National Science Foundation (NSF)

Computer & Information Science & Engineering (CISE)
Advisory Committee (AC)

Meeting Summary

The Advisory Committee (AC) for the National Science Foundation's (NSF) Directorate for Computer and Information Science and Engineering (CISE) convened on December 2 and December 3, 2020. Due to the ongoing novel coronavirus 2019 (COVID-19) pandemic, this meeting was held virtually.

Wednesday, December 2, 2020 (all times Eastern)

11:00 AM Welcome, Introductions, Review of Agenda, and Approval of Minutes

Dr. Rob Rutenbar, CISE AC Co-Chair, opened the meeting with a welcome and introductions of the NSF CISE AC. Minutes from the last AC meeting were approved with no objections.

11:12 AM NSF and CISE Update

Dr. Margaret Martonosi, NSF Assistant Director for CISE, opened the presentation by emphasizing the importance of NSF investments, their long-term value and impact, followed by an overview of findings from a recent National Academies study on Information Technology Innovation. Dr. Martonosi introduced the CISE directorate and its core programs and initiatives. Dr. Martonosi next provided an overview of the CISE budget for FY 2020, followed by the President's budget request and congressional markups for NSF for FY 2021.

Dr. Martonosi highlighted technical themes for CISE activities and provided an overview of CISE Infrastructure programs including NSF's vision and work towards a national research computing resource. She also talked about CISE efforts in engaging Minority-Serving Institutions (MSIs) and detailed next steps for this engagement (CISE-MSI Research Expansion Program, solicitation deadline in 2021). Dr. Martonosi provided an overview of several solicitations and highlighted the shift to no deadlines for core small grants. She also gave an overview of CISE's COVID-19 impact and response (e.g., COVID-19 HPC consortium, Project OVERCOME).

After her presentation. Dr. Martonosi took questions and opened the session for discussion with the AC. The discussion included topics such as how many more CISE awards would be possible with a larger CISE budget and the career paths for researchers, particularly early career researchers and the types of support available to them.

12:45 PM Break

1:47 PM CISE Future Visions: Report-out from the AC Subgroup and Discussion

Dr. Magdalena Balazinska, CISE AC co-chair, led a discussion in this session about the NSF CISE Vision 2030 document. Dr. Balazinska described the purpose of the document and questions the document sought to address. Dr. Balazinska notified the AC that the first full draft is ready and open to input from the AC and highlighted the key thesis of Vision 2030. Dr. Balazinska went over each section of the report and solicited feedback from the AC on its contents. Dr. Balazinska presented additional discussion questions on how and when to seek community input on Vision 230, as well as thoughts on future NSF CISE programs and the future of this visioning activity.

At the end of the session, Dr. Balazinska specified that the draft will be revised and finalized by the AC first before going out for community feedback.

2:47 PM Break

3:00 PM Information Technology Innovation: Resurgence, Confluence, and Continuing Impacts

Dr. Elizabeth Mynatt, Member of the CISE AC, discussed the National Academies report "Information Technology Innovation: Resurgence, Confluence, and Continuing Impacts." Dr. Mynatt spoke in her capacity as chair of the National Academies effort to make updates to the 2012 version of this report. These updates included updating the so-called "tire tracks" figure, depicting innovation in IT, as well as a deeper dive in AI. Dr. Mynatt discussed the approach in putting this report together and provided an overview of the findings, highlighting how IT research areas lead to IT innovations. Dr. Mynatt talked about importance of IT research as a partnership amongst diverse stakeholders and strong partnership between government, academia, and industry within this space. Dr. Mynatt highlighted the risks to US IT leadership including the digital divide and a more globalized IT industry and stressed the importance of funding and partnerships with industry in addressing these risks.

Dr. Mynatt finished the session with an open discussion with AC members. The discussion covered topics including innovation and talent being brought into industry and how to create a better pipeline of talented students into new, creative industries. The discussion also covered the best ways to convey the impact of federally funded basic science.

3:48 PM Breakout discussions
BREAKOUT 1: CISE Partnerships

Dr. Erwin Gianchandani, NSF Deputy Assistant Director for CISE detailed to the Office of the Director as Senior Advisor for Technology, Innovation, and Partnerships, started the discussion with an overview of NSF/CISE partnerships. Dr. Gianchandani described the characteristics of NSF partnerships and talked about the guiding principles for partnering with public and private stakeholders. Dr. Gianchandani provided an overview of different models for NSF partnerships

(e.g., Fairness in AI in collaboration with Amazon) and different challenges they present (e.g., receiving questions from the community about why NSF is partnering with Amazon).

Dr. Gianchandani closed his opening remarks by requesting the AC members to provide input on NSF's partnership programs, with a particular goal toward understanding community views on NSF partnerships and next steps forward. AC members proposed ideas such as a consortium model for collaboration with multiple stakeholders and challenges such as skepticism over the openness and fairness of government-industry partnerships within academia.

At the conclusion of this session, AC member Dr. Vint Cerf was tasked with compiling a PowerPoint slide summarizing the key points of the session.

BREAKOUT 2: CISE Graduate School Enrollment (including Undergraduate Research and Pathways)

Dr. Ran Libeskind-Hadas gave a presentation on the report by CRA-E, "Addressing the National Need for Increasing the Domestic PhD Yield in Computer Science." This presentation highlighted trends in student admission and demand for faculty. The presentation included recommendations from the report to improve the health of the graduate school pipeline. Dr. Marie DesJardins presented on CISE Grad Diversity. This presentation included defining terms, examining gender diversity in computing, myths, and biases. Discussion followed the presentation, where the committee discussed what metrics would define success, the role of risk aversion in reducing student diversity, the importance of retention efforts as well as recruitment, and the relationship between the graduate and undergraduate curriculum.

4:50 PM Adjourn

Thursday, December 3rd

11:05 AM Welcome and Overview of Day

Dr. Balazinska opened the meeting. Dr. Martonosi thanked NSF individuals involved in making this meeting function smoothly.

11:08 AM Report-Out and Next Steps for Breakout Groups

Dr. Libeskind-Hadas reported on the CISE Graduate Student Enrollments breakout session, including the questions generated by the session. Members of the AC shared some thoughts on the presentation, including possible industry partnerships for fellowships and non-tenure-track faculty, as well as the role of undergraduate student debt on graduate student recruitment. Dr. Cerf presented on the partnerships breakout session. The committee discussed the presentation, including the importance of transparency in the selection and development of industry partnerships and complications caused by conflicts of interest. Dr. Balazinska

suggested the CISE AC think about next steps from the breakout discussions, which may include producing reports for circulation and review by the CISE AC.

12:01 PM Break

12:34 PM Prep for Visit by the NSF Director and Chief Operating Officer (COO)

Dr. Rutenbar moved the approval of the CISE Future Visions Report conditioned on some modest modifications from comments at this meeting that would be circulated within a week. No objections were registered, and the motion passed. Dr. Balazinska requested any comments through the weekend, which she promised to incorporate.

Dr. Rutenbar explained that the CISE AC regularly meets with the Director and Chief Operating Officer and the purpose of these meetings. The committee decided to present four topics to the Director: Visions Report, New Tire Tracks, Graduate Enrollment, and Partnerships.

12:55 PM Break

1:15 PM Meeting with NSF Director and COO

Dr. Sethuraman Panchanathan, Director of NSF, and Dr. Fleming Crim, Chief Operating Officer of NSF, joined the CISE AC. The Director gave a presentation on "NSF Strategy into the Future, Strengthening @ Speed & Scale." During this presentation, the Director highlighted three pillars of his vision: advancing the frontiers of research into the future, ensuring accessibility and inclusivity, and securing global leadership. The Director discussed how this is a defining moment for NSF due to global competition, the missing millions, and bipartisan support. A question-and-answer session followed the presentation. Members of the CISE AC discussed partnerships with other agencies and the balance of funding between graduate students and faculty.

The CISE AC then presented on their work. Dr. Mynatt presented on the updated Tire Tracks report and the growing role of IT innovations throughout the economy. Dr. Balazinska discussed the CISE Vision report, and the potential of CISE fields to impact society as well as the socio-technological aspects of the field and potential downsides to emerging technology. The Director highlighted that ethics and societal implications should not be an afterthought, but rather must be integrated even at the conceptualization stage, and praised CISE for recognizing this. Dr. Libeskind-Hadas presented on graduate student enrollment. Dr. Cerf presented on partnerships, and the importance of transparency in these partnerships.

2:23 PM Break

2:30 PM Joint Session with the Social, Behavioral, and Economic Sciences (SBE) Advisory Committee

The members of both the CISE and SBE Advisory Committees were introduced. Drs. Beth Mynatt (CISE AC) and Duncan Watts (SBE AC) presented a report from a May 2020 workshop, "Harnessing the Computational and Social Sciences to Solve Critical Societal Problems." This report discussed the interdependence of technology and society, as well as potential collaborations between both disciplines. The joint committee then discussed the report, including how learning science and computer science intersect, the feedback between digital platforms and extreme behavior, and how to encourage cross-talk between the disciplines. Dr. Arthur Lupia, NSF Assistant Director for SBE, and Dr. Martonosi gave closing remarks for the joint committee meeting.

3:29 PM Break

3:50 PM Departing Members' Reflections

Dr. Greg Hager and Dr. Mike Franklin gave departing reflections.

4:04 PM NSF Strategic Plan Revision

Dr. Martonosi introduced Dr. Stephen Meacham (Office of Integrative Affairs) to discuss the process for developing NSF's 2022-2026 Strategic Plan. Dr. Meacham explained that this strategic plan is not about technical direction but instead how the agency operates. Dr. Meacham explained the timeline of the strategic planning process and how to provide feedback. He discussed how the plan identifies broad, long-term objectives and values that help NSF achieve its mission. A question-and-answer session followed.

4:20 PM Closing Remarks

Dr. Rutenbar initiated the closing remarks. Dr. Rutenbar introduced a request for a formal endorsement of the report between the CISE and SBE partnership. Lacking objection, Drs. Rutenbar and Balazinska will draft a one-page endorsement of the CISE-SBE partnership going forward.

4:26 PM Adjourn