

National Science Foundation Advisory Committee for Cyberinfrastructure (ACCI)

Fall (VIRTUAL) Meeting, September 23rd-24th, 2021

Meeting Minutes

Day 1 (September 23rd, 2021)

ACCI Welcome and Committee Introductions

Karen Willcox, Ruth Marinshaw, co-Chairs, ACCI

Co-chairs, Dr. Ruth Marinshaw, began the ACCI 2021 Fall meeting by greeting everyone on behalf of the co-chairs and all the ACCI members. Dr. Marinshaw expressed her expectations for the next two days of the ACCI meeting and went through the agenda. She thanked the departing members for their work and leadership and thanked everyone for their participation.

Members in attendance are listed in the minutes' Appendix.

Updates from the Office of Advanced Cyberinfrastructure

Manish Parashar, Office Director, Office of Advanced Cyberinfrastructure (OAC)

Dr. Manish Parashar began by greeting the ACCI members and all the attendees. He reported on the retirement of Dr. Amy Friedlander and introduced Dr. Amy Walton as the Acting Deputy Office Director for the Office of Cyberinfrastructure. Dr. Parashar began by giving updates on the impact of the cyberinfrastructure ecosystem for science, transforming science and engineering via cyberinfrastructure, the COVID-19 HPC consortium, the advanced computing ecosystem including Leadership Class Computing and Advanced Computing Systems and Services, and large facility data lifecycles. He also gave updates on OAC's partnerships with the Department of Energy (DoD) and the Exascale Computing Project (ECP), the 2021 Antarctic Cable Workshop, and how to democratize access to the National Research Infrastructure through access, allocation, and support. Moreover, he reported on the CI learning and workforce development, the CI Center of Excellence Pilot Program, the National Strategic Computing Reserve (NSCR), and the National AI Research Resource (NAIRR).

Updates from the CISE Directorate

Margaret Martonosi, Assistant Director, CISE

Dr. Margaret Martonosi, Assistant Director of CISE, began by thanking the ACCI members for all their hard work. Dr. Martonosi noted that Dr. Joydip Kundu is now the CISE Deputy Assistant Director. Dr. Martonosi began by giving updates on NSF funds, solicitations, and reported that NSF invests over \$500M in AI annually. There were updates about the American Rescue Plan and the "skinny" budget release. She gave updates on 2020 awards for AI Research Institutes, CISE's sociotechnical frontier, CIVIC Innovation Challenge Awards Tracks, Platforms for Advanced Wireless Research (PAWR), RINGS program, and the National Research Resource Building Blocks.

Open Discussion with OAC and CISE Management

ACCI Members and NSF Staff

The open discussion began by the co-chair, Dr. Karen Willcox, thanking both Manish and Margaret for their presentations. Next, Dr. Willcox moderated the discussion between NSF staff and the ACCI members. The discussion's points included worries about infrastructure in remote experimentation, cyberattack, supply chain resilience efforts, addressing efforts at technological level, computer systems and information systems, increasing resilience by safety buffers, new approaches and oppositions, abstraction layers, embedding algorithms, architecture, rethinking interfaces for security purposes, constrained data and machine learning data, CI research, and access to computing resources.

Joint Session with Office of Polar Programs Advisory Committee

OPP Advisory Committee Members (OPP-AC), ACCI Members and NSF Staff

The Joint session began with the introduction of the two offices to the ACCI members. After the introduction, there were three presentations and then came a question & answer session between the two offices and the ACCI members. The ACCI members and the two offices discussed various topics such as data interoperability & (re)use challenges, equity of access, diverse data sets, multi-science needs, visualization, opportunities for deploying new and advanced cyberinfrastructure (networking, data services, data assimilation, edge computing, simulations, remote observational capability). The following NSF staff presented at the joint session:

Dr. Allen Pope from OPP presented on the ArticDEM & REMA, the science of the Polar Programs.

Dr. Tefvik Kosar from OAC presented on Cyberinfrastructure for Sustained Scientific Innovation, and on CSSI Projects co-funded by OAC and OPP in FY21.

Dr. Patrick Smith from OPP presented on Antarctic Subsea Cable – High-speed connectivity needs to advance U.S. Antarctic Science.

Update from the Learning & Workforce Development Working Group

Deborah Dent and Working Group Representatives

Members of the Learning & Workforce Development Working Group gave an update briefing to the committee on the status of the working group. Dr. Deborah Dent, the working group leader, greeted everyone and started her presentation by welcoming all the attendees to her working group's update. She presented the review of the timeline from April 2020 to April 2022 and reported on the working group's agenda. Dr. Valerio Pascucci presented the overview/goal of the working group and the CI workforce working group charter. Dr. Gwen Jacobs reported on the results of the survey activity for the community and how to use its data. Dr. Lisa Arafune reported on challenges and opportunities. Next, Dr. Deborah Dent presented the working group's draft survey to the ACCI members to get their inputs and recommendations before administering the survey to principal investigators (PIs). ACCI members and OAC staff made suggestions/recommendations to improve the survey and Members of the Working Group will revise the survey and submit a request to OMB before administering it to PIs.

Preparation for NSF Assistant Directors Visit and Debrief from Day's Discussions

Karen Willcox & Ruth Marinshaw, ACCI Chairs

The session began by Ruth Marinshaw thanking everyone for their participation for the first day of the ACCI meeting. Dr. Marinshaw noted that the session with NSF Assistant Directors and Office Heads the following day would be on crosscutting issues and asked Dr. Michael Heroux for recommendations on the preparation. Dr. Heroux stated that ACCI members would ask two questions on reproducibility and sustainability to NSF management. ACCI members and OAC staff commented on the questions to ask, and the meeting closed at 4:42 PM EST.

Day 2 (September 24th, 2021)

Session with NSF Assistant Directors and Office Heads

ACCI Members, NSF ADs/Office Heads (see appendix 2) and OAC Staff

The session began with an introduction of the ACCI Committee, NSF Assistant Directors, and the Office Heads. After this introduction, there was a discussion about the draft report created from the Reproducibility and Sustainability Working Group, available at:

https://docs.google.com/document/d/1d7kJ28-m8xxtrXQbTodKfFmDiR11uJto1jFb2h_w7bY/edit.

Topics of discussion included reproducibility, the role of AI in reproducibility/trustworthiness issues, challenges in differing training data, training issues and equity, artifact evaluation, research environments, transparency, computation and data, data quality, funding hazard infrastructure, data management, replication, exascale project, equal opportunity, CI, computer science, software science, algorithms, and education. Additional topics included a discussion on cyberinfrastructure impacts. Key questions discussed by the committee included: Are there key reproducibility opportunities that may be missing from the report? Are the first steps mentioned in this report – the right priorities or are there better and more urgent priorities? How can reproducibility and transparency elevate behaviors on how to further research?

Reflection on AD/Office Heads and joint session with OPP Advisory Committee

ACCI Members

The session began with co-chair Karen Willcox thanking ACCI members for their work with NSF Assistant Directors and Office Heads. She then noted that ACCI members had forty-five minutes for the reflection. The discussion focused on reproducibility, computational environment, science, data, data acquisition, source, AI, community principles, inclusivity, tools, educational modules, data accessibility, data management, data lifecycles, data sustainability, data transport for Polar programs, data sensitivity, simulations, requirement of significant investments, machine learning, big data, computing supporting facilities, the Exascale Computing Project (ECP), GPUs, Edge, and cloud computing. One theme brought up by members included a possible working group focus: that of democratizing access to resources. OPP

researchers could be seen as one example community to which lower barriers of access to CI could be beneficial. The reflection also brought about how to approach challenges in creating educational modules.

Update from the Reproducibility & Sustainability Working Group

Michael Heroux and Working Group Representatives

From the Reproducibility and Sustainability Working Group, Michael Heroux began by giving updates on feedback from the morning's conversation. The working group was encouraged by the interest and engagement the NSF Assistant Directors and Office Heads, including interest in more reproducibility expectations from NSF-sponsored activities (such as events). Dr. Parashar gave examples of NSF and OAC commitment to reproducibility and transparency efforts, such as those in the most recent Cyberinfrastructure for Sustained Software Innovation (CSSI) solicitation and the NSF Public Access Repository (PAR). Challenges from the academic community were then discussed, including 'reproducible' vs standard papers in tenure review, mismatched incentives, the 'valley of death' dynamic, and the importance of Social, Behavioral, and Economic (SBE) sciences. Dr. Wolfgang Bangerth was then introduced as an outside contributor to the working group. Dr. Bangerth presented a success story on transparency within the molecular simulation community as a result of the COVID pandemic response. Other topics discussed included ensuring reproducibility didn't become an obstacle for minority-serving or other underrepresented institutions, what could be mandated, and challenges with curating diverse formats of data. ACCI members and OAC staff thanked the working group, commented on their findings, and shared some ideas to help the working group complete their report. Michael Heroux and Working Group Representatives decided to incorporate feedback into the new draft by January 2022 and the whole report will be reviewed in Spring 2022 ACCI meeting.

Preparation for Visit from Representatives from the NSF Directors Office

Karen Willcox & Ruth Marinshaw, ACCI Chairs

The ACCI co-chairs, Karen Willcox, began this session by announcing the names of people from the Office of the Director (OD) who will be joining the ACCI meeting. ACCI members and OAC staff both worked on the preparation by identifying questions to ask and who will ask the question. It was noted that Dr. Karen Willcox will roll call ACCI members to introduce themselves to the representatives from the Office of the Director. It was noted that there would be opening remarks from the chief of staff about policies regarding NSF hosted meetings. There will be a discussion on topics such as the new technology and partnerships directorate, the proposed budget request, and research into cyberinfrastructure and insights on the three working groups. ACCI members then discussed the logistics of how to handle the session, including which member would bring up which topic of interest.

Visit from NSF Office of the Director

Dr. Karen Marrongelle, NSF Chief Operating Officer, and Mr. Brian Stone, NSF Chief of Staff

The session began with an introduction of the ACCI Committee. Under the leadership of the co-chair Dr. Karen Willcox, each ACCI member introduced themselves to the representatives from the NSF Office of the Director. Dr. Willcox then introduced herself as ACCI Co-chair and reported on the roles of ACCI members as well as their working groups. She reported on the work the ACCI members have been doing

during this Fall 2021 ACCI meeting with OAC staff, and a joint session with the Office of Polar Programs Advisory Committee. In turn, Dr. Karen Marrongelle thanked ACCI members for their hard work and sent greetings from the NSF Director to ACCI members as he could not be in the meeting. Brian Stone also greeted ACCI members and CISE/OAC staff. Next, a discussion between the ACCI members and the representatives from the Office of Director began. Dr. Karen Marrongelle and Mr. Brian Stone provided answers to the ACCI members' questions. The discussion then focused on two questions prepared by the ACCI: 1) What are NSF's plans for the new Technology, Innovation, and Partnerships (TIP) Directorate?; and 2) What is TIP's vision, role, and relation to NSF-supported cyberinfrastructure? In response to question 1), Dr. Marrongelle the plans described in NSF's FY2022 Budget Request to Congress. Mr. Stone added that the new Directorate synergizes with bills proposed in congress, such as the Endless Frontiers and NSF For the Future acts. In response to question 2), Dr. Marrongelle noted that TIP will have relationships with many activities across NSF, including those in OAC. She also noted the CISE Directorate has been at the forefront of innovative partnerships already. Possible interactions with other agencies and with industry were also discussed. The members then thanked Dr. Marrongelle and Mr. Stone for their time, and they in turn thanked the ACCI for their contributions to the Foundation.

Reflections from Departing Members

The session began by Dr. Karen Willcox announcing the names of the departing members, thanking them for their tremendous work, and calling on their names one by one to speak.

Dr. Tilak Agerwala talked about his experience and thanked ACCI members for the opportunity he had been given to learn from them. He thanked Manish and stated that he would be happy to contribute to future working group activities as an external member.

Dr. Edward Lazowska mentioned how Manish invited him to join the ACCI group in 2018. Next, he talked about his experience in data, data science, data science methodology, numerical computational science, AI deep learning, AI machine learning, software engineering, and cloud computing. He noted that data science didn't diminish the importance of computational science just like computer science did not diminish the importance of mathematical sciences. He also discussed the importance of quality software engineered for science. Lastly, he discussed the importance of commercial cloud computing for researchers and the importance on funding people vs. equipment in support of research.

Dr. Valerio Pascucci talked about his experience as an ACCI member and thanked all the ACCI members. He is passionate about data and talked about cloud computing, collaboration, and being able to work with this team. Dr. Pascucci was also very encouraged by the idea of a future working group on democratizing data access, and the OPP community could be a great example of possible impact. He also noted his interest in more collaboration between offices and to take innovation 'wherever it comes from, including from industry. He asserted that being an ACCI member has been a great experience for him and would be happy to contribute externally to other working groups. He finished by thanking everyone.

Dr. Padma Raghavan said that being an ACCI member has been a fabulous experience for her, and she was very excited about the progress she had seen. She talked about training the next generation, modulation, and computational data. She finished by thanking Dr. Karen Willcox and Dr. Ruth Marinshaw for their leadership, and everyone for being inclusive.

Wrap up, next steps, and adjourn

Karen Willcox & Ruth Marinshaw, ACCI Chairs

The ACCI Committee ended with a discussion about forming a new working group and upcoming topic areas and agenda items for the Spring meeting. The departing members showed interest in serving in other meetings as external members. There were closing remarks from Manish Parashar, Karen Willcox, and Alejandro Suarez where they thanked each of the participants and attendees. Dr. Suarez will find tentative dates for the Spring ACCI meeting and communicate them with the ACCI members. The Office of Advanced Cyberinfrastructure expects to hold the Spring ACCI meeting in person.

The meeting was adjourned at 3:30 PM EST.

APPENDIX 1: Members in attendance

Deborah Dent
Duncan Watts
Edward Lazowska
Hakizumwami Runesha
Juliana Freire
Karen Wilcox
Michael Heroux
Padma Raghavan
Patrick Heimbach
Rommie Amaro
Ruth Marinshaw (<i>Joined for 20 minutes on Day 2</i>)
Tilak Agerwala
Tiziana DiMatteo
Valerie Taylor
Valerio Pascucci

APPENDIX 2: NSF ADs/Office Heads and OAC Staff

NSF ADs/Office Heads

NSF Staff	Title
Alexandra Isern	Assistant Director / GEO
Alicia Knoedler	Office Head / Office of Integrative Activities (OIA)
Joanne S. Tornow	Assistant Director / BIO
Kellina Craig-Henderson	Deputy Assistant Director /SBE
Kendra Sharp	Office Head / Office of International S&E (OISE)
Lina Patino	Acting Deputy Assistant Director / GEO
Manish Parashar	Office Head / OAC
Margaret Martonosi	Assistant Director / CISE
Roberta Marinelli	Office Head / OPP
Susan Margulies	Assistant Director / ENG
Sylvia Butterfield	Acting Assistant Director / EHR
Tie Luo	Deputy Assistant Director / MPS

OAC Staff

Alan Sussman
Alejandro Suarez
Amy Walton
Appolinaire Abo
Bogdan Mihaila
Carl Anderson
Deborah White-Wilkins
Edward Walker
Kevin Thompson
Lakshmi Venkataramanan
Manish Parashar
Martin Halbert
Robert Beverly
Robert Chaddock
Seung-Jong Park
Tevfik Kosar
Thomas Gulbransen