**National Science Foundation
Directorate for Computer and Information Science and Engineering Advisory
Committee (CISE AC)**

May 6, 2011

**National Science Foundation
4201 Wilson Boulevard
Arlington VA 22230**

MEETING SUMMARY

The spring meeting of the National Science Foundation's Directorate for Computer and Information Science and Engineering's Advisory Committee (CISE AC) was held at the National Science Foundation on May 6, 2011.

Welcome and Introductions

Dr. Jennifer Rexford and J. Strother Moore, CISE AC co-chairs, called the meeting to order at 8:36 a.m., welcoming participants physically present as well as those participating virtually. AC members introduced themselves. A list of attendees can be found in Appendix I.

The minutes from the Spring 2010 AC meeting were approved.

Dr. Farnam Jahanian introduced Dr. Cora Marrett, Senior Advisor for Foundation Affairs in the Office of the Director.

NSF Update

Dr. Marrett welcomed the AC on behalf of the Director, NSF. She stressed the interest of both CISE and NSF senior management in the AC's engagement and input on CISE investments, activities and portfolio. Dr. Marrett discussed the PCAST report and highlighted the recommendation that the federal government must increase investment in those fundamental network and information technology frontiers that will accelerate progress across a broad range of priorities. She noted the challenges NSF faces in an era of constrained resources not only in articulating a case for increased investments in fundamental "core" research, but also in investing in the development of the next generation, and evaluating and documenting the outcomes of those investments. Dr. Marrett then thanked the AC members for their participation and contributions.

The AC was invited to ask questions of Dr. Marrett. One AC member commented on the achievements of the CDI program and asked about whether the program would be continued or a successor program launched. Dr. Marrett replied that the Agency is continuously looking at the lessons learned from our cross-directorate multidisciplinary activities and that the new CIF21 initiative would be picking up on parts of the CDI program.

CISE Overview and Update

Dr. Jahanian began by thanking AC members for their willingness to serve on the committee and the new co-chairs for serving in this capacity, and welcomed the new members. Since there was no AC meeting in November, 2010, he invited all AC members whose term was to end in the summer of 2011 to continue through the end of December, 2011. He also thanked Peter Arzberger for serving as Acting CISE AD until his arrival.

Dr. Jahanian then shared some thoughts on the opportunities for the field and the Directorate. He shared some of the significant societal and technological trends that are shaping the discipline for the next decade including explosive growth in the size and complexity of data, explosive growth in volume and diversity of internet traffic and the melding of the physical and cyber worlds. He discussed the potential impact of cloud computing and the challenges that society continues to face in cybersecurity.

Dr. Jahanian then provided a snapshot of the CISE directorate including a description of the CISE structure which includes three divisions, but many cross-cutting programs. Many of these programs are cross-cutting across the directorate and many others across multiple directorates. He updated the AC on CISE staffing, including the transition of the majority of the CISE leadership team, welcomed new CISE staff including the three new Deputy Division Directors, and noted other staff transitions. He then provided updates on the FY 2010 and FY 2011 budget statuses, and highlighted some of the ongoing and new programs that are cross-divisional or cross-directorate activities. These included Science Engineering and Education for Sustainability (SEES), Cyberinfrastructure Framework for 21st Century Science and Engineering (CIF21), National Robotics Initiative (NRI), Computing Education for the 21st Century (CE-21) and Cyberlearning Transforming Education (CTE).

Lastly, Dr. Jahanian asked for the AC members' help in recruiting Program Directors (PD). He reminded the AC that the quality of the PDs affects the quality of reviewers, reviews, panels, nature and content of research funded and the frontiers of the discipline.

Slides from Dr. Jahanian's presentation will be provided upon request to: kgeary@nsf.gov. His presentation is posted on the CISE AC Sharepoint site for the May 6 meeting, for those with access.

Computing and Communication Foundation (CCF)

Dr. Susanne Hambrusch gave an overview of the CCF Division. Her presentation outlined the core programs in CCF. She also addressed the challenge of recruiting Program Directors and noted that the assistance of the programming language community was critical in identifying rotators in that area.

Dr. Hambrusch outlined the cross-cutting programs managed by CCF. She discussed SEES and a recent workshop run by the CCC that brought together computer scientists with other researchers interested in what computer science could do toward sustainability; how can computations change how energy is generated, distributed and consumed; how people and goods are transported, etc. She also discussed the ICES program which was issued in 2010 which takes the work in economics and looks at it from a computer science and complexity perspective. Various workshops were outlined and discussed. She stated that CCF's challenges and opportunities include: 1) finding the right balance between core and cross-cutting programs and 2) understanding what areas mature and lead to tire track industries and making the public aware that that is the impact of what we're funding.

Computer and Network Systems (CNS)

Dr. Keith Marzullo gave an overview of the CNS division. His presentation described both the core and crosscutting programs that fall under this division. He highlighted some of the new activity in CNS since the last AC meeting including the funding of the first four Future Internet Architecture proposals over the last year: Named Data Networking, Mobility First, NEBULA and Expressive Internet Architecture. The objective of this program is to try to develop new architectures to address the fundamental tool issues that occurred from earlier networking development. This was followed by a discussion of whether CISE requires a large team of institutions to collaborate in order to receive funding for large proposals. Dr. Jahanian responded that this issue has been raised by the community in the past and CISE will review the language in its solicitations to ensure that the objective is clearly to create the team that's going to do the best job in addressing the research problem at hand, without creating unnecessary constraints.

Dr. Marzullo spent some time describing various exciting workshops funded by CNS including the Pervasive Computing and Communication Collaboration (PC3) workshop which created a structure to enable US researchers to collaborate with Indian researchers on the problems of pervasive computing. Another was the Science of Cloud Computing which pulled together researchers in the area to find out what are the research agendas in cloud computing. This was followed by a discussion of two crosscutting programs that are led by CNS: Trustworthy Computing and Cyberphysical Systems.

Information and Intelligent Systems (IIS)

Dr. Howard Wactlar brought the committee up to date on the activities of the IIS Division, which he described as" information and computing in service to people." He discussed the three core clusters: Robust Intelligence; Information, Integration and Informatics; and Human Centered Computing. He then spent some time describing three new programs and future priorities to help address national priorities.

The Smart Health and Wellbeing Program attempts to address the healthcare crisis.   The goal of the Smart Health and Wellbeing program is to seek improvements in safe, effective, efficient, equitable, and patient-centered health and wellness services through innovations in computer and information science and engineering. Doing so requires leveraging the scientific methods and knowledge bases of a broad range of computing and communication research perspectives.

He then described the National Robotics Initiative which seeks to accelerate the development and use of robots in the United States that work beside, or cooperatively with, people in order to increase everybody's productivity.

Lastly, Dr. Wactler discussed the Cyberlearning Transforming Education program which endeavors to integrate advances in technology with advances in what is known about how people learn to better understand how technology can be used productively to help people learn, better use technology for collecting, analyzing, sharing, and managing data to shed light on learning, and design new technologies for these purposes.

PCAST Report

Dr. Ed Lazowska, University of Washington and Dr. Susan Graham, University of California, presented a summary of the report "Designing a Digital Future: Federally Funded Research and Development in Networking and Information Technology," that resulted from a congressionally mandated review of the Network and Information Technology Research and Development Program. Dr. Lazowska and Dr. David Shaw co-chaired the working group that was convened by the President's Council of Advisors on Science and Technology for this purpose. Dr, Graham was a valuable member of the working group.

Dr. Lazowska emphasized networking and information technology (NIT) as central to achieving the national priorities in energy and transportation, education and life-long learning, healthcare, and national and homeland security and noted that the recommendations are for continued robust funding of NIT research and development. The review found that a substantial fraction of the NITRD spending reported by participating agencies is being allocated to activities other than NIT research and development, such as the creation of information technology products and infrastructure expansion in support of research in other fields. Although these activities are valuable, the result is that we're investing far less than we think on basic NIT research and

development that will be crucial to addressing critical priorities and challenges in the years ahead.

The committee noted that although high-performance computing is still an important area of NIT, there are several other areas for new investments at the forefront of the field. These included: modern expansive human computer interaction, large-scale data management and analysis, trustworthy systems and cybersecurity, to name a few. The group made several recommendations for increased investment in fundamental NIT research frontiers that will accelerate progress across a broad range of priorities. These included NSF partnering with other agencies in the areas of: privacy and confidentiality, human-machine and social collaboration and problem-solving in a networked environment, data collection, storage, management and automated analysis, among others. This was followed by a lengthy discussion of what it takes to have a successful multi-agency collaboration. Some successful examples for NSF include Cyberphysical systems and NRI.

The working group also recommended the creation of a high-level standing expert advisory committee focused on computing, analogous to what PITAC had been.

Concluding Brainstorming Session

The remainder of the day focused on a brainstorming session of the committee members. Dr, Rexford indicated that the focus of the brainstorming session was to provide advice to CISE Management and identify issues for outreach to the community.

The following topics were discussed:

- The PCAST report – Are there areas of emphasis for CISE? Are there areas in which CISE should take the lead? How can the AC assist CISE in responding to the report? Are there other research priority areas for FY 2013 and beyond?

- Postdocs – There are too many PhDs coming out of the system for the number of faculty positions available. There are an increasing number of people doing postdocs before going into academic positions. How should CISE adapt to the "new world order" in the field? CRA developed a white paper on this topic which is available on the CRA website and has asked the community to enter a summary of each department's thinking on their blog.

- Recruitment of reviewers – An AC member recommended having a more methodical study of why program officers have difficulty recruiting panelists. There were several suggestions in this area:
  - Have postdocs serve on finals, given the increasing number in the field,
  - Invite all junior faculty to serve on panels in their first year,
  - Have some panels on the west coast
  - Conduct virtual panels – to include telepresence systems

- Plan panels 3-4 months in advance

- Recruitment of rotators - The challenge of recruiting rotators was discussed and the impact of the quality of the Program Directors on the quality of the research funded. The importance of AC and community input in helping to identify individuals who might serve as rotators was highlighted. The CCC has been spearheading a Science Policy Institute which is now seeking its first class. This resulted from a CCC discussion on how they might identify people to serve.

- Committee of Visitors – There was a discussion of whether CISE should do three division-level COVs or one directorate-level COV in FY12. The extensive amount of work involved in the data analysis was discussed by AC members who had served on COVs in the past. AC members suggested coordinating chairs of individual COVs to abstract and synthesize the data across the directorate into a report with key themes.

  There is an opportunity to redefine the COV process in the next year. Dr. Jahanian volunteered that CISE management would seek input from AC members who have served on COVs in the past to get ideas of how CISE can improve the process for the next COV.

- Community Engagement – – How can we better engage the community in CISE activities? Dr. Jahanian informed the AC that CISE senior management is exploring ways to better engage the community in the development of new programs and initiatives. One approach being considered is a call to the community for new ideas expressed in the form of white papers.

CONCLUSION

Dr. Jahanian stated that he would like to form working groups around some of the topics that have been raised by the committee between now and the next AC meeting. He reiterated his desire to have a more actively engage AC and encouraged the members to share any suggestions about future agenda items, ideas on how the committee could be more involved, and thoughts on how the role of the AC should change over time. He concluded by thanking the committee for their commitment and willingness to serve on this committee and to serve the broader CISE community.

With no further discussion, the meeting was adjourned at 3:43PM.

Appendix 1

ATTENDEES

Members Present:

Dr. Anant Agrawal- MIT Computer Science and Artificial Intelligence Lab, Cambridge, MA (telecom)

Dr. Jamie Carbonell- School of Computer Science, Carnegie Mellon University

Dr. Henrik Christensen – Georgia Institute of Technology

Dr. Michelle Effros- Department of Electrical Engineering, California Institute of Technology

Dr. Jose Fortes- Department of Electrical and Computer Engineering, University of Florida

Dr. Juan Gilbert- Human-Centered Computing Division, Clemson University

Dr. Julian Goldman- Massachusetts General Hospital

Dr. Bruce Hajek- Computer and systems Research Laboratory, University of Illinois Urbana-Champaign

Dr. Eric Horvitz- Microsoft Research, Redmond, WA (telecom)

Dr. Charles Isbell- College of Computing, Georgia Institute of Technology

Dr. James Kurose- Department of Computer Science, University of Massachusetts Amherst

*Dr. Richard Ladner- Department of Computer Science, University of Washington, Seattle (telecom)

Dr. Susan Landau- Radcliffe Institute for Advanced Study, Harvard University

Dr. James Landay- Department of Computer Science and Engineering, University of Washington

Dr. Maja Mataric- Computer Science Department, University of Southern California (telecom)

Dr. J. Strother Moore- AC Co-Chair; Department of Computer Science, University of Texas at Austin

Dr. Greg Morrisett- School of Engineering & Applied Sciences, Harvard University

Dr. Andrew Ng- Computer Science Department, Stanford University

Dr. Keshav Pingali- Department of Computer Science, University of Texas at Austin

Dr. Jennifer Rexford- AC Co-Chair; Department of Computer Science, Princeton University

Members Absent:

Dr. Jon Kleinberg- Cornell University, Ithaca, NY

Dr. William Weihl- Google, Inc., Mountain View, CA

Dr. Stefan Savage – Department of Computer Science and Engineering, University of California, San Diego

*Liaisons from other NSF Advisory Committees