

THE COMPUTING COMMUNITY CONSORTIUM (CCC)

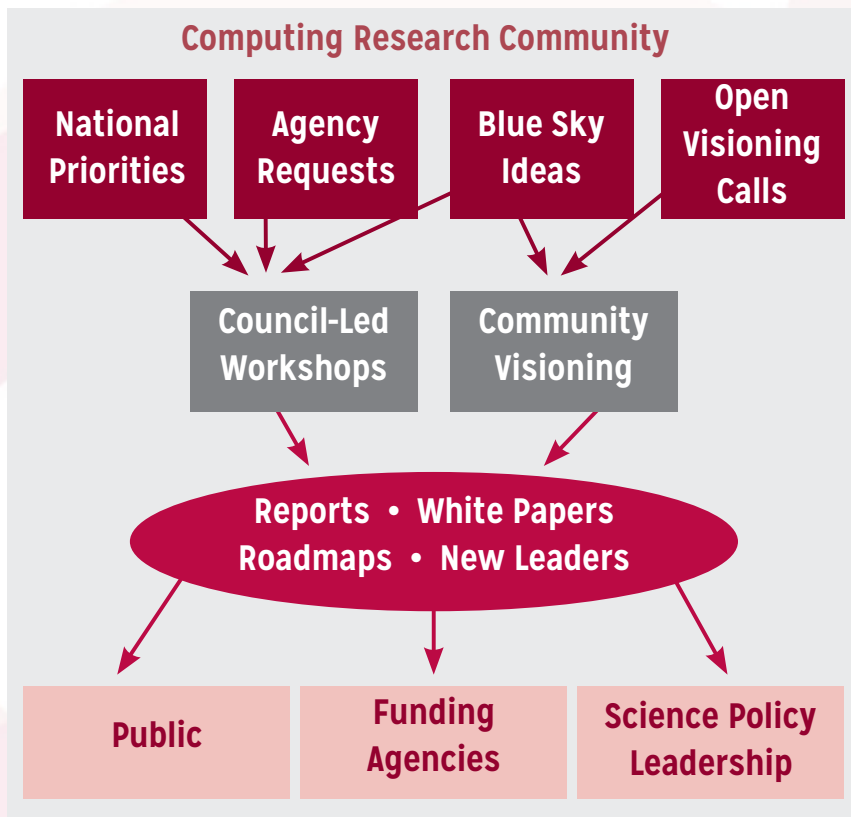


CCC

Computing Community Consortium
Catalyst

COMPUTING COMMUNITY CONSORTIUM

The **mission** of Computing Research Association's Computing Community Consortium (CCC) is to **catalyze** the computing research community and **enable** the pursuit of innovative, high-impact research.



Promote Audacious Thinking:

- Community Initiated Visioning Workshops
- Blue Sky Ideas tracks at conferences

Communicate to the Community:

- CCC Blog - <http://cccblog.org/>
- Great Innovative Ideas
- White Papers and Workshop Reports
- Social Media
- Council member presentations

Facilitate Investment:

- Outputs of visioning activities
- Task Forces – Health, AI, Privacy etc.
- Engage with federal agencies and industry

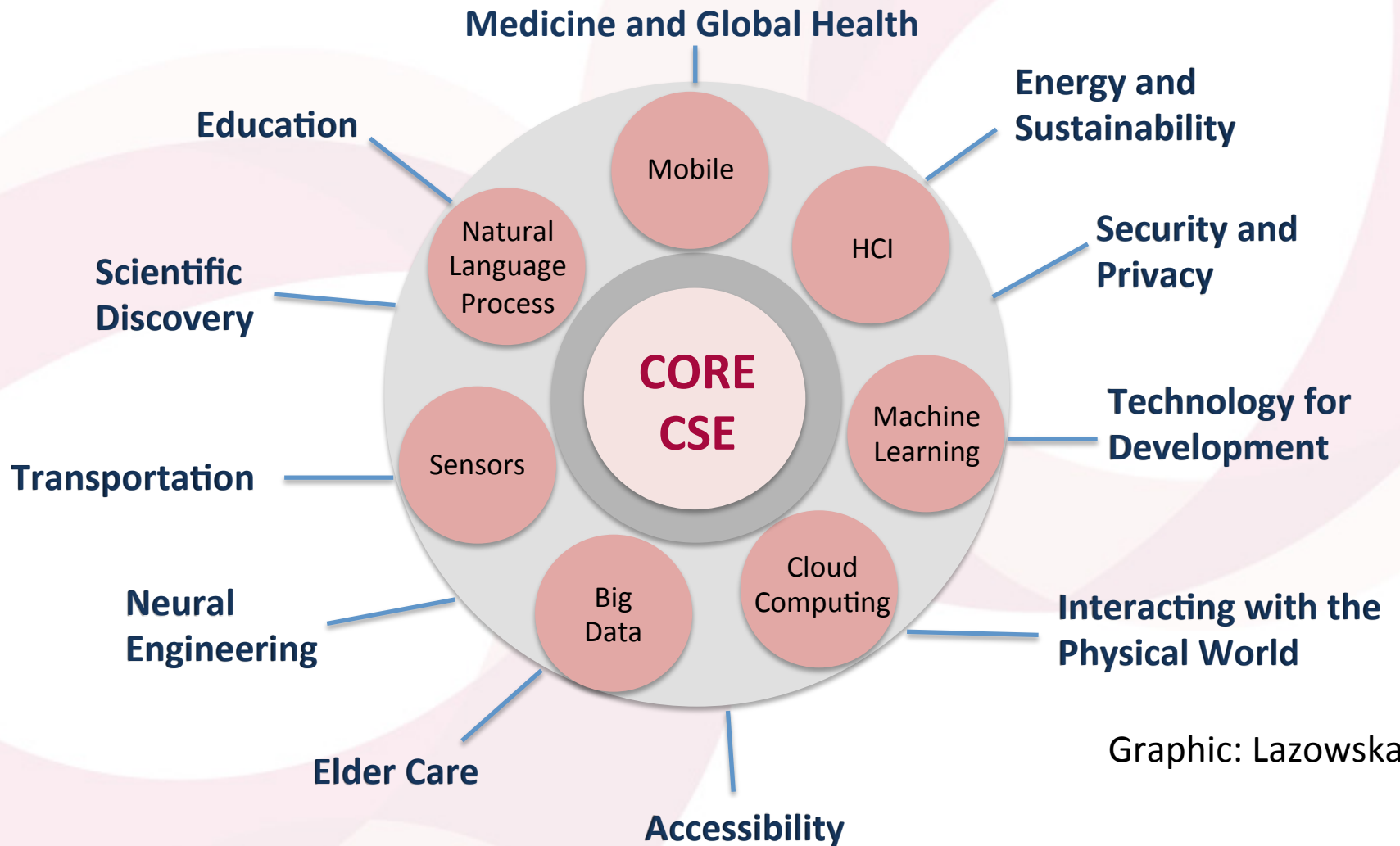
Inculcate Leadership and Service:

- Engage with CCC Alumni and Sister Organizations
- Biennial Symposia series

Influence Early Career Researchers:

- Industry – Academic Collaborations
- Leadership in Science Policy Institute
- Postdoc Best Practices

THE RAPIDLY EXPANDING WORLD OF COMPUTING



Graphic: Lazowska

AN OVERVIEW OF THE COMPUTING COMMUNITY CONSORTIUM

- Established in 2006 as a standing committee of the Computing Research Association (CRA)
- Funded by NSF under a Cooperative Agreement
- Facilitates the development of a bold, multi-themed vision for computing research – and communicates this vision to stakeholders
- Led by a broad-based Council
- Staff based at CRA



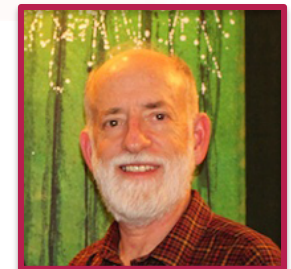
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THE CCC COUNCIL – EXECUTIVE COMMITTEE



- Beth Mynatt, Georgia Tech (Chair)
- Mark Hill, University of Wisconsin, Madison (Vice Chair)
- Dan Lopresti, Lehigh University
- Ben Zorn, Microsoft Research
- Jennifer Rexford, Princeton
- Ann Drobnis, Director
- Andy Bernat, CRA Executive Director



THE CCC COUNCIL



Terms ending June 2020

- Nadya Bliss, Arizona State
- Elizabeth Churchill, Google
- Juliana Freire, NYU
- Keith Marzullo, Maryland
- Greg Morrisett, Cornell
- Manuela Veloso, Carnegie Mellon



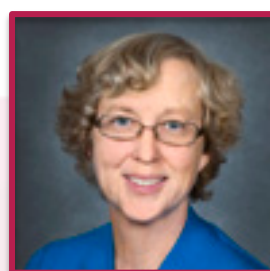
Terms ending June 2019

- Sampath Kannan, UPenn
- Maja Mataric, USC
- Nina Mishra, Amazon
- Holly Rushmeier, Yale



Terms ending June 2018

- Liz Bradley, CU Boulder
- Cynthia Dwork, Microsoft Research
- Kevin Fu, Univ. Michigan (Leave)
- Daniel P. Lopresti, Lehigh University
- Shwetak Patel, Univ. Washington
- Katherine Yelick, UC Berkeley
- Jennifer Rexford, Princeton
- Ben Zorn, Microsoft Research



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CRA STAFF

CCC Director: Ann Drobnis

- 100% CCC, responsible for day-to-day management of the Organization

Senior Program Associate: Helen Wright

- 100% CCC, responsible for promoting the CCC mission through the website, blog, and social media

Program Associate: Khari Douglas

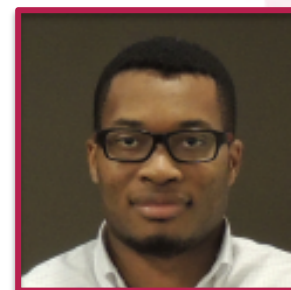
- 100% CCC, responsible for supporting CCC special programs, workshops, and communications

CRA Executive Director: Andy Bernat

- 10% CCC, responsible for general oversight

Other CRA Staff:

- Peter Harsha, Director of Government Affairs
- Sandra Corbett
- Sabrina Jacob



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GOALS FOR CCC

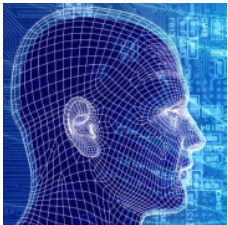
1. **Bring the computing research community together to envision audacious research challenges**, and to articulate concrete pathways to enable pursuit of these challenges.
2. **Communicate** these challenges and opportunities to the broader national community.
3. **Facilitate investment** in these research challenges **by key stakeholders**.
4. **Inculcate** values of **leadership** and service by the computing research community.
5. **Inform and influence early career researchers** to engage in these community-led research challenges.

DESIRED OUTCOMES

1. **Create broad awareness of the role computing research will play in future science and technology advances** within federal agencies, philanthropic organizations, and industry through concrete examples and products.
2. **Facilitate broad engagement of the computing research community** in identifying and articulating new directions for computing research, in shaping priorities for those new directions, and in responding to existing opportunities in the computing research ecosystem.
3. **Create high-impact tangible resources** that inform stakeholders as to the current and potential impact of computing research.
4. **Sustain the CCC** as a widely accepted catalyst and voice for the computing research community.
5. **Grow leadership and community capacity** to engage in and respond to national science policy needs.

VISIONING PROCESSES

- Periodic RFP for Community Initiated Activities
- 6 workshops per year in the last 3 years
- Top-down (agency initiated)
- Bottom-up (open call)
- Sideways (council initiated, joint with other agencies,....)



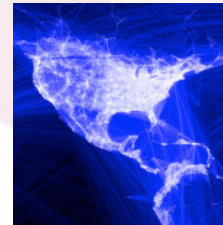
Cyber Social
Learning
Systems



Nanotechnology-
inspired
Information
Processing Systems



Smart
Health



Sociotechnical
Cybersecurity



Cybersecurity
for
Manufacturers

VISIONING ACTIVITIES

- Over 40 visioning activities in 10-year history
- Average of 6 activities per year in the last 4 years
- Research areas include:
 - Smart and Pervasive Health
 - Nanotechnology-inspired Information Processing Systems
 - Cyber Social Learning Systems
 - Privacy by Design
 - BRAIN Initiative
 - Inclusive Access
 - Personalized Education
- 13 workshop reports released in past 4 years
- 20 white papers released in past 4 years

Workshop	Date
Privacy by Design – Catalyzing Privacy by Design	January 6-7, 2016
Robotics	March 5 and 11, 2016
Cyber-Social Learning Systems Workshop 1	August 29-30, 2016
Nanotechnology-Inspired Information Processing Systems of the Future	August 31-September 1, 2016
Cyber-Social Learning Systems Workshop 2	November 2-3, 2016
Discovery and Innovation in Smart and Pervasive Health	December 5-6, 2016
Sociotechnical Cybersecurity Workshop 1	December 12-13, 2016
Cyber-Social Learning Systems Workshop 3	January 24-25, 2017
Cyber Security for Manufacturers	March 14-15, 2017

RECENT VISIONING WORKSHOPS

Cyber Social Learning Systems

Aug 29-30, 2016

Nov 2-3, 2016

Jan 23-24, 2017

**AAAI Symposium on Accelerating Science
A Grand Challenge for AI**

Nov 17-19, 2016

Smart Health and Health IT

Dec 5-6, 2016

Sociotechnical Cybersecurity

Dec 12-13, 2016

Aug 8-9, 2017

Cyber Security for Manufacturers Workshop

Mar 14-15, 2017

— Joint with MForeSight

AAAI Symposium on AI for Social Good

Mar 27-29, 2017

BLUE SKY

Goal - Help conferences reach out beyond the usual research papers. Papers are opened ended and possibly “outrageous” or “wacky.”

- 8 different tracks at 6 different conferences in last 4 years
- On average, 13 papers submitted per track at a conference
- Winners are asked to submit Great Innovative Ideas



Past CCC Chair Gregory Hager with AAAI-16 Blue Sky award winner Francesca Rossi



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CCC TASK FORCES

CCC task forces are organized around national priorities, community needs, and council member interests. Our current set of topics are:

- Computing in the Physical World
- Convergence of Data and Computing
- Artificial Intelligence and Robotics
- Healthcare
- Privacy and Fairness

Goal is for CCC to be **engaged in ongoing activities** around these topics, to **identify needs and opportunities** in the topic area, and to **identify actions** (generating white papers, convening a workshop, publicizing information, etc.) that have the possibility of “moving the needle” for these topics.

Annual process to determine topics, membership and priorities. Informed by major stakeholders (NSF, OSTP, PCAST, NITRD, workshops and council members)

COMPUTING IN THE PHYSICAL WORLD TASK FORCE

Chairs: Ben Zorn and Shwetak Patel

Ben Zorn
Microsoft
Research



Shwetak Patel
University of
Washington



Current Members:

Kevin Fu
University
of Michigan



**Daniel
Lopresti**
Lehigh
University



**Beth
Mynatt**
Georgia
Tech



**Klara
Nahrstedt**
UIUC



**Jennifer
Rexford**
Princeton
University



**Debra
Richardson**
UC - Irvine



**Greg
Morrisett**
Cornell
University



Recent Activities:

- *Intelligent Infrastructure* white paper series
- Response to NITRD Smart Cities and Community Strategic Plan

White Papers:

- *Safety, Security, and Privacy Threats Posed by Accelerating Trends in IoT*
- *Embedding Computing Innovations into our Cities and Communities (in process)*



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CONVERGENCE OF DATA AND COMPUTING TASK FORCE

Chair: Vasant Honavar

**Vasant
Honavar**
Penn State



Current Members:

**Tom
Conte**
Georgia
Tech



Mark Hill
Wisconsin,
Madison



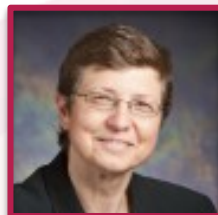
Kathy Yelick
UC - Berkeley



**Holly
Rushmeier**
Yale



**Klara
Nahrstedt**
Illinois,
Urbana-
Champaign



Recent Activities:

- *Accelerating Science: A Computing Research Agenda* white paper
- Co-sponsor of the AAAI Symposium on *Accelerating Science: A Grand Challenge for AI*
- Discussions with DARPA
- White papers and coordination with PCAST

White Papers:

- *Challenges to Keeping the Computer Industry Centered in the US*
- *Democratizing Design for Future Computing Platforms*



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AI AND ROBOTICS TASK FORCE

Chairs: Greg Hager and Eric Horvitz

Gregory Hager
Johns Hopkins



Eric Horvitz
Microsoft
Research



Current Members:

Randy Bryant
Carnegie
Mellon



**Vasant
Honavar**
Penn State



**Maja
Mataric**
USC



Recent Activities:

- *AI for Social Good* workshop report
- *Intelligence Require Progress Across all of Computer Science* white paper
- Discussions with Partnership on AI

White Papers In Process:

- *An Actionable Agenda for AI*
- *Work Through Human Augmentation*
- *White Paper on Safe AI*

HEALTHCARE TASK FORCE

Chair: Beth Mynatt

Beth Mynatt
Georgia Tech



Current Members:

Kevin Fu
University
of Michigan



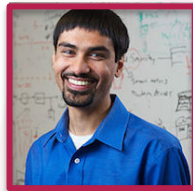
**Gregory
Hager**
Johns
Hopkins



Nina Mishra
Amazon



**Shwetak
Patel**
University of
Washington



**Maja
Matarić**
Penn
State



Recent Activities:

- *Discovery and Innovation in Smart and Pervasive Health* December, 2016 Workshop Report
- Response to NITRD draft *Federal Health Information Technology Research and Development Strategic Framework*

White Papers In Process

- *Population Health Surveillance and Response*
- *Transforming Aging*



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PRIVACY AND FAIRNESS TASK FORCE

Chairs: Cynthia Dwork and Sampath Kannan

**Cynthia
Dwork**
Harvard
University



**Sampath
Kannan**
University of
Pennsylvania



Current Members:

**Lorenzo
Alvisi**
University of
Texas, Austin



**Elizabeth
Bradley**
University of
Colorado,
Boulder



**Vasant
Honavar**
Penn State



Recent Activities:

- Published a white paper called *Privacy-Preserving Data Analysis for the Federal Statistical Agencies* (joint with the Census Bureau)
- Visioning Workshop on Sociotechnical Cybersecurity- December, 2016

White Papers In Process

- *An Ontology for Fairness*



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COMPUTING RESEARCH

ADDRESSING NATIONAL PRIORITIES AND SOCIETAL NEEDS



- Held first National Symposium to Highlight the Impact of Computing Research in 2016
- Establish a biennial Symposium to communicate the role of computing research to address national and societal priorities
- Bring in early career researchers to connect them with and invigorate the community
- 2017 Symposium October 23-24th in Washington, DC



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COMMUNICATING

- Workshop Reports
- White Papers
 - CCC works with community to produce timely white papers that inform policymakers and the broader community on national priorities
- CCC Blog
 - Provides a continuous stream of information on advances in computing research
 - Opportunities for community to get involved
 - Forum for community discussion
- Great Innovative Ideas
 - A way to showcase the exciting new research and ideas generated by the computing community
- Annual events
 - CCC Symposium
 - CRA Snowbird
- Special Events



Computing
Research
2016



AI for Social Good
2016

NURTURING NEXT GENERATION OF LEADERS

Grow leadership and community capacity to engage in and respond to national science policy needs and identify new directions for computing research.

Leadership in Science Policy Institute

- Educates and trains computing researchers on how science policy in the U.S. is formulated and how to advocate for computing research
- Co-sponsored by CRA's Government Affairs Committee

Industry – Academic Collaborations

- CCC collaborated with Big Data Regional Hubs
- Activities to enhance the research of early career faculty

Postdoc Best Practices

- Program to study institutional support structures for postdocs
- 3 programs: University of Washington, NY ASCENT, Arizona

Computing Innovation Fellows (CIFellows) Project

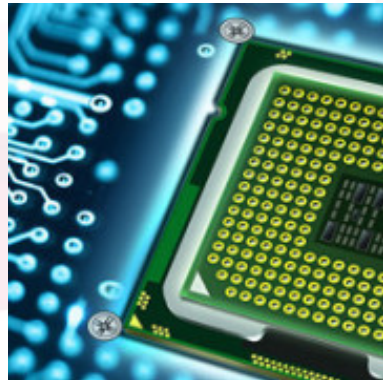
- Rapidly created the CI Fellows program to preserve human capital when faculty positions became scarce with the financial crisis

AMPLIFICATION



BRAIN Initiative launched in 2013.

CCC co-hosted the Brain Workshop with NSF in 2014.



CCC co-hosted the SA+TS workshop with SRC and NSF in 2013.

Produced Research Needs for Trustworthy, and Reliable Semiconductors Report in 2015.



NSCI announced in July 2015.

CCC produced a series of blog posts on the topic, featuring one from Doug Burger, and the Convergence of Data and Computing task force frequently overlaps with this topic.



Smart and Connected Health Program in NSF and NIH.

CCC has hosted several workshops on related topics, including: Aging in Place (2014), Inclusive Access (2015), and Smart and Pervasive Health (2016) and produced related reports and white papers.

IMPACT: ARCHITECTURE

<p>Workshop on Advancing Computer Architecture Research (ACAR-1)</p> <p>Failure is not an Option: Popular Parallel Programming</p> <p>Organizers: Josep Torrellas (University of Illinois) and Mark Oskin (University of Washington).</p> <p>Steering Committee: Chita Das (NSF and Pennsylvania State University), William Harrod (DARPA), Mark Hill (University of Wisconsin), James Larus (Microsoft Research), Margaret Martonosi (Princeton University), Jose Moreira (IBM Research), and Kunko Olukotun (Stanford University).</p> <p>Written by: Josep Torrellas, Mark Almadena Chichelnikova, Chita Das, Jon Hillier, Sampath Kannan, Krishna Richard Murphy, Onur Mutlu, Satish Anand Sivasubramanian, Kevin Skadron, Karin Strauss, Steven Swamy, and Dean Tuller.</p> <p>Funded by the Computing Research Association's (CRA) Computing Core Consortium (CCC) as a "visioning exercise" meant to promote forward computing research and then bring these ideas to a funded program.</p> <p>Held on February 21-23, 2010 in San Diego, California Contact: torrella@illinois.edu; oskin@cs.washington.edu Websites: http://www.cra.org/ccc/acar.php; http://iacoma.cs.uiuc.edu/acar/</p> <p>August 2010</p>	<p>Workshop on Advancing Computer Architecture Research (ACAR-II)</p> <p>Laying a New Foundation for IT: Computer Architecture for 2025 and Beyond</p> <p>Organizers: Mark Oskin (University of Washington) and Josep Torrellas (University of Illinois).</p> <p>Steering Committee: Chita Das (Pennsylvania State University), M. Martonosi (University of Wisconsin), James Larus (Microsoft Research), Margaret Martonosi (Princeton University), Jose Moreira (IBM Research), and Olukotun (Stanford University).</p> <p>Written by: Mark Oskin, Josep Torrellas, Chita Das, John Davis, S. Daskalakis, Lieven Eeckhout, Bill Feiler, Daniel Jimenez, Mark Marathe, James Larus, Margaret Martonosi, Onur Mutlu, Kunko Olukotun, Andrew Putnam, Tim Sherwood, James Smith, David Wood, and Chita Das.</p> <p>Funded by the Computer Research Association's (CRA) Computing Core Consortium (CCC) as a "visioning exercise" meant to promote forward computing research and then bring these ideas to a funded program.</p> <p>Held on September 20-21, 2010 in Seattle, Washington Contact: oskin@cs.washington.edu; torrella@illinois.edu Website: http://www.cra.org/acar.php</p>	<p>21st Century Computer Architecture</p> <p><i>A community white paper</i></p> <p>May 25, 2012</p> <p>1. Introduction and Summary</p> <p>Information and communication technology (ICT) is transforming our world. Healthcare, education, science, commerce, government, defense, and entertainment to name a few, are all being transformed. Future visions include personalized medicine to and seeks to distill their attributes. Future visions include personalized medicine to and seeks to distill their attributes. Future visions include personalized medicine to and seeks to distill their attributes.</p> <p>Importantly, much evidence suggests that ICT innovation is accelerating with many visions moving from science fiction toward reality. Appendix A both touches upon the and seeks to distill their attributes. Future visions include personalized medicine to and seeks to distill their attributes. Future visions include personalized medicine to and seeks to distill their attributes.</p> <p>Two key—but often invisible—enablers of this transformation are computer architecture and computer architecture. See Appendix B for more details. Computer architecture took these rapid transformations and applied them to the real world. Computer architecture took these rapid transformations and applied them to the real world.</p> <p>Because much technology and computer architecture innovations were (intentionally) higher layers, application and other software developers could reap the benefits of the without engaging in it. Higher performance has both made more computationally applications feasible (e.g., virtual assistants, computer vision) and made less applications easier to develop by enabling higher-level programming abstractions (e.g., languages and reusable components). Improvements in computer system cost enabled value creation that could never have been imagined by the field's four distributed web search sufficiently inexpensive so as to be covered by advertising line</p> <p>¹ FCAST, "Designing a Digital Future: Federally Funded Research and Development Networking and Technology, Dec. 2010 (http://www.whitehouse.gov/the-press-office/2010/12/01/fcast-report-2010.pdf)</p> <p>² CCC, "Challenges and Opportunities with Big Data," Feb. 2012 (http://www.cra.org/ccc/bigdata/whitepaper)</p>	<p>Exploiting Parallelism and Scalability (XPS)</p> <p>PROGRAM SOLICITATION NSF 13-507</p> <p>National Science Foundation Directorate for Computer & Information Science & Engineering Division of Computer and Communications Foundations Division of Computer and Network Systems Office of Cyberinfrastructure</p> <p>Full Proposal Deadline(s) (due by 5 p.m. proposer's local time): February 20, 2013</p> <p>IMPORTANT INFORMATION AND REVISION NOTES</p> <p>A revised version of the NSF Proposal & Award Policies & Procedures Guide (PAPPG), NSF 13-1, was issued on October 4, 2012 and is effective for proposals submitted on or after, or after January 14, 2013. Please be advised that the guidelines contained in NSF 13-1 apply to proposals submitted in response to this funding opportunity. Proposers who opt to submit prior to January 14, 2013, must also follow the guidelines contained in NSF 13-1.</p> <p>Please be aware that significant changes have been made to the PAPPG to implement revised merit review criteria based on the National Science Board (NSB) report, "Transforming the National Science Foundation: Review and Recommendations." The new merit review criteria have been incorporated into the PAPPG and are effective for proposals submitted on or after January 14, 2013. Changes will affect the project summary and project description sections of proposals. Annual and final reports also will be affected.</p> <p>A by-chapter summary of the other significant changes is provided at the beginning of both the <i>Grant Proposal Guide</i> and the <i>Grant & Award Administration Guide</i>.</p> <p>Please note that this program solicitation may contain supplemental proposal preparation guidance and/or guidance that deviates from the guidelines established in the <i>Grant Proposal Guide</i>.</p> <p>SUMMARY OF PROGRAM REQUIREMENTS</p> <p>General Information</p> <p>Program Title: Exploiting Parallelism and Scalability (XPS)</p> <p>Synopsis of Program: Computing systems have undergone a fundamental transformation from the single processor devices of the turn of the century to today's ubiquitous and networked devices and warehouse-scale computing on the cloud. Parallelism has become ubiquitous at many levels. The proliferation of multi- and many-core processors and increasing numbers of interconnected high-performance and data-intensive edge devices, and the data centers serving them, is enabling a new set of global applications with large economic and social impact. At the same time, semiconductor technology is facing fundamental physical limits and single processor performance has plateaued. This means that the ability to achieve predictable performance improvements through "vertical" processor scaling will end.</p> <p>The Exploiting Parallelism and Scalability (XPS) program aims to support groundbreaking research leading to a new era of parallel computing. XPS seeks research in evaluating, and prototyping in designing, the traditional computer hardware and software paths for today's heterogeneous parallel and distributed systems and exploring new holistic approaches to parallelism and scalability. Achieving the needed breakthroughs will require a collaborative effort among researchers representing all areas from the application layer down to the micro-architecture—and all in both the core and new hardware programs. New architectures, programming models and languages, hardware architectures, compilers, operating systems and run-time systems, and exploit domain and application-specific knowledge. Research should also focus on energy- and communication efficiency and on enabling the decision of effort between edge devices and clouds.</p> <p>Principal Program Officer(s): Please note that the following information is current at the time of publishing. See program website for any updates to the points of</p>
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2010

2010

2012

2013



Josep Torrellas
UIUC



Mark Oskin
Washington



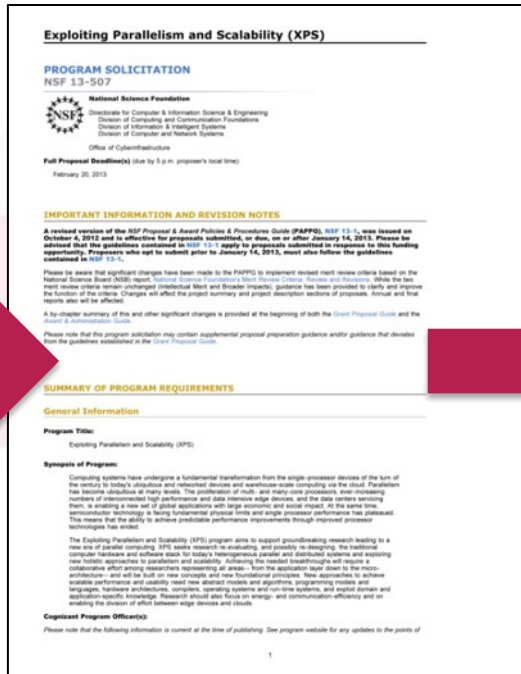
Mark Hill
Wisconsin



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IMPACT: ARCHITECTURE



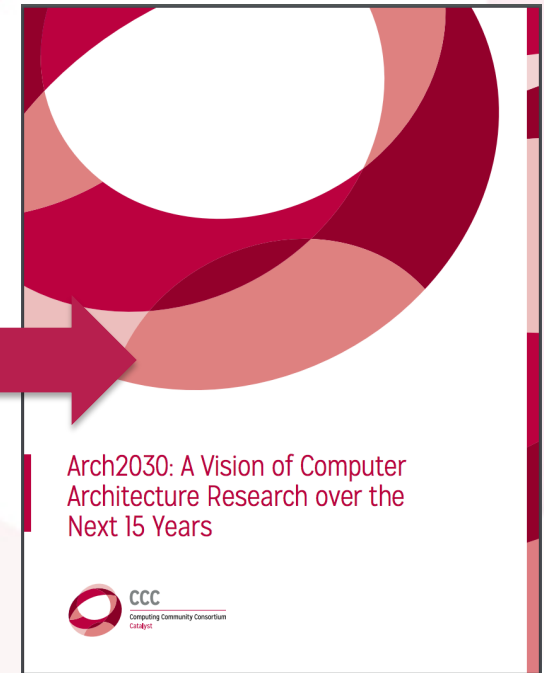
2013

Architecture 2030 Workshop @ ISCA 2016

CCC report out: Read the final report [here](#).

Video recordings: Watch the video recordings [here](#).

2016



2016



Luis Ceze
Washington



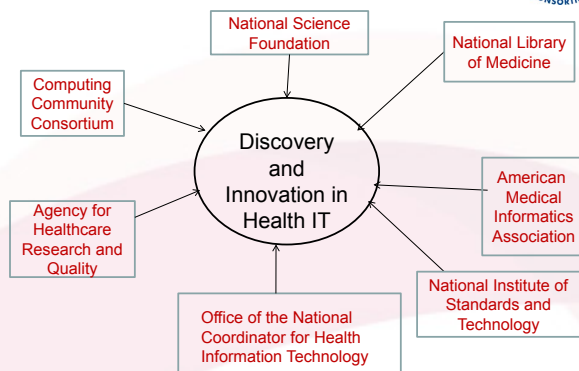
Tom Wenisch
Michigan



Mark Hill
Wisconsin

IMPACT: HEALTH IT

October 2009 Workshop



National Science Foundation
WHERE DISCOVERIES BEGIN

Directorate for Computer & Information Science & Engineering

SMART HEALTH AND WELLBEING (SHW)

CONTACTS

See program guidelines for contact information.

SYNOPSIS

Smart and Connected Health (SCH)

PROGRAM SOLICITATION

NSF 13-543

REPLACES DOCUMENT(S):

NSF 12-512



National Science Foundation

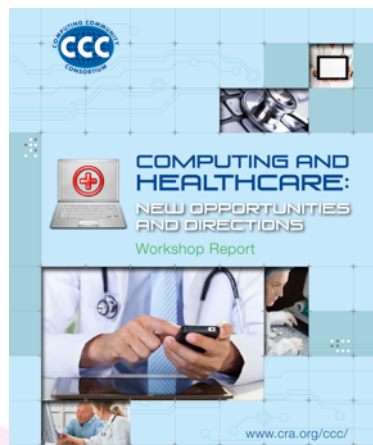
Directorate for Computer & Information Science & Engineering
Division of Computing and Communication Foundations
Division of Computer and Network Systems
Division of Information & Intelligent Systems

Directorate for Engineering

Directorate for Social, Behavioral & Economic Sciences



National Institutes of Health



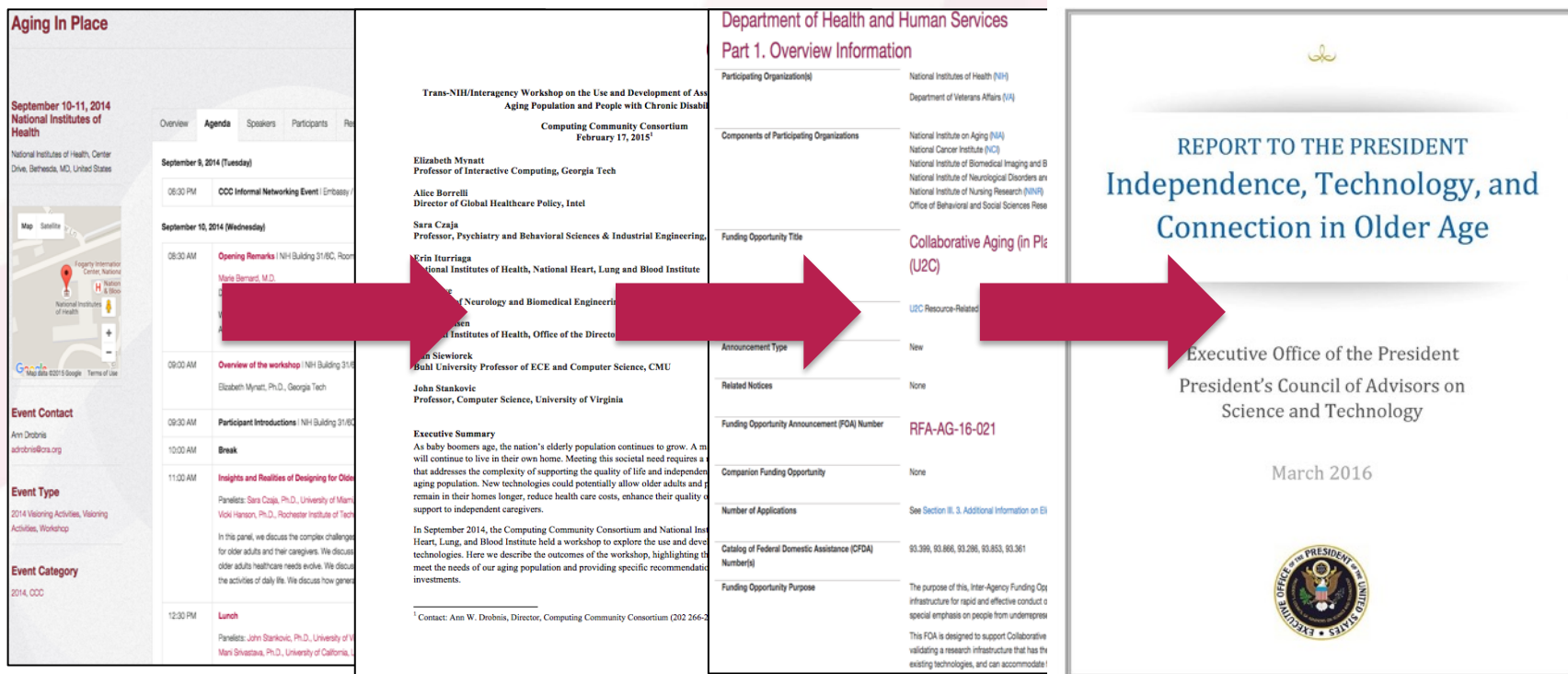
October 2012 Workshop



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IMPACT: AGING IN PLACE



Joint NIH/CCC
Meeting
September
2014

Produced
Workshop
Report
February
2015

NIH released
new RFP
informed by
AIP Workshop
October 2015

PCAST Report
March 2016

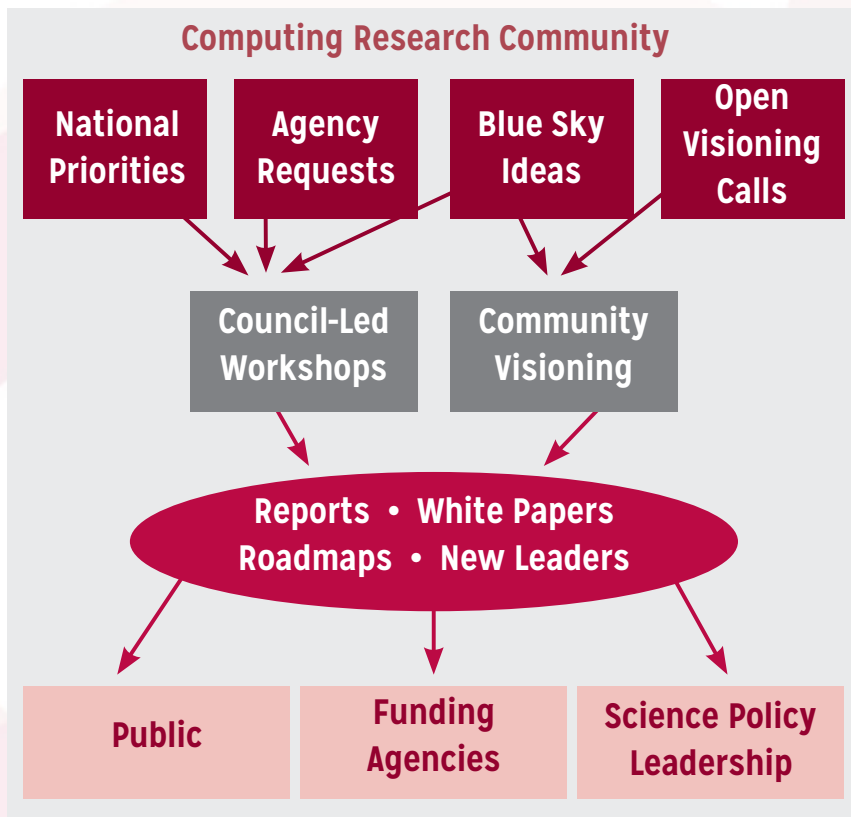


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- Leadership in Science Policy Institute
- Postdoc Best Practices