

National Science Foundation
Directorate for Social, Behavioral, and Economic Sciences (SBE) Advisory Committee (AC) Meeting
May 10-11, 2018; Room E 3430, 2415 Eisenhower Avenue, Alexandria, VA 22314
Meeting Summary

SBE Advisory Committee (AC) Members Present: Dr. Kenneth Bollen, AC Chair, Department of Psychology and Neuroscience and Department of Sociology, University of North Carolina, Chapel Hill; Dr. Joseph Altonji, Economics Department, Yale University (via videoconference); Dr. Christopher Bail, Department of Sociology, Duke University; Dr. Ann Bostrom, Daniel J. Evans School of Public Policy & Governance, University of Washington (and Advisory Committee for Environmental Research and Education Liaison); Dr. Karen Cook, Department of Sociology, Stanford University; Dr. Nilanjana Dasgupta, Department of Psychological and Brain Sciences, University of Massachusetts at Amherst; Dr. Ruth DeFries, Department of Ecology, Evolution and Environmental Biology, Columbia University; Dr. Catherine Eckel, Department of Economics, Texas A&M University; Dr. John Gabrieli, Department of Brain and Cognitive Sciences, Massachusetts Institute of Technology; Dr. Arthur Lupia, Department of Political Science, Institute for Social Research, University of Michigan; Dr. Jennifer Richeson, Department of Psychology, Yale University; Dr. William Riley, Office of Behavioral and Social Sciences Research, National Institutes of Health (*Ex officio*); Dr. Linda Smith, Department of Psychological and Brain Sciences, Indiana University (via videoconference), and Dr. Duncan Watts, Microsoft Research.

NSF Staff in Attendance: Dr. France Córdova, Director, NSF; Dr. Joan Ferrini-Mundy, Chief Operating Officer, NSF; Dr. Fay Lomax Cook, Assistant Director (AD), SBE; Dr. Kellina Craig-Henderson, Deputy AD, SBE; Ms. Emilda Rivers, Acting Division Director (DD), SBE/National Center for Science and Engineering Statistics (SBE/NCSES); Dr. Samson Adeshiyani, Acting Deputy Division Director (DDD) and Chief Statistician, SBE/NCSES; Dr. Alan Tomkins, Acting DD, SBE/Division of Behavioral and Cognitive Sciences (SBE/BCS); Dr. Tamera Schneider, DDD, SBE/BCS; Dr. Daniel Sui, DD, SBE/Division of Social and Economic Sciences (SBE/SES); Dr. Katherine Meyer, Acting DDD, SBE/SES; Dr. Deborah Olster, Senior Advisor, SBE/Office of the Assistant Director (SBE/OAD); Mr. John Garneski, Staff Associate for Budget and Program Analysis, SBE/OAD; Ms. Madeline Beal, Communications Specialist, SBE/OAD; Mr. Anthony Teolis, SBE Administrative Coordinator, SBE/OAD; Ms. Clarissa Johnson, IT Specialist, SBE/OAD; Mr. Philip Johnson, IT Specialist, SBE/OAD; Dr. Rebecca Ferrell, Program Director, Biological Anthropology, SBE/BCS; Dr. Chu-Hsiang (Daisy) Chang, Program Director, Science of Organizations, SBE/SES; Dr. Colleen Fitzgerald, Program Director, Documenting Endangered Languages, SBE/BCS; Dr. Nancy Lutz, Program Director, Economics, SBE/SES; Mr. John Finamore, Program Director, SBE/NCSES; Mr. John Jankowski, Program Director, SBE/NCSES; Dr. May Aydin, Program Director, SBE/NCSES; Dr. Beethika Khan, Program Director, SBE/NCSES; Dr. Dawn Tilbury, Assistant Director, Directorate for Engineering; Dr. Meghan Houghton, Staff Associate for Strategic Engagements, Directorate for Computer & Information Science & Engineering; and others.

Summary

This was the first meeting of the SBE AC in 2018. The agenda included the following items: SBE Directorate Update; Implicit Bias Workshop; National Academies of Sciences, Engineering, and Medicine (NAEM) Reproducibility and Replicability in Science Study; NCSES Update; Partnerships and Partnership Planning at NSF; Strategic Planning/Grand Challenges in the SBE sciences; NSF's Big Ideas Updates; Report on the Advisory Committee for Environmental Research and Education (AC-ERE) Activities; Meeting with NSF Leadership, Sackler Colloquia on the Science of Science Communication; and Future Meetings, Assignments and Concluding Remarks.

Welcome, Introductions, and Agenda Preview (Dr. Kenneth Bollen, SBE AC Chair)

Dr. Bollen welcomed everyone to meeting, and introduced a new AC member, Dr. Christopher Bail, Associate Professor of Sociology at Duke University. Following around-the-table introductions, the AC voted to accept the summary of the fall 2017 AC meeting. Dr. Bollen then previewed the meeting agenda.

SBE Directorate Update (Dr. Fay Lomax Cook, AD, SBE)

Dr. Cook welcomed the AC and provided a brief update on staff transitions within the Directorate leadership and OAD. She then provided a budget update. In March 2018 the Congress passed the Fiscal Year (FY) 2018 Omnibus Appropriation Bill, which provides NSF with \$7.7 billion, an increase of \$295 million, or four percent, over the FY 2017 level. The FY 2019 President's Budget Request stipulates \$7.472 billion for NSF, which holds steady with the FY 2017 enacted budget.

Dr. Cook's presentation continued with discussion of NSF's 10 Big Ideas, and described the Foundation's new stewardship model for managing the them. The intellectual development of the Ideas will be done collaboratively by all the participating directorates/offices. The funding for each Big Idea will be centrally housed and managed within a single directorate on behalf of all participating directorates and offices. Dr. Cook also described the new Convergence Accelerators (CAs) that are being developed for two of the Big Ideas (The Future of Work at the Human-Technology Frontier; and Harnessing the Data Revolution). Convergence Accelerators are new organizational structures that leverage external partnerships to speed up convergent and translational activities. They house use-inspired basic research that advances ideas from the concept stage to deliverables. Dr. Cook then introduced Dr. Deborah Olster, who gave a brief introduction to the [NSF 2026 Idea Machine](#), a prize competition that invites researchers, the public, or any other interested stakeholder to submit entries for compelling research questions or challenges in fundamental science and engineering, to inform the next set of Big Ideas.

Dr. Cook resumed her presentation and described the NSF's [Strategic Plan for FYs 2018 – 2022](#). The plan has three strategic goals: 1) expand knowledge in science engineering and learning; 2) advance the capability of the nation to meet current and future challenges; and 3) enhance NSF's performance of its mission. Each strategic goal is fleshed out with specific objectives.

Dr. Cook concluded her presentation by highlighting SBE-funded scientists who have won prestigious awards. The most recent was Dr. Kristina Olson, University of Washington, who won the 2018 Alan T. Waterman Award. This annual award recognizes an outstanding young researcher in any field of science or engineering supported by the NSF. Dr. Olson was recognized for her "innovative contributions to understanding children's attitudes toward and identification with social groups, early prosocial behavior, the development of notions of fairness, morality, inequality and the emergence of social biases."

The discussion following the SBE update focused on the difference between CAs and the Big Ideas. Dr. Cook explained that the Big Ideas are about supporting convergent, fundamental research, while the CAs are time-limited structural entities intended to leverage external partnerships to facilitate convergent and translational activities in areas of national importance.

Implicit Bias Workshop (Dr. Nilanjana Dasgupta, University of Massachusetts, Amherst)

Dr. Dasgupta began by describing the goals, structure, and participants of the fall 2017 Implicit Bias workshop funded by SBE. The goals of the workshop were to: 1) summarize current theories of implicit bias and the historical context in which these theories emerged; 2) identify and summarize the current methods and measures that have been used to assess implicit attitudes and beliefs and to compare

them with explicit bias counterparts; 3) synthesize the current state of evidence about implicit social cognition as applied to social groups; 4) consider critiques of implicit cognition theories and measurement; and 5) make recommendations that would promote a productive and forward looking research agenda to substantially advance the field.

Dr. Dasgupta reviewed the methodologies used to measure group-related attitudes and beliefs, identified aspects of implicit social cognition around which the scientific community has reached consensus, and conveyed the workshop participants' recommendations for future investments by NSF. Several recommendations addressed methodology (measurement properties of implicit measures and cross-measure convergence) and theory. The latter included questions about linkages between implicit and explicit measures of group attitudes, beliefs and behaviors; how to reduce biases in behaviors; and the need for longitudinal field studies about implicit social cognition about groups and how these change over time.

Dr. Jennifer Richeson (Yale University, Discussant) emphasized that implicit bias is a real phenomenon, obviating the need for additional debate on its existence. Questions about measuring bias remain, and the categories that make up implicit bias are numerous. She noted the importance of understanding the relationship between implicit bias and behavior, and of communicating the science of implicit bias accurately. This is especially important as implicit bias awareness training has become extremely popular in workplace and other settings, despite the lack of evidence that such training effectively reduces bias. Dr. Richeson maintained that implicit biases are embedded in all of us, and we need to create structures/policies to circumvent them.

The ensuing discussion focused on how to more broadly and accurately communicate about implicit bias. AC members noted that it is important to convey that the Implicit Association Test does not predict behavior; and that implicit bias awareness training will not eliminate the bias. A suggestion was made to draft an executive summary of the workshop report for a public audience. The remainder of the discussion focused on possible remedies to reduce biases and recommended more research be done to test the efficacy of these remedies.

NASEM Reproducibility and Replication in Science Study (Dr. Barbara Wanchisen, Senior Board Director, Board on Behavioral, Cognitive, and Sensory Science, NASEM, and Dr. Jennifer Heimberg, Study Director and Senior Program Officer, Nuclear and Radiation Studies Board, NASEM)

Drs. Heimberg and Wanchisen described how in response to a Congressional mandate, NSF tasked NASEM with assembling a Committee to 1) provide definitions of "reproducibility" and "replication"; 2) assess what is known and what is not known about the extent of the issues of scientific reproducibility and replication in science and engineering research; 3) consider if the lack of reproducibility and replicability impacts the overall health of science and engineering as well as the public's perception of these fields; and 4) review current activities to improve reproducibility and replication. The Committee was also asked to examine factors that may affect reproducibility or replication, consider a range of scientific methodologies as they explore research and data reproducibility and replicability issues, and draw conclusions and make recommendations for improving rigor and transparency in scientific and engineering research. Drs. Heimberg and Wanchisen shared the Committee membership, timeline of the study (final report expected in early 2019), and the agenda topics from open sessions of the Committee's meetings. The project [website](#) has additional details. The speakers also asked the AC to forward nominations for reviewers of the report.

Dr. Kenneth Bollen (SBE AC Chair) began the discussion by providing examples of reproducibility problems in science. He noted that since science is a social process, the social and behavioral sciences can be helpful in both diagnosing the problem and devising solutions. Other AC members noted the importance of conveying that this lack of reproducibility affects multiple scientific disciplines, not just the SBE sciences, and that the “science is self-correcting” argument is not effective. A possible alternative is to focus on outcomes and precision, and the ability of science to help people make better decisions. AC members also questioned the definitions of “reproducibility” and “replicability” and raised the issue of over-interpretation of scientific results by scientists, reporters, and the public.

NCSES Updates (NCSES Staff)

Mr. John Finamore, Program Director for Human Resources Statistics (HRS), described NCSES’s mission to serve as a central federal clearinghouse for the collection, analysis, interpretation and dissemination of objective data on the science and engineering enterprise. HRS conducts surveys that collect education, enrollment, and graduation data for individuals in science and engineering fields and conducts surveys on individuals in the science and engineering workforce. Two recent projects address specific needs identified by NCSES stakeholders. Enhancements to the [Early Career Doctorate Survey](#) were initiated to collect information on the factors and opportunities that influence the employment decisions of early career doctorates. Following a 2016 pilot survey that provided information on demographics, professional activities, work-life balance, the impact of mentoring and training, and research opportunities for early career doctorates, NCSES has moved toward a fully functional, nationally representative survey to collect unprecedented information on early career doctorates. The second new project centers on the use of administrative data sources. NCSES recently initiated discussions with the Census Bureau and Virginia Tech’s Social and Decision Analytics Laboratory to understand the role that administrative data sources can play in NCSES’s work, and to explore whether administrative data sources can supplement or replace survey data for measuring the science and engineering enterprise.

Mr. John Jankowski, Program Director of the Research Development Statistics Program (RDS), reported that RDS is responsible for surveys and analysis on the size and health of the U.S. scientific enterprise, with a focus on research and development (R&D) expenditures, research infrastructure, innovation, and the international comparability of these U.S. metrics. RDS conducts one bi-annual and nine annual surveys that collect data on R&D performance and funding by the Federal government, state government agencies, businesses and institutions of higher education. This year NCSES will launch two new surveys. The [Survey of Nonprofit Research Activities](#) will collect R&D spending, funding, and personnel data from a sample of 6,400 U.S. non-academic, non-profit organizations. The Annual Business Survey will collect data on owner and company characteristics, innovation, R&D, and financing. It also includes rotating modules to capture data on technology and intellectual property and globalization.

Dr. May Aydin, Program Director for Information and Technology Services Program (ITSP), described how ITSP is responsible for the dissemination of all publications and statistical products produced within NCSES. This includes publication support, the NCSES website, and the NCSES data system. Dr. Aydin introduced the NCSES Integrated Data System and new Interactive Data Tool (the latter available at ncesdata.nsf.gov/ids), noting that new data and features would be added regularly through 2018 and 2019.

Dr. Samson Adeshiyan, Acting Deputy Division Director and Chief Statistician, described the consultative work performed by the Statistics and Methods Group. He discussed activities related to blended data

and improving processes for accessing and maintaining confidentiality of NCSES survey data, specifically, restricted-use data access and statistical disclosure control techniques for protecting respondents' confidentiality in disseminated data.

Dr. Beethika Khan, Program Director, Science & Engineering Indicators (SEI) Program, announced that [Science and Engineering Indicators 2018](#) was released in January 2018. One of the major themes in the report is the continued worldwide trend toward more knowledge- and technology-driven economies, and capacity-building in science and engineering. Dr. Khan also presented data on international R&D expenditures, science and engineering publications, and science and engineering doctoral degrees awarded.

Partnerships and Partnership Planning at NSF (Dr. Dawn Tilbury, AD, Directorate for Engineering; Dr. Meghan Houghton, Staff Associate for Strategic Engagements, Directorate for Computer & Information Science & Engineering)

Dr. Tilbury summarized the activities of the Industrial Innovation and Partnerships (IIP) Division in the Directorate for Engineering. IIP's programs serve all of NSF and partner with industry. She provided background on the transfer of technology/research results from university to industry and patent rights from research conducted through IIP's partnership programs. She also described the Industry University Cooperative Research Centers (I/UCRCs) program, another example of NSF partnerships activities.

Dr. Houghton provided an overview of partnership activities across NSF. She described the three primary objectives of most partnerships, i.e., research, research infrastructure, and workforce development. The partners come from a variety of sectors, e.g., industry, foundations, non-profits, universities, international agencies, and other federal agencies. She explained the value proposition for NSF and the U.S. research ecosystem as the following: 1) leveraging resources to grow innovations that address real-world problems; 2) accelerating the translation of discoveries from the university to the development of products and services in the commercial sector; and 3) building research and workforce capacity. She then described the role of partnerships in Renewing NSF, a component of the Foundation's Agency Reform activity.

Dr. Duncan Watts (Microsoft Corporation) launched the discussion. He described how large companies are starting to recognize the importance of the SBE sciences to industry. Companies are hiring psychologists, economists, and sociologists, but still have a long way to go to appreciate the full value of the SBE sciences to their efforts. He posited that industry can benefit by collaborating with social scientists on issues of measurement and data quality, experimental design, and causal inference. In addition, industry is facing heightened regulatory scrutiny and can increase their transparency and perceived legitimacy by partnering with academia. By partnering with industry, academic researchers can get access to social and economic data (phone logs, email, social media, purchases), infrastructure, and resources. In addition, academicians can benefit from the large panels of people that can be gathered by industry partners for experiments and surveys.

The remainder of the discussion focused on access to and security of proprietary data, treating data as infrastructure with wider availability to researchers, and the terms and conditions of NSF-funded partnerships with industry. In addition, there was conversation around workforce development, research on human decision-making, and international partnerships.

Strategic Planning/Grand Challenges in the SBE Sciences: This agenda item continued a discussion initiated at the fall 2017 AC meeting in response to the NASEM report, [The Value of Social, Behavioral](#)

[and Economic Sciences to National Priorities](#). In that report, the study Committee recommended that SBE undertake a strategic planning process, that articulates the important scientific questions in the SBE Sciences that are consistent with the NSF mission. Since the report's release, SBE has been working with its staff, with scientific and professional societies that represent the SBE sciences, and with the SBE AC to identify Grand Challenges in the SBE Sciences. The following Grand Challenges were presented by sub-groups of AC members:

- Improving the information ecosystem for democracy
- Gene X environment 2.0: Understanding gene environment interplay for the life course.
- How does equality of opportunity and group diversity influence learning, work, innovation and creativity?
- Enhancing developmental opportunities from birth to school

Ms. Madeline Beal, SBE Communications Specialist, presented four Grand Challenges identified by SBE staff:

- Strengthening Public Trust in Institutions
- Maximizing Cooperation and Communication
- Stimulating Creativity, Innovation, and Productivity
- Increasing Access to Opportunities in America

Ms. Beal also described how SBE reached out to and met with over forty scientific societies that represent research disciplines supported by SBE, asking them to identify Grand Challenges for the SBE sciences. Twenty-nine ideas were received, which SBE staff clustered into these categories:

- Optimizing Human Capacity and Social Capital
- Opportunities and Challenges of Diversity in America
- Increasing Scientific Literacy in America
- Strengthening Trust in Government Institutions in the Digital Age
- Enhancing National Security, Safety, Stability and Peace in the Modern Era

The discussion following presentation of the Grand Challenges touched on several topics: how best to frame the Challenges; common themes, e.g., child development and technology; the time frame for the Challenges; the balance between problem-focused or "pure" basic research; and the role of non-SBE scientific disciplines to addressing these Challenges. Following the discussion, AC members were given scorecards and asked to indicate their top priorities among all of the Grand Challenges that had been presented. These would be used by SBE to inform next steps in the Directorate's planning process.

NSF's Big Ideas Updates (SBE Staff)

Dr. Daisy Chang, Program Director, SES/Science of Organizations, gave an update on [Navigating the New Arctic \(NNA\)](#). The goal of this Big Idea is to document the rapid biological, physical, chemical and social changes that are happening in the Arctic region.

Dr. Nancy Lutz, Program Director for SES/Economics, reported on the [Future of Work at the Human Technology Frontier \(FW-HTF\)](#). This Big Idea will bring together NSF research communities to conduct basic scientific research on the interaction of humans, society, and technology that will help to shape the future of work, to increase opportunities for workers, and to bolster productivity for the American economy. Investing in this area will improve our understanding of human-technology partnerships, design new technologies to augment human performance, illuminate the emerging sociotechnical landscape, and foster lifelong learning with technology.

Dr. Rebecca Ferrell, Program Director for BCE/Biological Anthropology, reported on [Understanding the Rules of Life: Predicting Phenotype \(URoL\)](#). The overall goal of this Big Idea is to better understand how living systems arise from interactions between genetic underpinning and environment, through identification of predictable patterns, constraints and rules that shape the genotype to phenotype relationship.

Dr. Daniel Sui, SES Division Director, presented the Big Idea [Harnessing Data for 21st Century Science and Engineering \(Harnessing the Data Revolution, HDR\)](#). HDR is engaging the NSF's research community in the pursuit of fundamental research in data science and engineering, the development of a cohesive, federated, national-scale approach to research data infrastructure, and the development of a 21st-century data-capable workforce. Its three main components are research across all NSF directorates, educational pathways and advanced cyberinfrastructure.

Dr. Colleen Fitzgerald, Program Director, BCS/Document Endangered Languages, spoke about [NSF INCLUDES](#). This Big Idea will advance the scientific understanding of what strategies are most effective for the different broadening participation challenges; and to better understand the barriers that hinder and factors that enhance our ability to broaden participation in STEM. The goal is to build a nation where everyone has opportunities in STEM.

The discussion following the presentations touched on many topics. For FW-HTF, there was conversation about technology replacing human workers; risks and benefits of human-technology interactions; the unique role of NSF-supported basic research on human-technology interactions; and partnerships. Discussion around URoL touched on excitement about the idea and its very broad scope. HDR elicited questions about the use of administrative data, and the potential for public-private partnerships.

Report on the Advisory Committee for Environmental Research and Education (AC-ERE) Activities (Dr. Ann Bostrom, University of Washington and AC-ERE Liaison)

Dr. Bostrom provided a snapshot of the AC-ERE 2018 report, [Sustainable Urban Systems: Articulating a Long-Term Convergence Research Agenda](#), and described how SBE can play a role in advancing this agenda. AC members noted that the particularly strong opportunities for international collaboration in the sustainable urban systems domain.

Meeting with NSF Leadership (Dr. France Córdova, NSF Director; Dr. Joan Ferrini-Mundy, Chief Operating Officer)

Drs. Córdova and Ferrini-Mundy thanked the SBE AC members for their service to the Foundation. AC members provided summaries of the Implicit Bias Workshop and the previous day's discussion about partnerships. Dr. Córdova described the recent Whitehouse Summit on Artificial Intelligence (AI), during which the SBE sciences were mentioned several times by the various industry participants. She sees AI as a real opportunity to engage industry in the inclusion of the SBE sciences in their business models. The Summit participants were particularly excited by the FW-HTF Big Idea. Other discussions at the Summit focused on researcher access to industry data, and how to change university models to make it easier for faculty to go back-and-forth between academia and industry.

The AC provided the Director update about the Grand Challenges discussion. Dr. Córdova was supportive of this approach. She explained how NSF's 10 Big Ideas, which take a targeted, strategic approach, have generated a lot of excitement have been positively received. She emphasized the

importance of situating NSF proposals in frameworks that demonstrate the Foundation’s movement in specific, strategic directions.

Sackler Colloquia on the Science of Science Communication (Dr. Dietram Scheufele, University of Wisconsin-Madison)

Dr. Scheufele started his presentation by positing that the scientific community needs to do a better job communicating about science and technology. Most of the Nation’s newspapers have eliminated their science sections, leaving people with fewer opportunities to learn about scientific studies. His opinion is that scientists need to be as scientific about communication, as they are with the science they are communicating. He described the knowledge deficit model, which assumes that if people were only more informed, they would draw the same conclusion as scientists. While highly popular, this model is not supported by scientific data. Dr. Scheufele continued, describing renewed efforts to craft a science of science communication. Activities include the NASEM Sackler Colloquia on the Science of Science Communication, a NASEM consensus study, [*Communicating Science Effectively. A Research Agenda*](#) (2017), and the proposed creation of a standing NASEM Committee to Advance Science Communication Research & Practice. He then presented data on the public’s perception and opinion of scientific topics such as gene editing, the public’s trust in science.

Dr. Arthur Lupia (University of Michigan) started the discussion by noting that the mission in science communication is to provide clarity, and there are two ways doing so in science: information and meaning. The goal is for people to come away with accurate understanding of the research. He also differentiated between science communication (an aspirational goal) and the science of science communication (an endeavor to help achieve that goal more effectively and efficiently).

The ensuing discussion touched on how to train and reward scientists (e.g., during tenure and promotion review) for science communications, how to communicate uncertainty, the difference between accurate communication and persuasion, and the activities of the proposed standing NASEM Committee to Advance Science Communication Research and Practice.

Future Meetings, Assignments, and Concluding Remarks:
(Dr. Kenneth Bollen, AC Chair, and Dr. Fay Lomax Cook, SBE)

The AC identified the following topics as potential agenda items at future meetings: Grand Challenges in the SBE Sciences; the NASEM Report on Reproducibility and Replicability in Science; science communications; graduate training; and the revision of the Common Rule for the Protection of Human Subjects in Research. Dr. Cook bid farewell to and thanked Dr. Ruth DeFries, who was rotating off the SBE AC.

The meeting was adjourned at 12:42 p.m.

This summary was approved by the SBE Advisory Committee at its meeting on December 6, 2018.