

AC-ISE Meeting Minutes



**National Science Foundation
Advisory Committee for International Science and Engineering
June 18-19, 2018
2415 Eisenhower Avenue • Alexandria, VA**

AC-ISE Members in Attendance:

Susan Avery (Chair) (virtual); Jay Cohen (virtual); Meg Lowman (virtual); Caroline Wagner; Anne Petersen; José Fortes; Nai-Chang Yeh

AC-ISE Members Not in Attendance:

Julio Ibarra; Steve McLaughlin

Day 1- June 18, 2018

Introductions and Opening Remarks

Susan Avery, Chair

Dr. Avery, Chair of the National Science Foundation Advisory Committee for International Science and Engineering (AC-ISE) called the meeting to order by welcoming all participants to the meeting and thanking them for their attendance. Dr. Avery then initiated a motion to approve the meeting minutes from the virtual AC-ISE meeting on May 24, 2018, and the in-person AC-ISE meeting on January 26, 2018. The Committee approved the minutes of both meetings.

OISE Cluster Activities

Anne Emig, Office of International Science and Engineering (OISE) Programs and Analysis Cluster Lead
Jessica Robin, Office of International Science and Engineering (OISE) Countries and Regions Cluster Lead

Anne Emig gave a brief overview of OISE's funding programs such as the International Research Experiences for Students (IRES) and Partnerships for International Research and Education (PIRE). She mentioned that new IRES tracks that were implemented in the last solicitation and discussed current learning and management activities during the current PIRE off-year. She addressed OISE's increased focus on networks-of-networks, including a potential new programming area (Accelerating International Collaboration through Networks - AccelNet). Ms. Emig noted that OISE anticipates funding workshops in the near future which focus on team and network science and exploring partnership opportunities with counterpart funding agencies and other partners. She also highlighted OISE's increased capacity in the field of data analytics related to OISE programs, specifically mentioning how increased coordination with NSF's business enterprise systems have yielded more impactful, reproducible international data. She concluded by asking the AC-ISE for advice on which approaches or opportunities might be pursued by OISE to support U.S. basic research and education in the international arena.

Jessica Robin began by thanking Joe Miller (Program Manager, OISE) for his service as Acting Cluster Lead for Countries and Regions from June 2017 through March 2018. Dr. Robin briefly mentioned the OISE staff members who are part of the Countries and Regions cluster and addressed the diplomatic and science collaboration aspects of the cluster's portfolio. She also mentioned NSF Director, Dr. France Córdova's, recent and upcoming international travel, as well as the upcoming Embassy Science Fellows program. Dr. Robin concluded by asking the AC-ISE for recommendations on identifying and enhancing regional and multilateral collaborations

Caroline Wagner advocated for engaging with developing countries and expanding the global knowledge network. She also stressed the importance of connecting with countries engaged in frontier research and bringing the concepts and ideas back to the U.S. (the reintegration opportunity). One of the challenges identified by the AC-ISE was the difficulty of quickly identifying opportunities for funding research and publishing solicitations. Mr. Cohen noted from a national security perspective that OISE would benefit from sharing knowledge and fostering robust exchange with other non-science funding organizations, particularly in the Arctic, such as National Oceanic and Atmospheric Administration, U.S. Coast Guard, and the Office of Naval Research. Overall, Mr. Cohen commented on pursuing greater knowledge share and exchange between the interagency. Dr. Keiser added that Dr. Córdova would be representing the U.S. at the 2nd Arctic Science Ministerial in October 2018. She also thanked Dr. Wagner for her remarks on engaging countries involved in frontier science efforts and how that philosophy encapsulates the new MULTIPLIER approach (addressed below).

The AC-ISE also proposed partnering in a limited extent with U.S. professional societies to identify promising international research networks, however an analytic matrix pertaining to the NSF's Ten Big Ideas is needed to avoid overlooking frontier research in developing countries while investigating networks. Dr. Avery advocated going through overseas campuses of U.S. universities, and foreign universities with U.S. operations, due to their rich knowledge of the respective country's S&T landscape and long-term perspective on the development of ideas. Dr. Wagner brought up the Kavli Foundation as a potential source of opportunities. Dr. Rebecca Keiser, Office Head, OISE thanked the AC-ISE for the idea, noting that it would complement "Renewing NSF," a Foundation-wide effort to examine ways to improve NSF efficiency and effectiveness.

Two final questions that the AC-ISE posed to OISE were: 1) as it transitions from physical international offices how will NSF maintain international connections; and 2) is it possible to estimate the additional work OISE is doing to support NSF as it represents the U.S. S&T interests in global fora in the absence of a Director for the White House Office of Science and Technology Policy (OSTP). Dr. Keiser acknowledged that it is a significant effort on the part of OISE to support the NSF Director at international multilateral meetings (addressed below).

OISE Challenges and Opportunities

Rebecca L. Keiser

Dr. Keiser began the session by asking the AC-ISE for their input on how OISE can have a greater impact at NSF, particularly within the Directorates. She commented on the need to bolster OISE's connections across the Foundation and utilize the National Science Board (NSB) to help promote OISE's role to the scientific community as well as with other stakeholders. Dr. Keiser noted that several members of the NSB, including the new NSB Chair Diane Souvaine, are interested in international collaboration. She also sought the AC-ISE's input on which types of analytics would be most helpful in aiding the U.S. research community to identify international collaboration opportunities moving forward. The last question that Dr. Keiser posed to the AC-ISE was how NSF should engage with Europe post-Brexit.

Dr. Wagner began the conversation by asking how OISE and NSF should be thinking about how the Foundation should demonstrate and maintain U.S. global science leadership through collaboration. She commented on the bottom-up approach wherein international collaboration at NSF arises from Program Officers and through the research Directorates support. Dr. Keiser added that the method of deciding when and how to collaborate on an international level is ad hoc and based more on interest and opportunities than on specified criteria. Dr. Wagner mentioned that in her opinion one of the largest barriers to conducting NSF-funded research on an international level is misalignment of funding among research funding entities. She commented on how the U.S. could potentially miss out on collaborative research opportunities because a P.I. may be getting funded by non-U.S. science funding agencies that are faster and more flexible than those in the U.S. Mr. Cohen noted the tension between the long-term perspective and benefits of research and the need to communicate the quick, short-term benefits to stakeholders, and suggested that the long-term perspective should dominate in communication. Dr. Avery suggested strategizing to develop innovative mechanisms for international collaboration connected to current workstyles and methods. Dr. Keiser proposed an NSF international strategic plan with two main goals: 1)

analyzing and communicating the impact of international collaborations; and 2) establish and addressing international priorities.

NSF's MULTIplying Impact Leveraging International Expertise in Research (MULTIPLIER) Approach

Rebecca L. Keiser

Dr. Keiser began the session by reviewing NSF's past overseas offices model, which had offices in Brussels, Belgium; Beijing, China; and Tokyo, Japan. She acknowledged that the overseas offices played a key role in assisting with international representation and fostering connections and analysis, despite the challenges of operating with one full-time NSF employee and one or two Locally Employed Staff. She emphasized that while the overseas offices did high-caliber work, limited resources did limit their impact. In an effort to increase impact, reach, and flexibility, NSF decided to transition to a new international approach. The new approach is called MULTIplying Impact Leveraging International Expertise in Research (MULTIPLIER).

Dr. Keiser outlined the details of MULTIPLIER, namely to:

- a) Identify international opportunities for potential funding;
- b) Develop a team of subject-matter experts—those who speak the “language of science” and know how to communicate with in-country researchers and organizations;
- c) Participate and lead short-term mission(s) for one week;
- d) Establish and identify clear goals from the beginning of the mission's development and base mission location on specific criteria;
- e) Conduct potential follow-up, which may include workshops, repeat visits, and other forms of collaboration.

Dr. Keiser also mentioned that she is looking into bringing in a project manager to run the MULTIPLIER approach initially. She added that the first three MULTIPLIER missions have been planned: 1) a synthetic biology mission to the U.K. and Germany at the end of June 2018; 2) a large facilities mission to China in early July 2018 to visit the deepest underground laboratory in the world; and 3) a quantum science mission to Japan in September 2018. Joe Miller and Claire Hemingway (Program Manager, OISE), who will be the OISE team leaders for the U.K./Germany and China missions respectively, shared further details on the planning for each trip. Dr. Miller commented that the MULTIPLIER mission to the U.K. and Germany will help the four NSF division that handle synthetic biology work better by facilitating conversations with international counterparts. Dr. Hemingway shared that a main purpose of the MULTIPLIER trip to China will be to advance China's engagement in the Group of Senior Officials (GSO) on Global Research Infrastructures meetings and the framework for collaborations on research infrastructure and improve understanding of China's research infrastructure. Dr. Hemingway mentioned Mr. Matthew Hawkin's role as Head of the Large Facilities Office at NSF, as well as point person for the GSO.

Dr. Wagner asked how the U.S. research community would benefit from the trip to China, and how the information from the visit would get back to the U.S. She suggested that OISE not write a report but make a video from the trip to the large facilities in China, expressing that video is more engaging and makes for better public optics. Dr. Wagner then asked how the material and subsequent research gleaned from MULTIPLIER missions would be ethically handled, particularly regarding synthetic biology. The AC-ISE also asked what the real value added of the MULTIPLIER missions would be in comparison to the overseas offices. Dr. Keiser responded that the overseas offices were created in the 1960s and 1970s. Since then, advances in information technology and global connectivity have shaped the S&T landscape to the point where it is not necessary to have physical, brick-and-mortar offices. Mr. Cohen commented on emphasizing the conceptual link, i.e. what NSF is trying to accomplish, to MULTIPLIER missions, advocating that this in turn will assist in exemplifying the strategic scientific priorities of the MULTIPLIER approach. Dr. Avery suggested soliciting the NSF research Directorates for advice on MULTIPLIER criteria for missions, tapping into their general knowledge for hot topics and important scientific updates in their respective fields. Dr. Keiser then asked for the AC-ISE's help in spreading the word on a recent blog written by Dr. Córdova on MULTIPLIERS (published June 4, 2018).

Working Lunch- International Collaborations – Update on Data and Visualization Tools

Paul Morris, Program Manager, Office of Integrative Activities

Dr. Morris, Program Director in the NSF Office of Integrative Activities (OIA), presented data analysis tools. He emphasized that it is hard to make decisions without data and reinforced the need for building a fast and simple search capability for proposals submitted to NSF. NSF now has a tool to cluster documents in specified topic areas. Dr. Morris noted that NSF is leveraging funding toward artificial intelligence in machine learning research and can incorporate those results into peer-review analytics.

Dr. Morris demonstrated numerous screen shots that displayed the following:

- Literary matching between an NSF proposal and science publication or NSF proposal and a patent;
- Performing a query within the search tool on a live dashboard, which allows NSF to respond to queries and request information at a quicker rate; and
- Showing two-dimensional topology maps.

The AC-ISE asked about two-dimensional maps and how the data can be used to generate information on international research activities, i.e. at the patent stage and not frontier research. Dr. Morris noted that the tools are internal to NSF.

The AC-ISE then paused to move from the main conference room to another public NSF conference room for the guest lecture.

NSF Guest Lecture: “Global Perspective on Social Media, Persuasion, and Public Life” Samuel Woolley, Research Director of the Digital Intelligence Lab, Institute for the Future

The AC-ISE attended Dr. Woolley’s guest lecture (open to all of NSF) titled “Global Perspectives on Social Media, Persuasion and Public Life”. He began his presentation by discussing his research focus at the intersection of technology and public life, and using collaboration to study automation, persuasion and communication. His overarching question was what role persuasion over social media plays in public life. Dr. Woolley presented his country case studies which demonstrated three broad findings regarding social media and public life, powerful persuasion in all countries, and civil society’s response. His methods ranged from qualitative to quantitative, i.e. measuring influence by K-score decomposition and using tools such as botnets and human groups. He went on to describe the theory of “the biology of disinformation” and describing fake news as a “pathogen”. Dr. Woolley’s forthcoming research will examine the effects of online persuasion via a series of experiments and studying the diffusion of digital propaganda.

At the end of the presentation, the AC-ISE reconvened in the main conference room to resume the meeting.

NSF Engagement in International Multilateral Meetings/Efforts Rebecca L. Keiser

Dr. Keiser began the session by providing an update on NSF’s increased involvement representing the U.S. Government in multilateral organizations and at global fora. She then asked the AC-ISE’s thoughts on ways to leverage this role to better benefit the U.S. research community. She noted that Dr. Córdova was the chief U.S. representative to multiple delegations. She attended the Global Research Council (GRC) Annual meeting in Moscow, Russia, in May 2018, and the Next Einstein Forum (NEF) Biannual Global Gathering in Kigali, Rwanda in March 2018. She will participate in the Carnegie Group Meeting of Science Ministers in September 2018 in Banff, Canada, with Dr. Keiser serving as the G7 Sherpa, and will head the U.S. delegation to the 2nd Arctic Science Ministerial in October 2018 in Berlin, Germany. The challenges associated with the increase in multilateral participation at the Director’s level are a spike in work level for OISE, which takes a great amount of time and level of effort on the part of OISE staff.

Program Officers from OISE went into more detail about certain multilateral events and organizations. Mangala Sharma discussed global coordination on research facilities under the G7. The G8 Ministers set up a working group to talk about good practices in managing scientific resources, called the GSO on Global Research Infrastructures. Now under the G7, the GSO meets twice per year. The U.S. hosted the last meeting in May 2018, which featured a visit to the MagLab National Laboratory in Florida. The country participants included G7 countries and Mexico, Brazil, and Australia, which have a large presence in global research infrastructure. Dr. Sharma also discussed the upcoming G7 Carnegie Group Meeting of Science Ministers, which will take place in Banff, Canada, in September 2018. A G7 Sherpa meeting will also take place at this time to discuss the various G7 working groups that have been set up, including research infrastructure and open science.

Roxanne Nikolaus gave a brief overview of the 2nd Arctic Science Ministerial. The meeting brings together science ministers and representatives of Arctic indigenous groups to further scientific collaboration in and about the Arctic. The Ministerial will center on three themes: Arctic observations, data, and infrastructure; dynamics of change in the Arctic, and vulnerability and sustainability of Arctic communities and ecosystems. One of the main products of the ministerial is joint statement of ministers highlighting activities on which the signatories agree to focus. Ms. Nikolaus then continued to speak about Horizon Europe, the upcoming E.U. research framework that will continue from the Horizon 2020 research framework. This €100 billion investment, which will cover 2021 through 2027, is set up under three pillars: open science, global challenges, and open innovation.

The AC-ISE asked whether the E.U. has asked for U.S. input on Horizon Europe. Ms. Nikolaus replied that they have not asked for input per se, only global input. Ms. Nikolaus then mentioned that one of the bureaucratic barriers to U.S. researchers working with European colleagues under Horizon 2020 is concern with adherence to the Horizon 2020 Grant Agreement. An Implementing Arrangement has been put in place to facilitate cooperation but has not solved all the challenges. Ms. Nikolaus added that the U.S. hopes to work with the E.U. on Horizon Europe to further address challenges of U.S.-E.U. research collaboration.

The AC-ISE then asked how engagement in these high-level multilaterals benefits the U.S. research community via OISE efforts, adding that in other countries the Minister of Science typically would be the representative. The AC-ISE noted that if an OSTP Director were in place, he or she likely would represent the U.S. at those high levels. Dr. Keiser replied that NSF access into this global scientific landscape and delving deeply into international issues provides an invaluable perspective and opportunity. She added that connections and conversations with Science Ministers helps NSF better assess, engage in, and respond to global issues related to the conduct of research. The AC-ISE asked to what extent science policy takes shape in these high-level meetings. Dr. Keiser acknowledged that it is somewhat unclear since statements are written before the meetings, and the discussions during the meeting can reveal additional issues not addressed beforehand. Many issues also end up being dealt with at a working level after the meeting. Dr. Avery agreed with Dr. Keiser that participation in high-level multilaterals elevates the position of NSF, though it is a significant effort and burden on the OISE staff.

CLOSED SESSION – New Approach to the Board on International Scientific Organizations (BISO)

Rebecca L. Keiser

Meeting minutes were not recorded during the closed session

Dr. Avery adjourned Day 1 of the AC-ISE meeting at approximately 4:30 p.m.

Day 2- June 19, 2018

Preparation for the conversation with France A. Córdova, Director, NSF; Joan Ferrini-Mundy, Chief Operating Officer, NSF; and Brian Stone, Chief of Staff, NSF

Dr. Avery opened the second day of the AC-ISE by leading the Committee members in brainstorming topics for their hour-long meeting with Dr. Córdova and NSF leadership. The AC-ISE agreed on the need to emphasize a stronger framing of overseas offices closure in a positive manner, by closing the communication gap between NSF

and the research community. The Committee also agreed to acknowledge OISE's heavy workload, as well as some constraints that they are operating under, and how the Committee can aid OISE and the Foundation as a whole.

Regarding the new MULTIPLIER approach, the Committee recommended proposing a process or strategy to effectively manage MULTIPLIER missions, i.e. a partnership with professional industries or foundations, and coordinating with others to get expert feedback. Another recommendation the AC-ISE agreed raise during the meeting with Dr. Córdova included reaching out to professionals who have good international connections, as well as Principal Investigators (PIs). Dr. Meg Lowman advised the need to reinforce the importance of language and communication during the MULTIPLIER initiative.

Additional MULTIPLIER-related topics that the AC-ISE members agreed to raise with Dr. Córdova included enabling international collaboration, strategic leadership for international science, adding resources to OISE (i.e. a rotator), funding (i.e. aligning dollars for MULTIPLIER missions), and bringing together key science leaders. The Committee also agreed to discuss flagship projects and emerging areas with the Director.

Conversation with France A. Córdova, Joan Ferrini-Mundy, and Brian Stone

Dr. Anne Petersen opened the session by expressing the AC-ISE's gratitude to NSF for playing a large role in international science, and to OISE for fostering science diplomacy initiatives and international collaborations.

Dr. Caroline Wagner echoed Dr. Petersen's sentiments, and indicated her enthusiastic support of AccelNet and MULTIPLIER initiatives. She then suggested that the NSF Office of the Director provide a broader statement regarding MULTIPLIER and international strategy to the U.S. scientific community as a way to resolve uncertainties and assuage anxieties caused by NSF's closure of the international offices in Brussels, Beijing, and Tokyo. Dr. Wagner provided some specific examples of broader support such as bolstering efforts from the Director's June 4, 2018 Blog Post ("NSF's Commitments to Global Partnerships"), and exploring potential avenues of involvement from the AC-ISE. Dr. Córdova and Dr. Ferrini-Mundy indicated the importance of implementation, and described how the first MULTIPLIER missions will be akin to pilots, i.e. to determine how subject-matter experts will work together; how to identify the best sites/research topics; and how to develop an annual MULTIPLIER nomination process. Dr. Córdova emphasized the importance of having a strong Program Director for MULTIPLIER who is well versed in implementation science. Dr. Keiser mentioned that the AC-ISE had suggested providing supplements to NSF-funded PIs with good strategic ideas to operationalize MULTIPLIER. Dr. Córdova then referenced the "International + X" strategy (X indicating a different discipline, e.g. International + Synthetic Biology) as a framework for formulating how OISE can adopt a leadership stance with NSF Directorates.

Dr. José Fortes commented that OISE is well positioned to take advantage of opportunities through strategic goals, yet the need for resources to uphold engagements is a current challenge. Dr. Fortes then asked Dr. Córdova what objectives she would like to see for OISE. Dr. Córdova indicated that OISE needs a strategic plan, comprising a robust evaluation process, future collateral outcomes from MULTIPLIER excursions, and scaling for impact and strong direction. Dr. Córdova then cited the "Inclusion across the Nation of Communities of learners of Underrepresented Discovers in Engineering and Science" (NSF INCLUDES) as a positive example of the theory of change that could be relevant to an OISE strategic plan. Dr. Keiser suggested the idea of convening a strategic planning retreat in the near future for MULTIPLIER.

Dr. Córdova also recommended that OISE achieve results from the current NSF Ten Big Ideas, as well as the new Big Ideas in 2026. Dr. Nai-Chang Yeh recommended that OISE pursue partnerships and linkages with professional societies with strong international ties in emerging fields, such as nanoscience, astrophysics, theoretical physics, artificial intelligence, and cybersecurity. Dr. Córdova expressed how it might be wise to add members with expertise in these fields to the AC-ISE.

Dr. Córdova shifted the conversation to multilateral meetings, speaking to the idea that international ministerial meetings are a test of the U.S. role in science moving forward and advancing a need to develop collaborative statements with other countries. Dr. Lowman commented on how NSF's leadership will affect the next generation, particularly women in STEM fields from developing nations. Dr. Córdova then referenced her recent trip with Dr.

Keiser to Rwanda to participate in the Next Einstein Forum Global Gathering and expressed interest in further capitalizing on that initiative.

Dr. Córdova then thanked the AC-ISE for their participation.

Planning for AC-ISE Future Meetings and Membership

Susan Avery and Rebecca L. Keiser

Dr. Avery encouraged the AC-ISE members to provide ideas for new Committee members to fill the four upcoming vacancies. The Committee also discussed key takeaways from the conversation with Dr. Córdova, including the development of an international strategic plan. Additional recommendations for OISE included adding a Program Manager for MULTIPLIER, as well as an East Asia Pacific Program Officer to handle the large regional portfolio. Dr. Keiser recommended adding open science and open access as a topic at the next AC-ISE meeting so that OISE can brief the Committee on upcoming multilateral meetings and discussions on these topics. Dr. Keiser also agreed with the recommendation to develop a strategic plan, and to present an outline or framework at the next AC-ISE meeting, which would include criteria for and prioritization of international engagement, actionable items, and data analytics. Dr. Keiser also proposed developing the strategic plan using NSF staff from the Directorates, and then reaching out to the U.S. research community for input through a workshop. Dr. Wagner also suggested meeting with personnel from the National Security Council at the next AC-ISE meeting since they need OISE's input regarding the international research perspective. The next AC-ISE meeting should also include discussion with NSF experts who work on science and engineering indicators.

Summary of AC-ISE Recommendations:

- Develop an NSF international strategic plan. An outline or draft will be shared at the next AC-ISE meeting.
- Hire Program Managers for MULTIPLIER and the East Asia Pacific regional portfolio.
- Quantify the OISE workload related to preparations for NSF representing the U.S. at high-level, multilateral meetings.
- Improve communication with the research community regarding closure of the NSF overseas offices.
- Develop criteria and other guidelines for MULTIPLIER.
- Promote frontier scanning, including using early-career awardees, overseas campuses of U.S. universities and international universities, and international partners to identify frontier research areas (i.e. a new type of EAGER-like grant for researchers to investigate potential frontier opportunities, drawing on new CAREER awardees to assist in identifying these frontier areas internationally).

Dr. Avery adjourned the meeting at approximately 12:30 p.m.

END OF MEETING MINUTES

Minutes Approved

e-Signature, Susan Avery, AC-ISE Chair

June 18, 2019

Susan Avery, AC-ISE Chair

Date