INTRODUCTION TO THE CCC AND THE CCC COUNCIL

June 20, 2017

CCC
Computing Community Consortium
Catalyst

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
  - Third Award begins in 2017, completed Reverse Site Visit (April 2017)

- 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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WHAT WE'LL TRY TO COVER

- Brief history

- Role and mission of CCC

- Organizational details

- CCC Stakeholders

- CCC Goals, Activities and Desired Outcomes

- CCC Impact

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PRE-HISTORY

In the mid-2000's, NSF CISE leaders and computing research community leaders had similar concerns regarding:

- The Federal commitment to research in general, and to computing research in particular
- Public and policymaker perception that computer science is "yesterday's news"
- Failure to articulate and coalesce around exciting research visions in computer science – research visions that would galvanize the public, policymakers, researchers, and students
- Need to groom leadership for the field
- Decrease in student interest
- GENI Project direction

This led to:

- Increased focus on these issues by NSF CISE and the computing research community
- Computing Community Consortium solicitation by NSF
- Eager response by a group of computing research community leaders under the auspices of the Computing Research Association
  - Randy Bryant
  - Susan Graham
  - Anita Jones
  - Dick Karp
  - Ken Kennedy
  - Ed Lazowska
  - Peter Lee
  - Jeff Vitter

INFORMAL MISSION

"A catalyst and enabler for the computing research community"

- Bring the community together to contribute to shaping the future of the field
- Provide leadership for the community, encouraging revolutionary, high-impact research
- Encourage the alignment of computing research with pressing national priorities and national challenges (many of which cross disciplines)
- Work with policymakers to facilitate the translation of these important research directions into funded programs
- Give voice to the community, communicating to a broad audience the many ways in which advances in computing will create a brighter future
- Grow new leaders for the computing research community

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MAJOR ORGANIZATIONAL MILESTONES

- NSF solicitation + CRA Proposal + Cooperative Agreement (2006)
- Chair appointed (Winter 2007) + Council appointed (Spring 2007)
- Vice-Chair position formalized: Fall 2007
- Full-time Director (Erwin Gianchandani) joins: Spring 2010
- Renewal proposal submitted: Spring 2011
- Steady-state organizational structure defined: Fall 2012
- Executive Committee launched: Winter 2013
- Ann Drobnis joins as Director: Spring 2013
- Regular Chair / Vice-Chair succession kicks in: Summer 2013
- Proposal and Renewal (in process, 2017)

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THE RAPIDLY EXPANDING WORLD OF COMPUTING

Medicine and Global Health

Energy and Sustainability

Education

Security and Privacy

Scientific Discovery

Technology for Development

Transportation

Interacting with the Physical World

Neural Engineering

Elder Care

Accessibility

Mobile

HCI

Natural Language Process

CORE CSE

Machine Learning

Sensors

Cloud Computing

Big Data
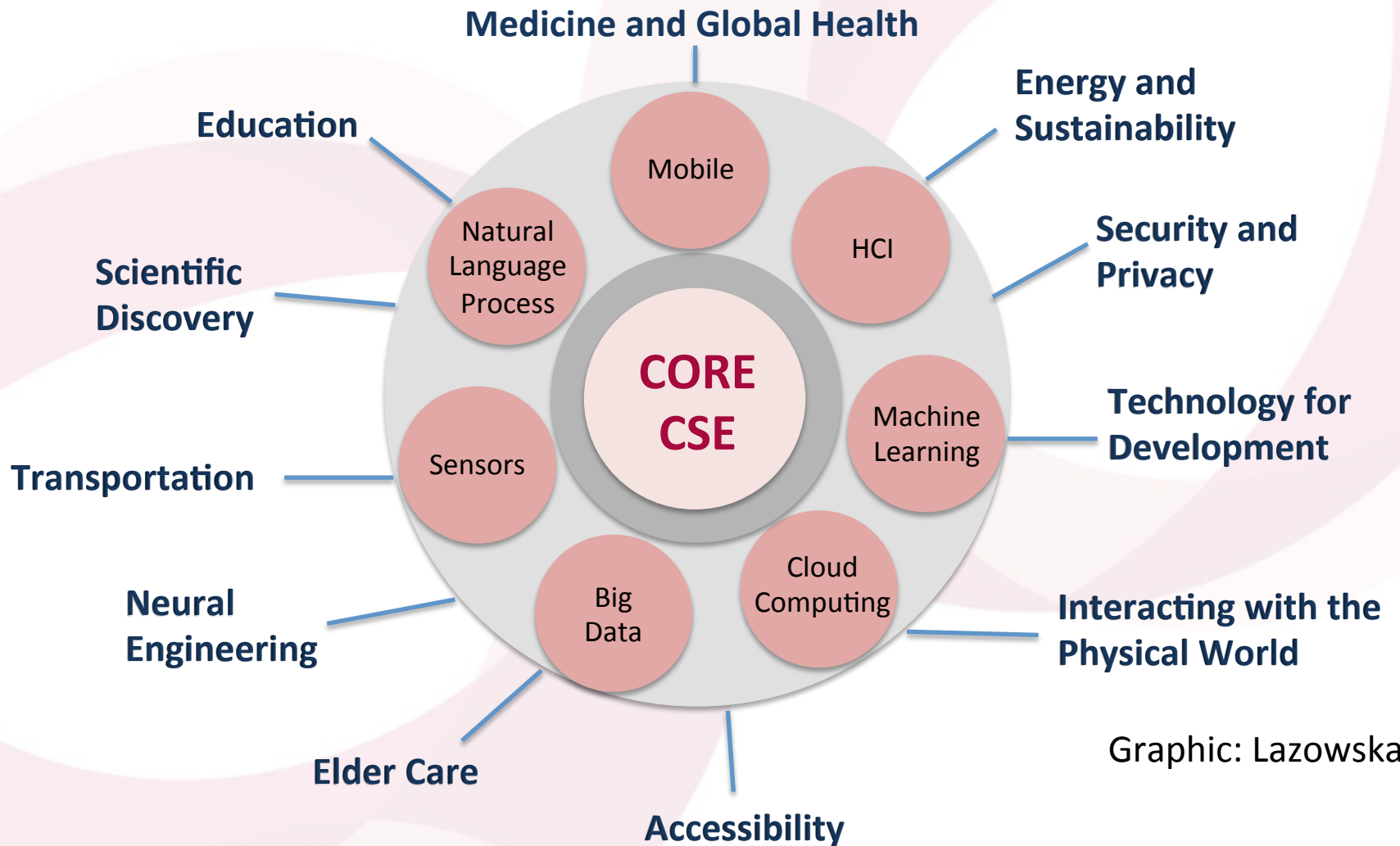
Graphic: Lazowska

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.

Computing Research Community

National Priorities	Agency Requests	Blue Sky Ideas	Open Visioning Calls

- Council-Led Workshops
- Community Visioning

Reports • White Papers Roadmaps • New Leaders

Public	Funding Agencies	Science Policy Leadership

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

ORGANIZATIONAL STRUCTURES

June 20, 2017

CCC ORGANIZATIONAL STRUCTURE

Chair, Vice-chair

- 2 year non-staggered terms
- Vice-chair is presumptive chair

Director, Program Associates (2)

- Full-time paid positions

Executive Committee

- Chair, Vice-chair, Director
- 3 at large drawn from Council for 1-year terms
- CRA Executive Director

Council

- 20 members
- 3 year terms, at most 2 consecutive terms

Support

- As needed, from CRA Staff

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WHAT DOES EXECUTIVE COMMITTEE DO?

- Each member has a major responsibility within the organization

- Oversees the work of subcommittees and working groups

- Guides the planning of new activities

- Oversees the execution of the Strategic Plan and annual Implementation Plan

- Meets biweekly by teleconference

- Meets biweekly with NSF by teleconference

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WHAT DO COUNCIL MEMBERS DO?

- Shepherd visioning activities
- Participate in topical task forces
  - Examples: AI and Robotics, Healthcare, Privacy and Fairness
  - Produce and curate relevant resources
  - Monthly teleconferences
- Develop new activities
  - Examples: CIFellows, LISPI, Post-doc Best Practices, Big Data Hub Industry-Academia Collaboration
- Engage with government agencies, industry, and sister organizations (NSF, ACM, Big Data Hubs…)
- Write white papers and blog posts
- Other requests as needed
- Monthly teleconferences
- Three face-to-face meetings each year

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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
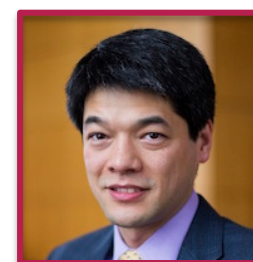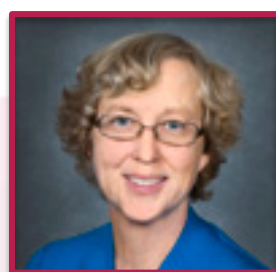
CRA STAFF

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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NSF INTERACTIONS

CISE Office of the Assistant Director
AD: James Kurose
DAD: Erwin P. Gianchandani

Advanced Cyberinfrastructure (ACI)
DD: Irene Qualters
DDD: Amy Friedlander

Computing and Communications Foundations (CCF)
DD: Rao Kosajaru
Acting DDD: Anindya Banerjee

Computer and Network Systems (CNS)
DD: Ken Calvert
DDD: Jeremy Epstein

Information and Intelligent Systems (IIS)
Acting DD: Howard Wactlar
DDD: Joydip Kundu

Data

Algorithmic Foundations

Computer Systems Research

Cyber Human Systems

High Performance Computing

Communications and Information Foundations

Networking and Technology Systems

Information Integration and Informatics

Networking / Cybersecurity

Software and Hardware Foundations

Robust Intelligence

Software

Program Officer: Nina Amla

RELATIONSHIP TO COMPUTING RESEARCH ASSOCIATION (CRA)

NSF cooperative agreement is with CRA

CCC is a standing committee of CRA

– Andy Bernat, CRA Executive Director, is an ex officio member of the CCC Executive Committee

– Beth Mynatt, the CCC Chair is a member of the CRA Board of Directors

– Susan B. Davidson, the CRA chair must consent to CCC Council appointments (and is a former Council member)

– Greg Hager, past CCC Chair and member of the CRA Board of Directors

– Greg Morrisett, CCC Council member and member of the CRA Board of Directors

– Shashi Shekhar, past CCC Council member and member of the CRA Board of Directors

– Josep Torrellas, past CCC Council member and member of the CRA Board of Directors

CCC staff are based in CRA

CCC AND ITS STAKEHOLDERS

Computing Research Community

| National Priorities | Agency Requests | Blue Sky Ideas | Open Visioning Calls |

↓ → Council-Led Workshops ← ← ↓ → Community Visioning ← ↓

Reports • White Papers
Roadmaps • New Leaders

Public | Funding Agencies | Science Policy Leadership

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MAJOR STAKEHOLDERS

- Computing Research Community
  - CRA
  - CSTB (Computer Science and Telecommunications Board, part of National Research Council)
  - Professional societies
  - Academic units
  - Research labs
- Industry
  - Computing industry, Major users of IT
- Public
- Government
  - See following slides

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GOVERNMENT STAKEHOLDERS

Agencies important to us

- NSF   – strong ties with CISE
- NIH   – growing ties with folks interested in Health IT
- DARPA   – ties come and go
- DoE   – ties with ASCR; interest in ARPA-E

Others that are relevant

- NIST
- HHS/ONC

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GOVERNMENT STAKEHOLDERS

Networking and Information Technology R&D (NITRD)

- Legislatively mandated coordination among Federal R&D agencies
- National Coordinating Office (NCO) facilitates
  - Interagency working groups
  - Coordinating groups
  - Senior steering groups
  - Community of practice
- Director is Bryan Biegel

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PCAST NITRD REPORT

2010

- 1/3 of the PCAST NITRD Working Group members were CCC Council Members
- The report drew extensively on CCC White Papers
- An excellent roadmap for the field

2013

- ¼ Contributing Members were CCC Council Members
- An excellent review of progress from 2010 report
- The challenge now: Continuing to translate it into action

2015

- 1/3 Contributing Members were CCC Council Members
- An update to the 2013 report, including recommendations for Federal Agencies
- The challenge now: restructuring NITRD

REPORT TO THE PRESIDENT AND CONGRESS
DESIGNING A DIGITAL FUTURE: FEDERALLY FUNDED RESEARCH AND DEVELOPMENT IN NETWORKING AND INFORMATION TECHNOLOGY

Executive Office of the President
President's Council of Advisors on Science and Technology

DECEMBER 2010

REPORT TO THE PRESIDENT AND CONGRESS
DESIGNING A DIGITAL FUTURE: FEDERALLY FUNDED RESEARCH AND DEVELOPMENT IN NETWORKING AND INFORMATION TECHNOLOGY

Executive Office of the President
President's Council of Advisors on Science and Technology

JANUARY 2013

REPORT TO THE PRESIDENT AND CONGRESS
ENSURING LEADERSHIP IN FEDERALLY FUNDED RESEARCH AND DEVELOPMENT IN INFORMATION TECHNOLOGY

Executive Office of the President
President's Council of Advisors on Science and Technology

August 2015

CCC GOALS AND ACTIVITIES

June 20, 2017

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.

Mapping CCC Strategic Goals to Priority Outcomes

	Goal 1: Research Challenges	Goal 2: Communicate Broadly	Goal 3: Research Investments	Goal 4: Leadership	Goal 5: Influence Community
Outcome 1: Agency Awareness	✔	✔	✔		
Outcome 2: Community Engagement	✔	✔		✔	✔
Outcome 3: Tangible Resources	✔	✔	✔		✔
Outcome 4: CCC Role	✔	✔		✔	
Outcome 5: Leadership and Capacity	✔	✔	✔	✔	✔

PLANNED ACTIVITIES

- Envisioning Future Computing Research

- Engaging and Aligning with National and Computing Research Priorities

- Communicating Future Computing Research

- Cultivating Computing Leadership and Community Capacity to Engage and Respond to National Priorities

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ENVISIONING FUTURE COMPUTING RESEARCH

"The Computing Community Consortium (CCC) solicits proposals that will galvanize the community to define visions and agendas for exciting frontiers of computing research."

- Create a new community of researchers.

- Inform a new funding initiative.

- Help an extant community define a new trajectory.

Goals for next phase

- Increase the participation of industry leadership and early career researchers at Visioning Workshops

- Expand the adoption of Blue Sky tracks at computing conferences

- Establish a biennial symposia series Computing Research: Addressing National Priorities and Societal Host on odd years and host in DC

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,….)
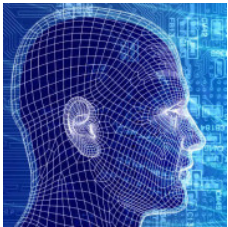
Cyber Social Learning Systems
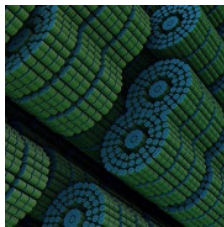
Nanotechnology-inspired Information Processing Systems

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

SUCCESSFUL VISIONING ACTIVITIES

- Engage the community and relevant stakeholders

- Facilitate broad thinking with compelling examples

- Create new avenues for (interdisciplinary) collaboration

- Prepare and energize the community for future opportunities

- Rapidly capture and synthesize ideas from the community.

- Present ideas and engage possible funders and stakeholders

- Articulate needs and barriers to research impact

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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RECENT BLUE SKY IDEAS CONFERENCE TRACKS

- BuildSys 2012

- Computational Sustainability Track @ AAAI 2013
- Computational Sustainability Award @ CHI 2013
- Robotics: Science and Systems 2013
- Conference on Innovation Data Systems Research (CIDR-2013)

- Autonomous Agents and MultiAgent Systems (AAMAS-2014, AAMAS-2016, AAMAS-2017)
- Foundations of Software Engineering (ACM SIGSOFT 2014)

- Advancement of Artificial Intelligence (AAAI-15, AAAI-16, AAAI-17)
- Advances in GIS (ACM SIGSPATIAL 2015, ACM SIGSPATIAL 2016)
- Robotics: Science and Systems (RSS) 2015

- Advancement of Artificial Intelligence (AAAI-15 and AAAI-16)
- International Conference on Software Engineering (ICSE 2016)

Upcoming:

- Robotics: Science and Systems (RSS) 2017
- AAAI-18

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ENGAGING AND ALIGNING WITH NATIONAL AND COMPUTING RESEARCH PRIORITIES

- Agility to respond to requests and ideas.
- Outreach pulls together visioning with stakeholder needs and timely opportunities

- Increase scale and capacity through CCC Task Forces
- Increase engagement with industry, sister organizations and other relevant stakeholders (philanthropy)

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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 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

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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

IMPACT

AMPLIFICATION

BRAIN Initiative launched in 2013.

CCC co-hosted the Brain Workshop with NSF in 2014.
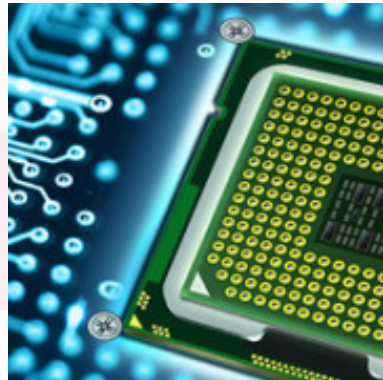
CCC co-hosted the SA+TS workshop with SRC and NSF in 2013.

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: BIG DATA

2008   2008   2010   2012   2016

IMPACT: ROBOTICS

A Roadmap for US Robotics
From Internet to Robotics

4 meetings during summer 2008

Roadmap published May 2009

Extensive discussions between visioning leaders & agencies
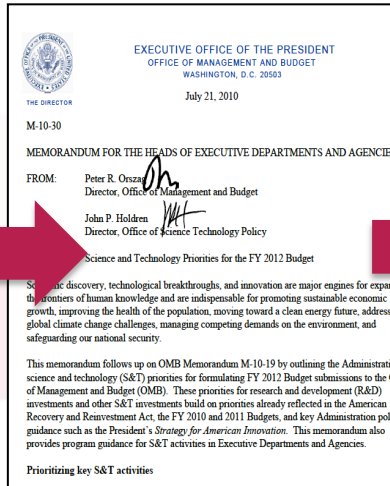
OSTP issues directive to all agencies in summer 2010 to include robotics in FY 12 budgets

National Robotics Initiative announced in summer 2011

2 meetings in Spring, 2016

Report and Congressional Briefing in June, 2016

Henrik Chistensen

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IMPACT: ROBOTICS

2 meetings in Spring, 2016

Report and
Congressional Briefing in
June, 2016
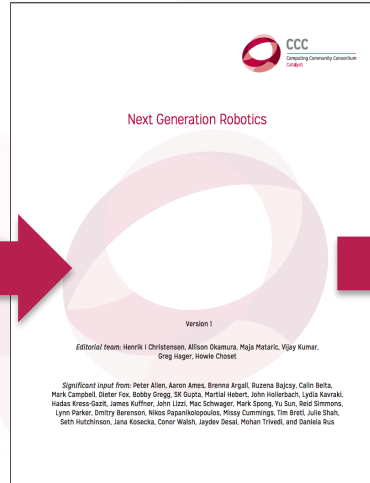
Next Generation
Robotics
published June, 2016
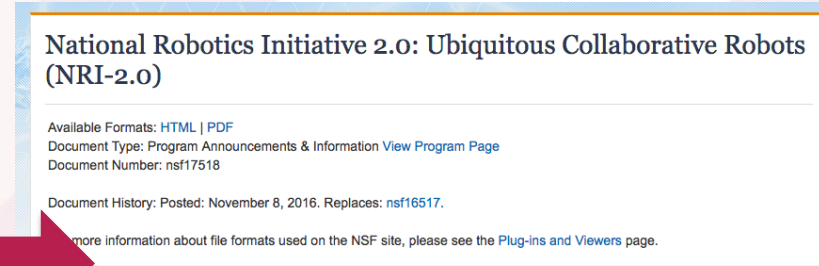
NRI 2.0 announced
November 2016

Henrik Chistensen

IMPACT: ARCHITECTURE

2010

2010

2012

2013

Josep Torrellas
UIUC

Mark Oskin
Washington

Mark Hill
Wisconsin

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IMPACT: ARCHITECTURE

Exploiting Parallelism and Scalability (XPS)

PROGRAM SOLICITATION
NSF 13-507

2013

Architecture 2030 Workshop @ ISCA 2016

CCC report out: Read the final report here.

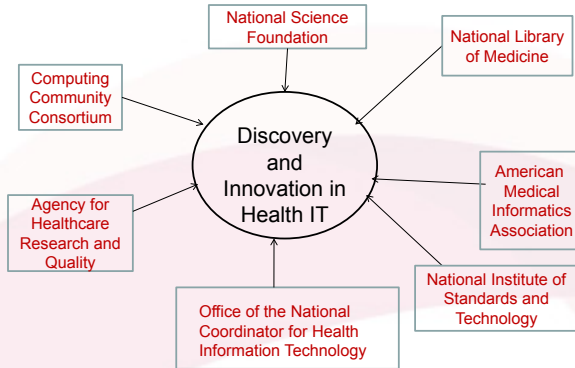**Video recordings:** Watch the video recordings here.

2016

Arch2030: A Vision of Computer Architecture Research over the Next 15 Years

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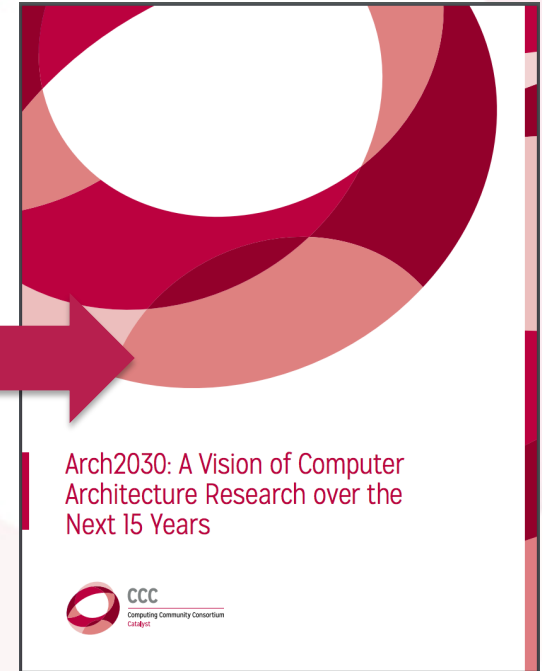
2016

Luis Ceze
Washington

Tom Wenisch
Michigan

Mark Hill
Wisconsin

IMPACT: HEALTH IT

October 2009 Workshop

- National Science Foundation
- National Library of Medicine
- Computing Community Consortium
- Discovery and Innovation in Health IT
- American Medical Informatics Association
- Agency for Healthcare Research and Quality
- National Institute of Standards and Technology
- Office of the National Coordinator for Health Information Technology

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) (nsf13543)   6/5/13 5:51 AM
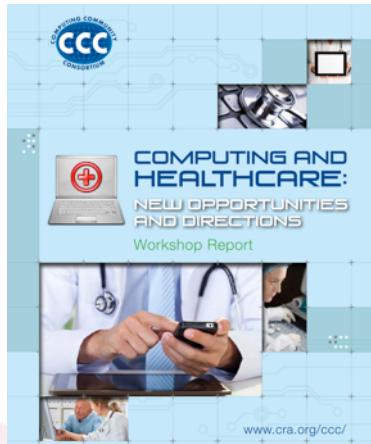
Smart and Connected Health (SCH)

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

COMPUTING AND HEALTHCARE:
NEW OPPORTUNITIES AND DIRECTIONS
Workshop Report

www.cra.org/ccc/

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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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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.

Computing Research Community

National Priorities — Agency Requests — Blue Sky Ideas — Open Visioning Calls

↓

Council-Led Workshops — Community Visioning

↓

Reports • White Papers
Roadmaps • New Leaders

↓

Public — Funding Agencies — Science Policy Leadership

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

DISCUSSION, QUESTIONS, IDEAS