National Science Foundation

Advisory Committee for Cyberinfrastructure (ACCI)

**Meeting Summary**

May 15-16, 2013

National Science Foundation
4201 Wilson Boulevard
Arlington, VA 22230

**May 15, 2013**

Welcome, Review of Agenda, and Approval of Minutes

Dr. Larry Smarr, ACCI Chair, called the meeting to order at 12:10 pm.

The meeting was open and public. A list of members in attendance is attached in the Appendix.

The minutes of the December 12-13, 2012 meeting of the ACCI were approved as submitted.

The minutes were accepted unanimously, with the exception of Bollen, Neeman, and Allison, who abstained, as they were not members of the committee in December 2012.

CISE Transition Update

Dr. Jahanian discussed budget priorities in CISE for FY 2014. He talked about the breadth of the CISE community and the trend that more and more CISE investigators are from outside the traditional computer science and information schools. He also discussed FY 2013 sequestration planning and NSF guiding principles. Dr. Jahanian stated that this year is manageable but a sustained cut over the years will have a damaging effect on the science, engineering, research, and education enterprise.

Dr. Jahanian discussed the NSF Cyberinfrastructure Council, comprised of NSF Assistant Directors. He also highlighted the CISE mini- retreat and lunch brown bag series which have helped better integrate all of the divisions in CISE.

Cyberinfrastructure Projects Common Issues

Judith Verbeke, the Acting Director of the Division of Biological Infrastructure within the Directorate for Biological Sciences (BIO) discussed the synthesis centers in BIO. These are disparate groups looking at grand challenge questions using different approaches. In these centers, cyberinfrastructure staff is co-located with domain scientists. Within the centers, it has been noticed that often domain scientists have datasets that are not interoperable and cyberinfrastructure scientists help to make them interoperable. Many domain scientists are unaware of the powerful tools available to them. The cyberinfrastructure scientists learn about interesting questions in domain sciences and how to advance their systems and research.

ACCI discussion focused on the impact of the centers and how the cyberinfrastructure investments are leveraged by other awards and grants that work with the synthesis centers.

Jean McGovern, the program director for Ocean Observatories Initiative (OOI) within the Directorate for Geological Sciences (GEO)discussed the OOI and its cyberinfrastructure components. OOI includes significant efforts towards developing middleware tools to enable the use of data in education as well as research.

Discussion focused on the differences between research efforts like EarthCube within GEO and the delivery of facilities like OOI, and also on the need to provide adequate resources for operations and maintenance once a facility construction is complete. The importance of science users’ input into the production of data was emphasized.

Eva Zanzerkia, a program director in GEO discussed the EarthCube program. EarthCube also recognizes the importance of colocation of domain scientists and cyberinfrastructure professionals in developing the project scope and needs for user communities. The vision for EarthCube is to make all geosciences data both easily discoverable and accessible by the community at large.

Following each presentation there was a general discussion. The issue of cyberinfrastructure as a service vs. cyberinfrastructure research arose. Project leaders acknowledged that some of both occur in the different projects. ACCI members familiar with some of the efforts felt that cyberinfrastructure professionals are often viewed more in a service role, though they do sometimes have the opportunity for co-authorship of publications in the domain sciences. The Committee also discussed differences in the types of services that could be provided by the commercial sector and the academic environment. OOI represents an academic-private partnership, for example. The need to document and maintain a “lessons-learned” knowledgebase is important and there was some discussion on how this might be accomplished, with no resolution reached. One ACCI member noted that it would be worthwhile to consider lessons learned by other agencies such as DOE and CERN that have constructed large facilities with substantial cyberinfrastructure components.

Finally, the issue of data storage was discussed as an important issue that spans all projects – knowing what to save and for how long. It was noted that government can leverage private cloud providers for this type of service.

NSF Strategic Plan

Alan Blatecky presented some background and status on the re-drafting of the NSF strategic plan. There was discussion of the tension between basic and applied research that NSF has been facing for a number of years. The push for translational research has been seen as a particular necessity in recent years with programs such as cybersecurity, Science, Engineering, and Education for Sustainability (SEES), and others.

Public Access to Data

Jane Silverthorne, Division Director for Integrative and Organismal Systems within the BIO Directorate, and Cliff Gabriel from the Office of International & Integrative Activities spoke about public access to data and publications. Dr. Gabriel co-chairs the NSF Public Access Working Group along with Myron Gutman, the NSF Assistant Director for Social, Behavioral, and Economic sciences. Dr. Silverthorne leads the data subgroup of the Working Group. Another subgroup is considering open access to publications. NSF efforts will be more advanced on publication access, because there are many models already, such as NIH PubMedCentral and others. For data, in addition to the NSF subgroup, there is an interagency coordinating group that involves 21 agencies. ACCI discussion that followed the presentation centered on the definition of data and the scoping activities that the committee will be undertaking, and also on metadata and the challenges with capturing it.

Discussion with NSF Assistant Directors

Lee Zia, the Acting Deputy Director for Undergraduate Education substituted for Joan Ferrini-Mundy, the Assistant Director (AD) for Education and Human Resources. Also present were John Wingfield, AD for BIO, Pramod Khargonekar, AD for Engineering, Michael Morgan, a Division Director from GEO, and Fleming Crim, AD for MPS. There were no formal presentations.

The ADs discussed overarching cyberinfrastructure issues in their domains and disciplines. Common issues that were raised included sustainability of data during uncertain budgets, the generation of big data, and integration of heterogeneous datasets. Dr. Wingfield mentioned that sometimes integration of data is not critical because there are significant challenges in building resources for just one discipline, but he added that the projects should be communicating to consider interoperability. Individual investigators in the community are also thinking about data storage and whether they should use providers or buy their own storage. Of growing concern is the idea of managing information generated by citizen scientists.

ACCI Member Issues and Discussion

Victoria Stodden presented a report from a subcommittee of the Directorate for Mathematics and Physical Sciences (MPS) Advisory Committee that is examining the current structure of and support of the statistical sciences within NSF and providing recommendations to NSF. The subcommittee held a face-to-face meeting in December 2012. They consider the concept of statistical sciences more broadly as data sciences. The Subcommittee members began collating information from relevant reports and soliciting feedback from NSF (including interviews with NSF ADs) and from professional societies. They began discussing recommendations on a May 2013 conference call.

ACCI discussion raised issues of best practices in data archiving and academic homes for data science as well as computational science.

**May 16, 2013**

Meeting with Acting NSF Director, Dr. Cora Marrett.

Dr. Smarr began the discussion raising issues of how to come up with cross-Foundation investments in cyberinfrastructure that build upon best practices from projects within the scientific domains.

Dr. Marrett commented that we should continue to expect close interactions among the four divisions in CISE and also across the Foundation. She also stressed the importance that the ACCI consider the role and sustainability of ACI into the future, perhaps by engaging the other advisory councils for input.

The Committee discussed the importance of providing support to transfer information through the cross-training of people. Programs should facilitate the exchange of ideas and people.

Discussion of Possible Working Groups

Dr. Jahanian discussed the idea of ACCI working groups that might meet between one full ACCI meeting and the next. A small number of focused items can be tackled with actionable recommendations that NSF can deal with programmatically. For example, what is a specific role for ACI? How does NSF rely on that? As GEO goes and invests in a new project, how does ACI engage? Another question might be surrounding education and workforce development: data science, computational science, etc. A third issue might be how to coordinate networks across disciplines with specific mechanisms that help us learn from various projects in the Foundation?

Peter McCartney from the Division of Biological Infrastructure spoke briefly about the BIO Directorate cyberinfrastructure strategic plan. It discusses how cyberinfrastructure is supported within the larger BIO ecosystem. It considers the lifecycle of projects and how to balance support for existing and new projects, as well as cutting edge activities. It considers scaling of investments from small pilot level to large scale infrastructure. Another question is how one can invest in the BIO communities such that they can use shared infrastructure rather than building their own solutions. Dr. McCartney encouraged rotational assignments of program officers from around the NSF into ACI as a valuable opportunity for two-way exchange of ideas and knowledge.

Barry Schneider, a program director in ACI spoke about XSEDE coordination and the need for more involvement from SBE with cyberinfrastructure projects.

Irene Qualters and Mark Suchman, program directors in ACI, discussed some ideas for workforce development that they have been considering and offered three foci for consideration: 1) the roles that people play as provider, user and developer often are fluid and change at different times during an individual’s career. Each role requires different types of skills and education. 2) What are the career paths within the different cyberinfrastructure roles, including private sector career paths? 3) There need to be some recommendations on diversity and broadening participation in the cyberinfrastructure workforce.

Next Steps

* ACCI members request a report from the NSF CI Council of ADs at each ACCI meeting
* ACCI members request a briefing from John Towns, the Principal Investigator on the XSEDE cyberinfrastructure project at the next ACCI meeting
* ACCI should consider developing a program of rotating program officers from around NSF into ACI

Joint Meeting of the CISE AC and the ACCI

CISE AC Members joined ACCI members for lunch and a joint discussion session from 12:00 PM to 1:30 PM. Dr. Jahanian welcomed all AC members and turned the meeting over to Dr. Smarr. Dr. Smarr began the meeting by explaining that the ACCI reports to OD as well as to ACI, because cyberinfrastructure is an NSF-wide need. He discussed the need for integrated cyberinfrastructure and the value of cross-linking between NSF Advisory Committees for meeting this need and developing best practices and architecture development for a full range of activities. CISE is a big part of this, because fundamental research is required to deal with rapidly evolving areas such as big data and open access mandates, and many fundamental CISE research projects will ultimately advance CI.

Jennifer Rexford, the co-chair of the CISE AC provided opening remarks, commenting that mid-scale infrastructure has been an issue that the CISE AC has been considering, including the idea of building cloud test-beds that would be on a much smaller scale than a private sector cloud environment.

Joint session:

The committees discussed what it means to create cyberinfrastructure and the idea of cyberinfrastructure as a single architecture or the idea of cyberinfrastructure as a concept for consolidation of expertise. Some expressed the opinion that one should not try to create architecture.

They also discussed the need for multidisciplinary research in advancing cyberinfrastructure, one of the biggest issues currently facing all of science. There is a need for cyberinfrastructure needs to inform fundamental scientific research (especially in CISE), and vice versa. In particular, Dr. Jahanian welcomed and encouraged more conversations between the ACI and the CISE communities; the work should be compatible and complementary. The need for expedited communication between multiple communities and for conceptualizing a path forward for informed planning was also discussed.

The group also discussed education and workforce development, particularly in the area of data and statistics. ACCI members noted their earlier discussions about possible new pilot programs centered on data. It was suggested that such pilots also address training and workforce development, in particular to enhance connections between the computer science and cyberinfrastructure communities, possibly including public-private partnerships, to provide new perspectives and experiences to researchers. In particular, cyberinfrastructure investments in domain sciences facilities present a unique opportunity for engagement of multiple communities.

This led into discussion of issues of culture and practice. NSF could play a major role in better integrating the cyberinfrastructure and computer science communities to ensure that each informs the other and can assist in meeting the other’s needs.

In closing, Dr. Jahanian expressed thanks to the committees for starting several very important conversations that will be continued, and thanked the ACCI for all it does for the community. Dr. Smarr thanked the CISE AC for attending the joint panel and enriching the discussion.

Following the joint discussion session and with no further business, the ACCI meeting adjourned at 1:30 PM.

APPENDIX: Meeting Attendees

ACCI Members Present

Larry Smarr (Chair)

Lee Allison

Ken Bollen

Fred Choobineh

Peter Cummings

Bruce Donald

Deidre Evans

James Hack

Kerstin Lehnert

Henry Neeman

Linda Petzold

Victoria Stodden

Todd Vision

David Yaron

ACCI Members Absent

Sharon Glotzer

Juan Meza

Jeremiah Ostriker

Collin Stultz

NSF Staff

Cora Marrett, NSF

Fleming Crim, MPS

Farnam Jahanian, CISE

Pramod Khargonekar, ENG

John Wingfield, BIO

Alan Blatecky, ACI

Cliff Gabriel, OIIA

Irene Qualters, ACI

Peter McCartney, DBI

Jean McGovern, OCE

Michael Morgan, AGS

Barry Schneider, ACI

Jane Silverthorne, IOS

Mark Suchman, ACI

Judith Verbeke, DBI

Eva Zanzerkia, GEO

Lee Zia, DUE