



Advisory Committee for Environmental Research and Education
8-9 May 2024 Meeting - All times Eastern Time

Summary Minutes

Committee Members in Attendance: Henry Bart Jr., Lora Billings, Vicki Grassian, Rupa Iyer, Kimberly Jones (Chair), Robin Leichenko, Bo Li, Amanda Lynch, Lynda McGilvary, Claire Monteleoni, Diane Pataki, Raina Plowright, Darren Ranco, Rodolfo Torres, Cathy Whitlock

NSF Staff: Ashley Pierce (OIA, Executive Secretary for AC-ERE), Alicia Knoedler (OIA, Office Head), Steve Meacham (OIA), Caroline Blanco (OGC), Wendy Graham (GEO/RISE, Division Director), Bruce Hamilton (ENG/CBET), Christopher Lowry (GEO/EAR), Carlos Martinez (GEO/RISE AAAS S&TP Fellow), Benjamin McCall (OIA), Linda Molnar (TIP/ITE), Rebecca Morss (OIA), Brandi Schottel (ENG/OAD), Elaine Shen, (GEO/OCE NOAA Knauss Sea Grant Fellow), Amy Walton (CISE/OAC, Deputy Office Director)

NSF Directorate Leadership Guests: Sylvia Butterfield (EDU DAD), Dean Evasius (MPS/OSI Office Head), Erwin Gianchandani (TIP AD), Kaye Husbands Fealing (SBE AD), Alexandra Isern (GEO AD), Joydip Kundu (CISE DAD), Simon Malcomber (BIO DAD), Susan Margulies (ENG AD), Jessica Robin (OISE Deputy Office Head), and Kendra Sharp (OISE Office Head)

Notetakers: Jennifer Riehl (AAAS S&T Policy Fellow, ENG/CBET), Sharon Homer-Drummond (AAAS S&T Policy Fellow, EDU/EES)

Wednesday, 8 May 2024

10:00 – 10:15 am Welcoming Remarks

Dr. Kimberly Jones welcomed the Committee, thanked everyone for attending, mentioned three new Advisory Committee members, Henry (Hank) Bart Jr., Lynda McGilvary, Darren Ranco, and asked attendees and members to introduce themselves.

10:15 – 10:45 am NSF Update

Dr. Knoedler welcomed the Committee and thanked and acknowledged the work of several committee members, Dr. Ada Monzon and Dr. Daniel Wildcat, who have rotated off the committee since the last meeting. Dr. Knoedler then welcomed three new Advisory Committee members, Henry (Hank) Bart Jr., Lynda McGilvary, and Darren Ranco.

Dr. Knoedler then gave an overview of NSF's budget including the FY23 actual budget, the FY24 request and appropriation, and the FY25 request and the differences between them. Dr.

Knoedler noted that the FY25 budget request pillars and themes are identical to the FY24 pillars and themes and include accelerating technology & innovation, advancing emerging industries, build a resilient planet, creating opportunities everywhere, and strengthening research infrastructure. Dr. Knoedler went over some recent Dear Colleague Letters (DCLs) and solicitations that have come out under the Build a Resilient Planet cross-cutting theme, including Confronting Hazards, Impacts, and Risks for a Resilient Planet ([CHIRRP](#)). Dr. Knoedler also touched on the different programs that support the Create Opportunities Everywhere budget theme including Growing Research Access for Nationally Transformative Equity and Diversity ([GRANTED](#)), the Established Program to Stimulate Competitive Research ([EPSCoR](#)), Advanced Technological Education ([ATE](#)), and Excellence in Research for HBCUs ([HBCU-EiR](#)). Dr. Knoedler reminded the Committee about the update in the Proposal & Award Policies and Procedure Guide ([PAPPG 24-1](#)) that requires investigators to seek and obtain approval from Tribal Nations for proposals that may impact Tribal resources or interests. Dr. Knoedler then gave a brief overview of a new Science and Technology Center ([STC](#)), the Center for Braiding Indigenous Knowledges and Science ([CBIKS](#)), noting that one of the senior personnel on the award is one of the new AC-ERE members, Darren Ranco.

Dr. Knoedler went over the major themes of the AC-ERE meeting agenda and noted some of the recent impacts of the Committee which include a second round of the Sustainable Regional Systems Research Networks ([SRS RNs](#)) released in January 2024, a program that emerged in response to the [AC-ERE's 2018 report on Sustainable Urban Systems](#). Another recent solicitation that was released in March 2024, Focus on Recruiting Emerging Climate and Adaptation Scientist and Transformers ([FORECAST](#)) calls on the research community to adopt the recommendations in the [AC-ERE's 2022 report on Engaged Research for Environmental Grand Challenges](#), to support the building of a robust scientific workforce ready to work with communities to address societal challenges through convergent research approaches. NSF's Environmental Justice Working Group, who will meet with the Committee during this meeting, also used the Engaged Research report as a resource for NSF's Strategic Plan.

The committee discussed the update from Dr. Knoedler including discussion on EPSCoR funding.

10:45 – 11:00 am Break

11:00 am – 12:00 pm Strategic Roadmap Discussion

Moderator: Kimberly Jones, Chair of Subcommittee

Subcommittee members: Lora Billings, Kimberly Jones, Rupa Iyer, Robin Leichenko, Bo Li, Diane Pataki

Dr. Jones introduced the context for the Strategic Roadmap including the AC-ERE 10-year report that expires soon, America's future: Environmental Research and Education for a Thriving Century, and the start of NSF's next round of strategic planning for 2027-2031. Dr. Jones then went through the Strategic Roadmap outline explaining the different sections, tools to leverage to improve environmental research and education, ways to improve the ecosystem of

environmental research and education, and the list of research priorities and then invited discussion from the Committee.

The Committee discussed the long list of research priorities and noted that it might be better to reorganize the outline to focus on the tools and improvements to the research and education ecosystem aspects of the outline. The Committee agreed to reorganize the Strategic Roadmap outline and to develop work groups around the different topics for the committee members to join and contribute to writing. The Committee took a brief break to grab lunch before returning to discuss the Strategic Roadmap.

12:00 – 1:00 pm Working Lunch

The Committee continued the conversation on how to reorganize the Strategic Roadmap. The committee agreed to focus the Strategic Roadmap more on research approaches instead of research areas. The conversation also touched on the need to focus on convergent research and potential gaps in partnership areas.

The Committee then spent the rest of the working lunch prepping for the discussion with the Office of the Director and reviewing the guiding questions for the conversations with the Directorate leadership.

1:00 – 2:00 pm Minimizing the Environmental Impacts of Research Discussion
Moderator: Vicki Grassian, Chair of Subcommittee
Subcommittee members: Lora Billings, Vicki Grassian, Kimberly Jones, Rodolfo Torres, Cathy Whitlock

Dr. Grassian gave an overview of the Minimizing the Environmental Impacts of Research Recommendation document and opened the discussion to feedback from the Committee. The discussion touched on the challenge of understanding the topic across varied research topics, institutions, and industries. There were several suggestions including looking to what may be common across disciplines, where can improvements be made, collaborating with other agencies or industries that have done work in this area, and considering when travel is necessary. There was also discussion about ensuring that the burden to address environmental impacts is not solely on researchers who may have different resources available to support them across different institutions.

2:00 – 2:30 pm Break

2:30 – 3:15 pm Discussion with Dean Evasius, Office Head, Office of Strategic Initiatives of MPS and Susan Margulies, Assistant Director of ENG
Moderators: Kimberly Jones, ENG Liaison, AC-ERE Chair and

Rodolfo Torres, MPS Liaison

Dr. Margulies thanked the committee for the previous reports they had published and noted that Engineering reads them and is interested in the recommendations. Dr. Margulies then went through some of the Engineering investments including collaborations with the USDA through Innovations at the Nexus of Food, Energy, and Water Systems ([INFEWS](#)) and Signals in the Soil ([Sits](#)), the Net Zero in ENG [DCL](#), and the Sustainable Regional Systems Research Networks ([SRS RNs](#)) programs.

Dr. Evasius noted that there were many points of contact in MPS with environmental research including in the Sustainable Chemistry program, Critical Aspects of Sustainability ([CAS](#)), an [environmental chemistry program](#), and the Molecular Foundations for Sustainability: Sustainable Polymers Enabled by Emerging Data Analytics ([MFS-SPEED](#)) solicitation. Dr. Evasius also noted that environmental research happens throughout the core programs and the importance of astronomy facilities particularly in energy usage and international diplomacy.

The discussion with the Committee touched on how the two Directorates handle interdisciplinary and convergent research. Dr. Margulies noted that Engineering is inherently multidisciplinary and provided biomanufacturing, the Robotics Program, and Clean Energy Technologies as examples. There was discussion on the definitions for transdisciplinary convergent research and the need for this term to be defined in the Strategic Roadmap. There was also discussion on if there are enough programs to support complex systems research and that complex research should be funded across NSF. Dr. Margulies listed some examples of programs at NSF that fund research that is convergent including Engineering Research Centers ([ERCs](#)), Civic Innovation Challenge ([CIVIC](#)), and the [Lemelson Foundation partnership](#). There was also discussion on how to improve the review of convergent and transdisciplinary research through reviewer training and learning from past experiences, engaging with Advisory Committees, International partnerships, and using metaprograms at NSF.

3:15 – 3:30 pm

Break

3:30 – 4:15 pm

Engagement of Students and Early Career Researchers Discussion

Moderator: Bo Li, Chair of Working Group

Subcommittee members: Kimberly Jones, Bo Li, Lynda McGilvary, Cathy Whitlock

Dr. Li gave an overview of what the work group had discussed on how to engage students and early career researchers in the work of the AC-ERE which includes potentially receiving feedback through a questionnaire or holding a panel discussion. The Committee discussed bringing early career researchers on to the Committee, potentially holding a panel discussion with students and early career researchers, and exploring resources from other associations and professional

societies that may have student and early career groups already established. The discussion also touched on the barriers to working on convergent and interdisciplinary research as an early career researcher due to the extra time needed to setup up complex research projects, the incentives for tenure, and the limits of programs like the CAREER program in supporting transdisciplinary research. The Committee noted that it may be important to include the early career researcher perspective in the Strategic Roadmap.

4:15 – 4:30 pm Committee business

The fall 2023 meeting minutes were approved.

4:30 – 5:00 pm Briefings from Advisory Committee Liaisons

Kimberly Jones, ENG AC

Dr. Jones reported on the Engineering Advisory Committee (AC) meeting where they discussed the Engineering Strategic Plan, the FY25 budget themes, and strategic priorities and values for Engineering. Highlights included Partnering for a Resilient Planet, Opportunities in Clean Energy and Climate Change Adaptation and Mitigation, Broadening Participation at Scale, Engineering PLUS Alliance, Investing in Engineering Research Infrastructure, and Revolutionizing Engineering Departments (RED).

Rupa Iyer, CEOSE

Dr. Iyer reported on the Committee on Equal Opportunities in Science and Engineering (CEOSE) meeting which highlighted topics such as STEM talent in rural America, EPSCoR 2022 envision the future, a National Academy of Science report on advancing antiracism, diversity, Inclusion, beyond broadening participation, and supporting Tribal communities.

Henry Bart, BIO AC

Dr. Bart reported on the Biological Sciences Advisory Committee which was holding a concurrent meeting and had so far discussed use inspired research opportunities and an interest in engaging with the AC-ERE.

Cathy Whitlock, GEO AC

Dr. Whitlock reported on the Geosciences Advisory Committee which highlighted new programs such as CHIRRP and EMBRACE, an update on the Sexual Assault and Harassment Prevention and Response (SAHPR), and discussions on how to enhance transdisciplinary science and education in the Geosciences (from universities to NSF).

Rodolfo Torres, MPS AC

Dr. Torres reported on the Mathematical and Physical Sciences Advisory Committee which included a Subcommittee report on facilities, a focus on building bridges between MPS and EDU, and a discussion on AI investments by NSF and use in NSF research.

5:00 pm

Adjourn Day 1

Thursday, 9 May 2024

8:30 – 9:00 am

Committee member arrival

Dr. Meacham and Dr. Jones welcomed everyone to the second day and thanked everyone for the great discussion on the first day. Then they turn it over to Dr. Whitlock to begin the first session of the day.

9:00 – 9:45 am

**Discussion with Alexandra Isern, Assistant Director of GEO and
Simon Malcomber, Deputy Assistant Director of BIO**

Kendra Sharp (Office Head, OISE)

Jessica Robin (Deputy Office Head, OISE)

Moderator: Cathy Whitlock, GEO Liaison

Dr. Malcomber presented on behalf of BIO and GEO and how the two Directorates see environmental research pointing to National Ecological Observatory Network ([NEON](#)), the Ocean Observatories Initiative ([OOI](#)), and Long-Term Ecological ([LTER](#)) programs which span BIO, GEO, and increasingly, SBE. Dr. Malcomber noted that BIO and GEO successfully review interdisciplinary research within the Directorates and stated that 50% or more of incoming proposals are co-reviewed, panelists are increasingly interdisciplinary, and can communicate across disciplines and understand challenges and opportunities for interdisciplinary research. Dr. Malcomber advised the broader research community to talk to their program officers, be aware of new and evolving metaprograms, suggest where a proposal could be co-reviewed, trust that program officers are selecting the best reviewers, and provide advice through advisory committees.

Dr. Isern noted that many of the transformational research areas are cross-Directorate efforts and that topics like biocomplexity have impacted how transformative science is supported across NSF.

Dr. Sharp talked about the Global Centers ([GC](#)) program in the Office of Science and Engineering which has worked to increase NSF's participation and leadership in multilateral approaches to global science with topics such as climate change, clean energy, and youth-inspired research.

The discussion touched on where human environmental interactions and socio-ecological research was funded within NSF and on how co-review occurs across NSF. The discussion also touched on how to support early career researchers in interdisciplinary research fields, particularly when programs sunset or evolve.

9:45 – 10:35 am

Preparation for Discussion with NSF Senior Leadership

The Committee debriefed on the earlier discussions and focused on what recommendations could be made to improve the review process for transdisciplinary and convergent research proposals.

Dr. Jones then turned to preparing to meet with Office of the Director and asked the Committee to synthesize the main meeting themes and work on summarizing key points for their discussion with the Office of the Director. The Committee decided on three main themes: fostering the creation of new research opportunities, reviewing interdisciplinary and convergent research, and strengthening the focus on environmental education.

10:35-10:45 am Break

10:45 – 11:30 am Discussion with Joydip Kundu, Deputy Assistant Director of CISE and Erwin Gianchandani, Assistant Director of TIP
Moderators: Diane Pataki and Claire Monteleoni

Dr. Kundu noted that CISE is thinking a lot about the sustainability of computing as well as innovation from computing and provisioning cyber infrastructure to advance research on sustainability. Dr Kundu mentioned several examples of CISE's efforts in these areas including Design for Environmental Sustainability in Computing ([DESC](#)), the Civic Innovation Challenge ([CIVIC](#)), and The National Discovery Cloud for Climate ([NDC-C](#)).

Dr. Gianchandani introduced TIP and notes that NSF supports transformative research, researchers, and ideas and TIP tries to push those ideas out into the market and into society. TIP has three key pillars, innovation ecosystem building, accelerating technology development and technology translation, and workforce development. Dr. Gianchandani noted that at least 13% of TIP's portfolio comes up in a search for "environmental research" and that two-thirds of the new Regional Innovation Engines ([Engines](#)) are on topics that intersect with environmental research and sustainability. Dr. Gianchandani mentioned other examples of how TIP supports environmental research including the [Convergence Accelerator](#), the [SBIR](#) program, workforce programs, and entrepreneurial fellowships.

The discussion touched on the difficulties in putting together an interdisciplinary panel to review convergent proposals. Dr. Kundu and Dr. Gianchandani both noted experience in core programs as well as in the Convergence Accelerator and Engines programs and for TIP, the necessity to include cross-sector expertise. The discussion also touched on the opportunities available for early career researchers looking for funding for interdisciplinary research ideas, how new research programs form, and how programs that have been around for a long time evolve.

11:30 am–12:15 pm Discussion with Sylvia Butterfield, Deputy Assistant Director of EDU and Kaye Husbands Fealing, Assistant Director of SBE
Moderator: Robin Leichenko, SBE Liaison

Dr. Husbands Fealing noted several programs in SBE or that SBE contributes to such as Human Environmental and Geographical Sciences ([HEGS](#)), [Cultural Anthropology](#), [Archaeology](#), and Dynamics of Integrated Socio-Environmental Systems ([DISES](#)) that fund environmental research. Dr. Husbands Fealing noted some of the challenges in reviewing interdisciplinary research proposals including recruiting panelists that cover all the disciplinary expertise needed, that can work together, that are varied, and that come from a range of institution types. Other challenges include budget constraints and how solicitations and DCLs are constructed. Dr. Husbands Fealing noted that it is important to include SBE folks when designing a call for interdisciplinary research proposals.

Dr. Butterfield reminded the Committee that EDU supports projects from pre-K through Post Doctoral experiences and workforce development and any of the programs in EDU could fund projects focused on environmental education. Dr. Butterfield listed a couple of examples including research on extreme climates and blizzards, learning about climate from informal learning activities, and developing community-based curriculum. Dr. Butterfield also noted some challenges in training reviewers and program officers in reviewing interdisciplinary proposals including using metrics that may differ from the metrics used in a specific research field which may lead to lack of support for overall, transformative projects, especially when addressing novel, risky, and innovative work. Dr. Butterfield noted that it is rare for a proposal to be strong in all fields and that it takes skilled panel facilitation and good reviewer orientation as well as varied reviewer expertise to address this issue.

12:15 – 12:30 pm Break

12:30 pm – 1:00 pm Karen Marrongelle, NSF Chief Operating Officer and Brian Stone, Chief of Staff

Dr. Jones welcomed Dr. Marrongelle and Mr. Stone and highlighted the work of the Committee including the Strategic Roadmap and recommendations on Minimizing the Environmental Impacts of Research. The Committee then discussed with Dr. Marrongelle how the Committee could support NSF when fostering the creation of new research disciplines and programs, how to support NSF in reviewing interdisciplinary and convergent research proposals, and how to increase the focus on environmental education. Dr. Marrongelle agreed that supporting interdisciplinary and convergent research and training reviewers can be challenging and noted that she looks forward to hearing recommendations in the Strategic Roadmap.

1:00 – 2:00 pm Lunch

2:00 pm – 3:30 pm Meeting with the NSF Working Group on Environmental Justice to provide feedback on the agency strategy in response to Executive Order 14096, Revitalizing Our Nation’s Commitment to Environmental Justice for All

Caroline Blanco, Assistant General Counsel, Office of the Director

Wendy Graham, Division Director, RISE/GEO

Carlos Martinez, AAAS S&TP Fellow, RISE/GEO

Elaine Shen, NOAA Knauss Sea Grant Fellow, OCE/GEO

Moderators: Robin Leichenko and Raina Plowright

Ms. Blanco is the NSF tribal liaison and co-chair of the Tribal Consultation Work Group and as such, gave the Committee an overview of NSF’s new tribal consultation policies in the Proposal and Award Policies and Procedures Guide ([PAPPG](#)). The discussion touched on how the policy would be enacted in regard to who gives permission and who is responsible for determining impact.

Dr. Martinez then gave an overview of the Executive Order *14096 Revitalizing Our Nation’s Commitment to EJ for All* and NSF’s Strategic Plan outline for feedback from the Committee. The discussion touched on the need for metrics, engaging with impacted communities, the challenges in engaging communities in the award funding timeline of a few years, how environmental justice could be addressed in broader impacts, the potential for administrative burden on under resourced communities, the need for guidance in how to do environmental justice work equitably, and potentially holding a workshop with organizations that are already doing this work to help inform NSF’s work in this area.

Ms. Blanco then went over the [Environmental Checklist](#) used to gain a better understanding of potential environmental impacts of proposed projects. This checklist is used as an initial screening tool and gives an idea of what to follow up on. Follow up may or may not lead to further environmental assessment and possibly reports on environmental impacts.

3:30 pm – 3:45 pm Committee Wrap Up

Dr. Jones, Dr. Pierce, and Dr. Meacham gave closing remarks and thanked the committee and the NSF staff for their time.

3:45 pm Adjourn Day 2