Casonya Johnson, BIO/MCB. This is focused on Strategic Goal 1 and aims to increase the number of communities underrepresented in STEM and unleash STEM talent for the USA. She then talked about empowering the so-called "missing millions" (sectors underrepresented in STEM).

The Agency Priority Goal seeks to broaden NSF's award portfolio by increasing the number and proportion of proposals, by 10% by September 30, 2023, from individuals and institutions that are underrepresented and underserved.

To meet the objectives outlined by the APG, four strategies are being pursued by NSF: Policy that meets expectations, Data Analytics to understand APG goals and the impact of NSF activities, External Engagement to improve the ability of emerging research institutions (ERI) to identify funding opportunities, and Internal Engagement/Capacity Building focused on NSF staff and proposal reviewers.

Dr. Casonya Johnson's presentation was followed by an overview of Education & Broadening Participation in GEO by Dr. Brandon Jones, GEO/Office of the Assistant Director. He first gave an overview of Geosciences foci and the vision (for learning and research), mission (create a geoscience community), and goals (highlight the value of broadening participation) of GEO's Broadening Participation activities.

He talked about a tripartite approach to workforce considerations, consisting of transferrable skills, equitable infrastructure (hiring, recruitment, committees, editorial) and inclusive culture (policies, practices, traditions). He then outlined some internal NSF GEO Broadening Participation activities.

Dr. Jones described an 'ecosystem of support' for broadening participation among undergraduate and graduate students in STEM fields. Dr. Jones cited the examples of "Pathways into the Geosciences - Earth, Ocean, Polar and Atmospheric Sciences (GEOPATHs)" program, which

concentrates on Career Development. Another example was the “Geoscience Opportunities for Leadership in Diversity (GOLD-EN)” program that creates a network of professionals. He ended with the example of the “Cultural Transformation in the Geoscience Community (CTGC)” program, which intends to create a culture of inclusion.

Dr. V. Celeste Carter, Program Director in the Division of Undergraduate Education, briefed the committee on a ‘Dear Colleague Letter: Enhancing Engineering Technology and Advanced Semiconductor Manufacturing Technician Education (ETSTE)’ developed in concert with Intel Corp as part of the response to the CHIPS Act. She pointed out two programs (opportunities) in the Division of Undergraduate Education: Advanced Technological Education (ATE) and the NSF Scholarships in STEM (S-STEM). Intel provides funds to support initiatives that focus on growing the semiconductor workforce. The ATE program has a current budget of \$75M and addresses a need for technologically well-educated graduates, particularly from Community Colleges. The S-STEM program emphasizes: 1) capacity building, 2) single institution proposals, and 3) inter-institutional consortia. It also supports collaborative planning projects.

Dr. Carter showed data from the American Association of Community Colleges that demonstrated the diversity of the student population at community colleges.

Dr. Sandra Richardson from OIA/EPSCoR discussed the topic of geographic diversity and note the emphasis on NSF EPSCoR in the CHIPS and Science Act. Dr. Richardson first introduced NSF EPSCoR, which seeks to diversify geographic representation in STEM fields. 23% of the EPSCoR portfolio focuses on Environmental Research. She cited that EPSCoR also seeks to broaden participation of diverse groups and institutions in STEM in EPSCoR jurisdictions.

Dr. Richardson mentioned that the CHIPS and Science Act creates a target of at least 15.5% of NSF’s grant funding going to organizations in EPSCoR jurisdictions in FY 2023, increasing to 20% by 2029. She then talked about opportunities for greater participation of Minority Serving Institutions in EPSCoR jurisdictions in NSF’s portfolio.

Dr. Richardson exhorted participants to propose how to leverage the experience and expertise of AC-ERE. She posed three major questions: What unique opportunities does the CHIPS and Science Act offer for environmental research in EPSCoR jurisdictions? What role can AC-ERE play in helping NSF meet the geographic and institutional diversity goals outlined in the CHIPS and Science Act? What outreach or other strategies would be helpful in the environmental science research community to help the research community learn about and embrace these goals?

Dr. Rita Teutonico, a Program Director in the Division of Ocean Sciences, talked about Emerging Research Institutions -- Opportunities and Barriers. Dr. Teutonico cited challenges and opportunities in Environmental Science to Broadening Participation. As challenges, she indicated institutional barriers related to support for field research opportunities, as well as individual (student) barriers associated with lack of research experiences, having a job commitment and other time obligations, and the challenge to create career path awareness among students.

The session talks on broadening participation at NSF closed with a presentation on the program NSF INCLUDES by Dr. Tori Smith, from the Division of Human Resource and Development. Dr. Smith mentioned a new solicitation that supports five types of INCLUDES projects: for design & development of launch pilots; collaborative change consortia; alliances; network connectors; and conferences. She illustrated the program with the example of a successful project: the SEAS Islands Alliance.

12:45 - 1:00 pm Break

1:00 - 2:00 pm Preparation for Discussion with NSF Senior Leadership

AC-ERE discussed what recommendations to make to leadership. Three topics emerged: 1) Enhance efforts to engage early career and senior researchers, together with the question: is there an analysis of what is working and what is not working? 2) Foster partnerships and explore effective partnerships. 3) Incentivize education and workforce development.

2:00 - 2:30 pm Discussion with NSF Office of the Director

The Committee met with Dr. Dr. Karen Marrongelle, NSF's Chief Operating Officer.

After the members of the AC-ERE introduced themselves. Amanda Lynch recommended that NSF should continue to engage individual researchers from underrepresented groups, both early career and senior people, but noted the often heavy service and teaching loads in some institutions can be obstacles.

Dr. Kimberly Jones stressed the need to ensure that partnerships and collaboration opportunities are beneficial to all institutions involved. She mentioned that NSF staff and proposal reviewers should be attuned to this issue when evaluating a proposal, i.e., ensure that the participation by a minority-serving institution in a collaboration is well articulated in the proposal and not reduced in budget negotiations or when the project is implemented. Moreover, these institutions should be involved early in the proposal preparations.

Dr. Andres Clarens recommended that NSF consider ensuring that the climate crisis and technology transformations are reflected in TIP's investment in workforce development. Dr. Clarens also declared an interest in how to fill gaps in the STEM K-12 pipeline to university. Dr. Marrongelle noted that school children are very aware of the environment and suggested that stronger partnerships with teachers would help. She also talked about the role of science programs at the undergraduate and graduate levels in attracting students to STEM fields.

Dr. Jones mentioned that two topics being pursued by the AC were environmental equity and broadening participation. She noted that the AC had also begun having conversations about minimizing environmental and climate impacts of environmental research. Dr. Marrongelle expressed a keen interest in this topic and noted that the AC-ERE was well placed to tackle it.

Dr. Marrongelle closed by acknowledging and complimenting the work of the committee and thanked the members for their efforts on behalf of the environmental research and education community.

AC-ERE Discussion Wrap-up

In the wrap-up discussions, the AC-ERE agreed to form a *Subcommittee on Environmental Equity* with initial members: Amanda Lynch, Andres Clarens, Kim Jones, Claire Monteleoni, and Robin Leichenko.

It also agreed to form an *interest group on the environmental impacts of research* with Ben McCall, Vicki Grassian and Kim Jones. Dr. Jones invited other members to join this group.

Vicki Grassian, Lora Billings and Kim Jones agreed to explore areas of common interest with the Advisory Committee for Mathematical and Physical Sciences.

The AC-ERE decided that its members should disseminate the Report on Engaged Research at scientific meetings. The AC-ERE also agreed to work on sharing the ideas in the report in a scientific journal article.

The committee ended by noting that education and workforce development activities were needed to make sure that the research in environmental science is well understood in high school and undergraduate education.

3:30 pm. The Chair of AC-ERE, Dr. Kim Jones, adjourned the meeting by acknowledging everybody's participation and the technical help from Elena Hillenburg and Una Alford.