

## **Advisory Committee for Environmental Research and Education (AC ERE)**

June 5, 2020

### **Summary Minutes**

**Committee Members in Attendance:** Raymond Arnaudo, Megan Bang, Lora Billings, Ann Bostrom, Andres Clarens (Chair), Peter Huybers, Charles Isbell, Maria Carmen Lemos, Patricia Matrai, Julia Parrish, Diane Pataki, Anu Ramaswami, Jeanne VanBriesen, Lisa White

**Guest Speakers:** Raina Plowright (Montana State University), Roxane Cohen Silver (University of California, Irvine), Samuel Myers (Harvard University)

**NSF Staff:** Brandi Schottel (OIA, Executive Secretary for AC ERE), Suzi Iacono (Office Head, OIA), Steve Meacham (Section Head - OD OIA), Margaret Martonosi (Assistant Director, CISE), Sean Jones (Assistant Director – Acting, MPS), Louise Howe (Program Director, ENG OAD), David Corman (CISE/CNS), Scott Freundschnuh (SBE/BCS), Amanda Adams (GEO/AGS), Kelvin Droege (Acting Director of NSF), Fleming Crim (COO of NSF), Una Alford (Program Analyst OIA). John Paul White (IT Specialist OIA), Katherine Ott (Compliance Officer OIRM/DAS), Angel Ntumy (NSF Contractor OIRM/DAS), Michelle Jenkins (Conference and Events Specialist, OIRM/DAS)

**Notetakers:** Ashely Pierce (AAAS S&T Fellow CBET), Tammy Wilbert (AAAS S&T Fellow EFMA)

#### **Friday – June 5, 2020**

**NSF Senior Hosts: Suzi Iacono (Head OIA)**

#### **10:00 – 10:20a      Welcoming Remarks, Suzi Iacono (OIA) and Andres Clarens (AC ERE Chair)**

Dr. Clarens welcomed the committee and thanked everyone for attending in difficult times. Dr. Clarens welcomed a new committee member, Dr. Megan Bang, and explained the staff change from Dr. Leah Nichols, who has left NSF to Dr. Brandi Schottel as the executive secretary for the AC ERE. Dr. Clarens noted that the majority of the June 5 meeting would be spent discussing global environmental change, the COVID-19 crisis, research disruptions, and how the AC ERE can contribute to NSF during this time.

Dr. Iacono acknowledged the challenging times everyone is facing. Dr. Iacono welcomed Dr. Megan Bang and noted those committee members who were rotating out (Dr. Kate Brandt, Dr. Richard Loft, and Dr. Margaret Lowman). She then provided a brief update on NSF's budget and on NSF's internal and external response to COVID-19.

#### **10:20 – 10:35a      Directorate for Computer and Information Science and Engineering, Margaret Martonosi (Assistant Director, CISE)**

Dr. Martonosi briefly introduced herself and some of the efforts in CISE to address COVID-19. She also identified where CISE was investing in areas important for the AC ERE and briefly introduced the [Smart & Connected Communities](#) solicitation launched in 2017 and the [Civic Innovation Challenge](#) to launch this year.

#### **10:35 – 10:50a      Directorate for Mathematical and Physical Sciences, Sean Jones (Assistant Director, MPS)**

Dr. Jones introduced some of the programs and initiatives in MPS that are advancing ERE fields. These included Sustainable Chemistry initiative ([SuSChEM](#)), Critical Aspects of Sustainability ([CAS](#)), an

FY20 [Dear Colleague Letter on micro- and nanoplastics](#), DMR polymers program, and a DMR and MRS partnership supported symposiums on sustainability. Dr. Jones left the committee with several questions: (1) What are important shared needs for facilities and cyberinfrastructure? (2) Does the AC ERE have advice on outreach strategies to help MPS cultivate and educate future generations of scientists? (3) How can NSF leverage the deep disciplinary expertise in MPS communities to promote the broad, multi-faceted goals of environmental research and education? The discussion with the committee touched on how to encourage more interdisciplinary work in the MPS directorate.

**10:50 - 11:20a Committee Discussion: Impacts of COVID-19 on the Research Community, Steve Meacham (OD OIA)**

Dr. Meacham started the conversation with the committee to inform NSF on COVID-19 research disruptions. Committee members raised concerns over the student to professor pipeline continuing to senior scientists who are faced with gaps in CVs, loss of funding, loss of job opportunities, loss of laboratory, field, and survey research, issues with visas for foreign post docs, and decisions between continuing at work or retiring early depending on health risk categories. Concerns were also raised regarding vulnerable and underrepresented groups during this time and the potential for a decline in publications and proposals from women, vulnerable groups, parents with no childcare options, people with elder care responsibilities, etc. Committee members agreed that no cost extensions on grants are useful but also discussed the need for longer-term solutions to restore careers such as extending deadlines and requirements (i.e. CAREER requirements), new supplements (e.g. REU-like and work/life balance), and new training programs to fill gaps in CVs. Committee members and NSF representatives agreed that the future of work is now, and support is needed not only for virtual platforms, but also a reimagining of research and education processes into the future may be necessary.

**11:20 --11:40a Report out from NSF COVID 19 Working Group, Louise Howe (ENG)**

Dr. Howe introduced the committee to the NSF working group efforts in handling NSF's COVID-19 response. On March 4, the [COVID-19 Dear Colleague Letter](#) (DCL) was released to encourage Rapid Response Research (RAPID) and (EARLY-Concept Grants for Exploratory Research (EAGER) submissions addressing COVID-19. On March 5, CISE released a complementary [COVID-19 DCL](#) followed by an [SBIR/STTR DCL](#) on March 25. On March 27, the [CARES Act](#) appropriated \$75 million for NSF to support COVID-19 research. NSF has made 622 COVID-19 related awards to date for a total of \$107 million in research funded. NSF focused on three major topic areas: (1) Understanding SARS-CoV-2 (function, origin, genome, discovery); (2) predictive understanding of virus spread; and (3) approaches to mitigating the negative effects of COVID-19 (PPE, air filtration, impact of COVID-19 on supply chains, infrastructure, social and economic institutions, and optimization of mitigation efforts). Dr. Howe described several main themes of the awarded COVID-19 research; biology of the virus, predicting spread, detecting the virus, limiting the spread, impact of behavior, and impact on society. Dr. Howe presented examples of funded research from the different directorates. All three DCLs are archived, and NSF now is interested in broader scale research related to COVID-19.

**12:00 - 12:45p Public Health and Environmental Research Panel, moderated by Andres Clarens (AC ERE Chair)**

**Raina Plowright (Montana State University)**

Dr. Plowright introduced her interdisciplinary research on bats in Australia and spillover events of the Hendra virus. Dr. Plowright's research group has found that, during times when there are food shortages, bat populations fission and remain in horse pastures. During this time, bats excrete more Hendra virus and other viruses, causing an increase in spillover events. During years with plenty of food for the bat population, there is less fissioning and the bats roam further across the landscape.

These more plentiful years lead to fewer observed spillover events. The results of the data indicate sustainable ecological levers for public health that include wildlife habitat restoration, a better understanding of wildlife distribution and infection, and identification of patterns of human-wildlife interactions.

### **Roxane Cohen Silver (University of California, Irvine)**

Dr. Silver's research focuses on innovative population-based methods to study human responses to community disasters. These community disasters are hard to study because they are random, unpredictable, uncontrollable, and a shared experience among many individuals. Examples of Dr. Silver's research include RAPID funding to study the effects of Hurricane Irma and a current RAPID award for COVID research. Some major takeaways from these projects are that research on community disasters is interdisciplinary, methodologically rigorous research is difficult but possible, population-based data collection is required, early funding is critical, and having teams in place before a disaster occurs greatly improves the ability for good research to occur quickly.

### **Samuel Myers (Harvard University)**

Dr. Myers focuses on planetary health and specifically on how large environmental issues impact human health. Dr. Myers introduced some of his research on planetary health and nutrition. One study on carbon dioxide (CO<sub>2</sub>) emissions found that increases in CO<sub>2</sub> will cause loss of nutrients from stable food crops while another study on global pollinator declines found that a 50% loss of pollination would lead to more than 700,000 excess human deaths. Furthermore, global changes in fisheries due to increased sea surface temperatures will affect greater than a billion people who are receiving more than 20% of the vital nutrients from fish. Some challenges to doing this kind of research included surprises that occur across the planet (e.g. COVID-19 and the breakdown in international food trade), the increased frequency of disruptions and transformations of environments, and the lack of funding for training, promotion, and funding structure in traditional science fields to support the kind of interdisciplinary and collaborative work that is needed to understand these issues.

### **12:45 – 1:30p Public Health and Environmental Research Discussion, Moderated by Andres Clarens (AC ERE Chair)**

A main theme of the panel centered around complex systems, how to understand them, and how to make changes that lead to improvements. The discussion touched on how to predict events into the future, synergies between different research communities, the need for interdisciplinary reviewers, the need for more research on entire systems, and how to cultivate and support interdisciplinary teams.

### **1:30 – 2:00p Committee Discussion on Potential Future Steps**

The committee was interested in developing a short white paper that would describe important research questions for public health connections to the environment. The committee agreed that now is an opportunity to understand complex systems better because COVID-19 is a global shock to a lot of social and environmental systems. There was also discussion on how to prevent the next pandemic, building back better in the wake of the pandemic, use of data already available, issues of equity, and co-occurrence of multiple shocks (e.g. pandemic and a hurricane or earth quake).

### **2:00 – 2:20p NSF Programs**

#### **Civic Innovation Challenge, David Corman (CISE/CNS)**

Dr. Corman introduced the Civic Innovation Challenge ([CIC](#)) which is a partnership between the Department of Energy (DOE) and the Department of Homeland Security. There are two tracks, a communities and mobility track and a resilience to natural disasters track with plans to create sub-

tracks to specifically address pandemics. This is a two-stage challenge, there will be about 12 planning grant awards for \$50,000 and 3-4 full awards for \$1 mill. for a year that are only accessible to planning grant awardees. I boot camp with NAF and metrolab works with the communities and academia to put together project ideas and stage 2 proposals. The challenge makes the community the driver of the research agenda and focuses on co-creation of research.

#### **Coastlines and People: Scott Freundschein (SBE/BCS) and Amanda Adams (GEO/AGS)**

Dr. Freundschein and Dr. Adams reported to the committee on Coastline and People ([CoPe](#)), a program primarily funded by GEO and managed by GOE, BIO, EHR, ENG, and SBE. CoPe aims to build capacity in research communities and has so far funding workshops, EAGERs, and research coordination networks. CoPe is now ready to start funding coastal research hubs to support convergence science focused on coastal hazards and how to address them through a range of spatial and temporal scales. There will be two tracks for the hubs, focused hubs that require \$1 mill. or less a year and large-scale hubs that require \$2-4 mill. per year. A question was raised on if living marine resources (e.g. tourism or fisheries) were included and it was clarified that all hazards relevant to coastlines and people were topics for funding. Another question touched on the tension between basic science and stakeholder interests and partnerships with other organizations. Partnerships are welcome and are not necessarily money based and at the large hubs it's reasonable to expect that not every single research question would be interdisciplinary or basic science.

#### **2:35 – 3:15p Preparation for Discussion with NSF Senior Leadership**

The committee discussed what to talk about with Dr. Kelvin Droegemeier and Dr. Fleming Crim. The discussion with Dr. Droegemeier would be about the Trillion Trees Initiative. While the discussion with Dr. Crim would be an update on the work that the committee and subcommittees are doing. The discussion would also focus on what needs to be done to restart universities and what Dr. Crim views as priorities for NSF.

#### **3:30 – 4:30p Discussion with NSF Office of the Director**

##### **Kelvin Droegemeier – Acting Director of NSF/ Director of the White House Office of Science and Technology Policy (OSTP)**

Dr. Droegemeier outlined the One Trillion Trees (1TT) Initiative that the president committed to at the [2020 World Economic Forum](#). This initiative aims to plant one trillion trees over the next 10 years. OSTP's role is to help coordinate agencies in the development of a tree budget to understand how many trees are gained or lost across the US and understand how much carbon is sequestered by trees. In addition, OSTP also aims to help develop metrics for planting the trees (when, where, and what type of trees) and the creation of an app to track the health of these trees.

##### **Fleming Crim – COO of NSF**

Dr. Crim gave a brief update on NSF that included changes in leadership (the director and two new ADs), NSF's 70<sup>th</sup> anniversary, and the 2021 budget request. Dr. Crim also gave an overview of changes at NSF in response to COVID-19. Currently, only about 35 people are in the NSF building each day, mainly for maintenance and security. Phase 0 reopening will start the following week. NSF seamlessly transferred to 100% telework and was able to introduce flexibilities to try and make it easier on the workforce. So far, NSF has received similar numbers of proposals and made about the same awards as this time last year. Multiuser facilities and major construction projects are going to have a lot of setbacks from COVID-19 interruptions. NSF, through the recovery planning task force, has discussed and planned how the NSF staff will come back work safely and implement needed changes quickly for the research community to do the same. The research workforce is vulnerable to negative impacts from these disruptions, and NSF is committed to understanding these impacts and potentially mitigating them. The discussion that followed centered on issues around the job market for early

career scientists and students, gender inequities and impacts, and how to support the return to research post-COVID-19. Dr. Crim indicated that a white paper on research gaps from the ERE related to public health and environmental research would be welcome. The Environment and Human Security and the Education subcommittees gave an update on the status of the work being done in those subcommittees that was delayed due to COVID-19. Additionally, a subgroup interested in co-production topics outlined what they might do moving forward, but no official steps (no subcommittee formation) have been taken yet.

#### **4:30 – 5:00p AC ERE Business: Next Steps and Wrap-up**

The minutes from the last AC ERE meeting were approved and the Education and the Environment and Human Security subcommittees addressed the status of report drafts.

Ideas for the short white paper planned for public health and environmental research included: (1) Identifying directorates that received fewer COVID-19 RAPID inquiries for ideas that may not have been funded yet; (2) Transdisciplinary research and how people understand complex global change on a longer time scale than normal research (3) Environmental impacts resulting from change in behavior on a global scale; (3) World of the future research that needs to be happening now; (4) Education and workforce impact at both end of the pipelines; and (5) Identifying partnerships outside of the normal disciplinary boundaries that are more helpful in the COVID-19 or global change context. This is potentially an opportunity to illustrate to Congress what NSF could do with more money to address this kind of issues.