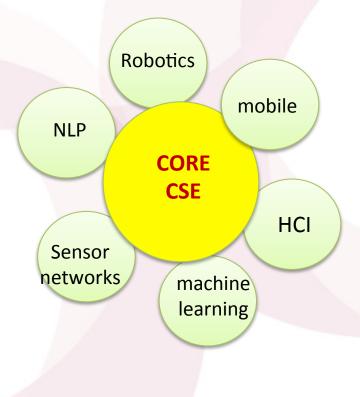
THE COMPUTING COMMUNITY CONSORTIUM: CATALYZING AND ENABLING COMPUTING RESEARCH

Gregory Hager Chair Johns Hopkins University Elizabeth Mynatt Vice Chair Georgia Tech

Ann Drobnis Director



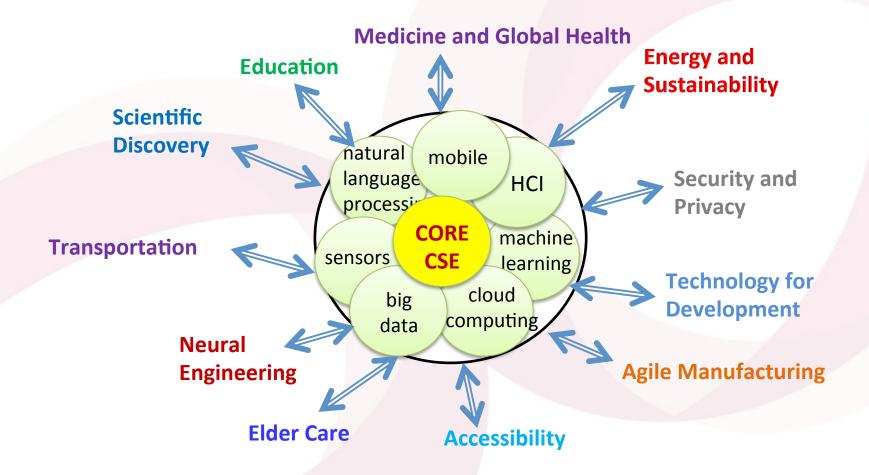
THE "CANONICAL" VIEW OF COMPUTER SCIENCE





USC 2014, GD Hager

A MORE EXPANSIVE VIEW OF THE FIELD



Drivers: Industry, Society, Government, Science



Computing Community Consortium Catalyst

Modified from Lazowska

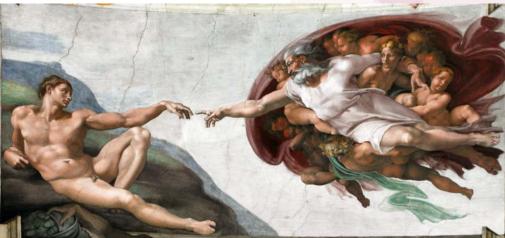
USC 2014, GD Hager

WHAT IS OUR FUTURE? HOW DO WE SHAPE IT?

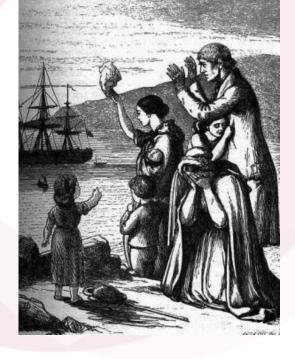
Enlightenment:

Is Computing the future of thought and discourse?





Renaissance: Is Computing creating a new ways to Combine and create?



DIASPORA: Is it the beginning of The end of Computing as we know it?



Computing Community Consortium Catalyst

USC 2014, GD Hager

SOME MOTIVATING QUESTIONS

How do we energize the community around "big ideas" that will create excitement and energy for computing and computational research?

How do we shape and articulate the relevance of computing research to national priorities?

How do we communicate these ideas, as a community, to science policy and funding leadership?



THE COMPUTING COMMUNITY CONSORTIUM

- Established in 2006 as a standing committee of the Computing Research Association
- Funded by NSF under a Cooperative Agreement
 - Second Award began in 2012, Site Visit completed in 2014
- Facilitates the development of a bold, multi-themed vision for computing research – and communicates this vision to stakeholders
- Led by a broad-based Council
- Staffed by CRA



OUR MISSION

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.

CCC conducts activities that strengthen the research community, articulate compelling research visions, and align those visions with pressing national and global challenges.

CCC communicates the importance of those visions to policymakers, government and industry stakeholders, the public, and the research community itself.



CCC ORGANIZATIONAL STRUCTURE

Chair, Vice-chair

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

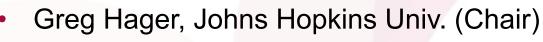
Executive Committee

- 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
- Director, Program associate
 - Full-time paid positions



THE CCC COUNCIL – EXECUTIVE COMMITTEE





- Beth Mynatt, Georgia Tech (Vice Chair)
- Susan Graham, UC Berkeley (Past Chair)
- Bob Sproull, formerly Sun Labs, Oracle
- Liz Bradley, University of Colorado, Boulder
- Mark Hill, University of Wisconsin, Madison
- Ann Drobnis, Director





Andy Bernat, CRA Executive Director









Computing Community Consortium Catalyst

THE CCC COUNCIL











** 1 year leave

Terms ending June 2017

- Lorenzo Alvisi, UT Austin
- Vasant Honavar, Penn State
- Jennifer Rexford, Princeton
- Debra Richardson, UC Irvine
- Klara Nahrstedt, UIUC
- Ben Zorn, Microsoft Research

Terms ending June 2016

- Randy Bryant, CMU**
- Limor Fix, formerly Intel
- Tal Rabin, IBM
- Daniela Rus, MIT
- Ross Whitaker, Univ. Utah

Terms ending June 2015

- Sue Davidson, Univ. Pennsylvania
- Joe Evans, Univ. Kansas
- Ran Libeskind-Hadas, Harvey Mudd College
- Shashi Shekhar, Univ. Minnesota















Computing Community Consortium Catalyst

OUR MISSION

Catalyze and communicate the excitement of computing research

Align and articulate our contributions to other fields and to national priorities

Groom future leadership to help shape science policy



WHAT DISTINGUISHES CCC?

Proactive, rapid response

Identify, plan, and execute in a matter of weeks to months

Community-based

 Find and foster ideas from germination to fruition and beyond

Leadership incubator

- Everyone is expected to do something!



WHAT DO WE DO?

Community-initiated visioning:

- Workshops to discuss "out-of-the-box" ideas
- Blue Sky Ideas tracks at conferences

Outreach to White House, funding agencies:

- Outputs of visioning activities
- Short reports to inform policy makers
- Task Forces Health IT, Computing in the Physical World, Manufacturing, Big Data, Industry, High Performance Computing, Education



Communicating CS Research:

- CCC Blog [http://cccblog.org/]
- Computing Research in Action Video Series

robotic technology. Professor Cindy Bethel starte Systems (STARS) Lab. She leads a team of 22 rese

CCC Computing Research in Action: ST

- Research "Highlight of the Week"
- "The Impact of NITRD" symposium

students.

Nurturing the next generation of leaders:

- Computing Innovation Fellows Project
- Leadership in Science Policy Institute
- Postdoc Best Practices Program



Computing Community Consortium Catalyst

Research · Innovation · Impact CFEEDOWS Worksh Worksh @ MI Thursday, July 31 Researchers at Mississippi State University are st

Getting Serious about the Design of S

"This research has been an investment of heart a we didn't have any funding for this, but it was so by Ann Drobnis devoted our time to this and to building this prov

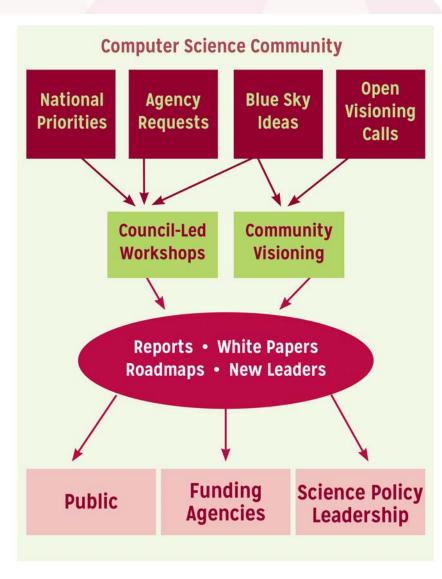
This is a guest post, written by David W. McDonald, Cr Centered Design and Engineering Department at the U application is hard. Designing a good computer system accounts for the vagaries of people, their motivations, a



VISIONING GOALS

Communicate the role of CS research to stakeholders

Develop leadership capacity to help shape science policy





VISIONING PROCESSES

- Periodic RFP for Community Initiated Activities
- Historically 3-7 workshops per year
- Top-down (agency initiated)
- Bottom-up (open call)
- Sideways (council initiated, joint with other agencies,)



Robotics



Spatial Computing



Online Education



Privacy R&D

Uncertainty in Computation



omputing Community Consortium atalyst

VISIONING ACTIVITIES

2012

- From GPS and Virtual Globes to Spatial Computing 2020
- Computing and Healthcare: New Opportunities and Directions

2013

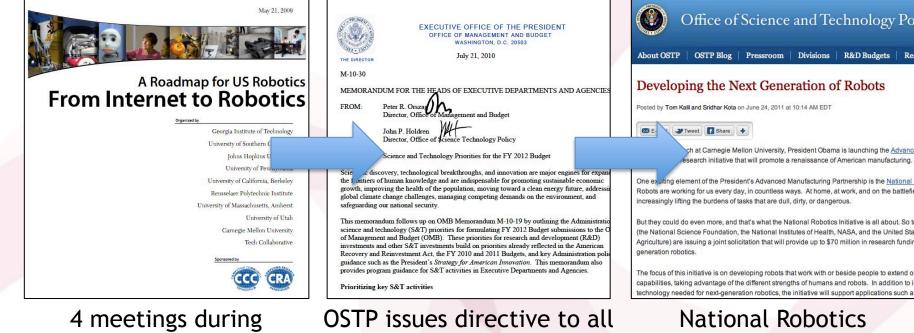
- Convergence of Software Assurance Methodologies and Trustworthy Semiconductor Design and Manufacture (SA+TS)
- Multidisciplinary Research for Online Education
- Privacy R&D Workshop (with ITIF)
- Extreme Scale Design Automation 2 (with ACM)
- Visions of Theory of Computing (with Simons Institute)
- Robotics, Automation, and Computer Science (with NSF, OSTP)

2014

- Extreme Scale Design Automation 3 (with ACM)
- Computing Visions 2025: Interacting with the Computers All Around Us (with CISE)
- Computing Visions 2025: The New Making Renaissance: Programmable Matter and Things (with CISE)
- Human Computation
- Aging in Place
- Uncertainty in Computation
- BRAIN



CATALYZING AND ENABLING: ROBOTICS



summer 2008

Roadmap published May 2009

Extensive discussions between visioning leaders & agencies

agencies in summer 2010 to include robotics in FY 12 budgets

> Henrik Chistensen Georgia Tech

Tweet 🚺 Share 🕂 ch at Carnegie Mellon University, President Obama is launching the Advanc esearch initiative that will promote a renaissance of American manufacturing.

One exuting element of the President's Advanced Manufacturing Partnership is the National Robots are working for us every day, in countless ways. At home, at work, and on the battlefi increasingly lifting the burdens of tasks that are dull, dirty, or dangerous

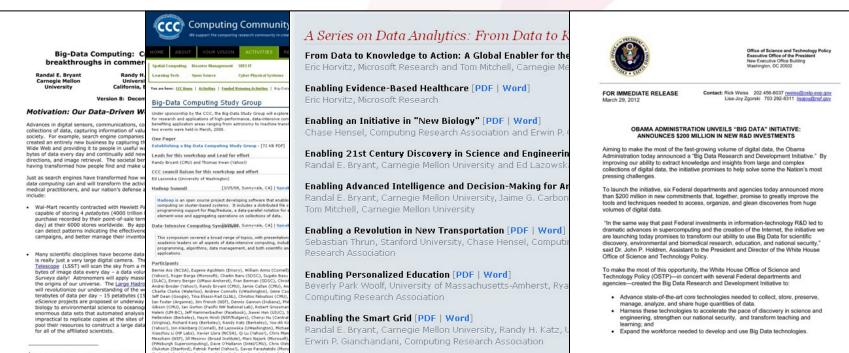
But they could do even more, and that's what the National Robotics Initiative is all about. So (the National Science Foundation, the National Institutes of Health, NASA, and the United St Agriculture) are issuing a joint solicitation that will provide up to \$70 million in research fundi

The focus of this initiative is on developing robots that work with or beside people to extend of capabilities, taking advantage of the different strengths of humans and robots. In addition to technology needed for next-generation robotics, the initiative will support applications such a

National Robotics Initiative announced in summer 2011

Computing Community Consortium Catalvst

CATALYZING AND ENABLING: BIG DATA



Erwin P. Gianchandani, Computing Research Association

Challenges and Opportunities with Big Data [PDF] A community white paper developed by leading researchers a

Oluxioni (Statron), partick rankel (Sancol), Savis Farisstoos (Ho (Indiaa), Paribakar Raghava (Sahoo), Rayla Banakirishaa (Sah (SURY Suffalo), Dan Reed (Microsoft), Anne Rogers (Choago), Rika Aris Shoshan (Lawrence Berkeley, Laborator), Palfraid Smyth (UC (Yahoo), Ravi Sundaram (Northeastern), Alex Salay (PMU), Douglas Thomgan (Datroub), Andrees Tomkins (Yahoo), Cristias Ungurea

Vogel (CMU), Dan Weld (UWashington), John Wilkes (HP), Jeannette Labs), Ke-Thia Yao (ISI/USC), Hongyuan Zha (GeorgiaTech), Cher Zhang (UC Santa Cruz)

2008

¹ For the most current version of this essay, as well as rel

2008

· Expand the workforce needed to develop and use Big Data technologies

2010





Computing Community Consortium

CATALYZING AND ENABLING: ARCHITECTURE

Workshop on Advancing Computer **Architecture Research (ACAR-1)**

Failure is not an Option: Popular Paralle Programming

Organizers: Josep Torrellas (University of Illinois) and Mark Oskin (Uni of Washington).

Steering Committee: Chita Das (NSF and Pennsylvania State University William Harrod (DARPA), Mark Hill (University of Wisconsin), James I (Microsoft Research), Margaret Martonosi (Princeton University), Jose Mo (IBM Research), and Kunle Olukotun (Stanford University).

Written by: Josep Torrellas, Mark Almadena Chtchelkanova, Chita Da Jon Hiller, Sampath Kannan, Krish Richard Murphy, Onur Mutlu, Satis Anand Sivasubramaniam, Kevin Skauron, Karın Sırat Dean Tullsen.

Funded by the Computing Research Association's (CRA) Computing C Consortium (CCC) as a "visioning exercise" meant to promote forward th computing research and then bring these ideas to a funded program.

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

August 2010

Workshop on Advancing Computer Architecture Research (ACAR-II) Laying a New Foundation for IT: Compute Architecture for 2025 and Beyond

Organizers: Mark Oskin (University of Washington) and Josep Torr (University of Illinois).

Steering Committee: Chita Das (Pennsylvania State University), N (University of Wisconsin), James Larus (Microsoft Research), Marga Martonosi (Princeton University), Jose Moreira (IBM Research), and Olukotun (Stanford University)

Written by: Mark Oskin, Josep Torrellas, Chita Das, John Davis, Sa Dwarkadas, Lieven Eeckhout, Bill Feiereisen, Daniel Jimenez, Mark Martha Kim, James Larus, Margaret Martonosi, Onur Mutlu, Kunl Andrew Putnam, Tim Sherwood, James Smith, David Wood, Crai

Funded by the Computer Resea Consortium (CCC) as a "visioni thinking in computer research a program

Held on September 20-21, 2010 in Seattle, Washington Contact: oskin@cs.washington.edu; torrella@illinois.edu Website: http://www.cra.org/acar.php

2010

21st Century Computer Architectu

A community white paper

May 25, 2012

1. Introduction and Summary

Information and communication technology (ICT) is transforming our wor Incommon and commonsator commons, government, deferes, and entertainment to remember that 20 years ago the first step in information search involved a trip to 10 years ago social networks were mostly physical, and 5 years ago "tweets" cartoon characters.

Importantly, much evidence suggests that ICT innovation is accelerating with many visions moving from science fiction toward reality¹. Appendix A both touches upon t and seeks to distill their attributes. Future visions include personalized medicine to and seeks to distill their attributes. Future visions include personanzized medicine to and drugs to an individual, sophisticated social network analysis of potential terror aid homeland security, and telepresence to reduce the greenhouse gases spent for Future applications will increasingly require processing on large, heterogeneous Data²⁰), using distributed designs, working within form-factor constraints, and re deployment with efficient operation.

wo key-but often invisible-enabler technology and computer architecture. Se transistors (Moore's Law) for roughly co Computer architects took these rapid tra techniques to scale processor performance and mitigate memory system losses effect of technology and architecture has provided ICT innovators with exponent growth at near constant cost.

Because most technology and computer architecture innovations were (intention higher layers, application and other software developers could reap the benefits of 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 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 lini

¹ PCAST, "Designing a Digital Future: Federally Funded Research and Development Networking and Technology, Dec. 2010 (http://www.whitehouse.gov/sitesidefaultifies/micrositesiostpipcast-nitrd-report-2010.pc 2 CCC, "Challenges and Opportunities with Big Data," Feb, 2012 (http://cra.org/ccc/docs/init/bigdata

note that the following information is cu

2010



Josep Torrellas UIUC



Mark Oskin Washington



Mark Hill Wisconsin



Computing Community Consortium Catalyst

Exploiting Parallelism and Scalability (XPS)

PROGRAM SOLICITATION NSF 13-507

Directorate for Computer & Information Science & Engineerin Division of Computing and Communication Foundations Division of Information & Intelligent Systems Division of Computer and Network Systems NSF AAAA

Office of Cuberinfrastructure Full Proposal Deadline(s) (due by 5 p.m. proposer's local time) February 20, 2013

IMPORTANT INFORMATION AND REVISION NOTES

A revised version of the NSF Proposal & Award Policies & Procedures Guide (PAPPO), NSF 13-1, was insued or October 4, 2012 and is effective for proposals submitted, or due, on or after January 14, 2013. Please be opportunity. Progress who again to submit prior to January 14, 2013, must also follow the guidelines.

Disase he means that significant chor of the criteria. Charges will affect the project summary and project description also will be affected. A by-chapter summary of this and other significant changes is provided at the beginning of both the Gr

lease note that this program solicitation may contain supplemental pro on the guidelines established in the Grant Proposal Guide.

IMMARY OF PROGRAM REQUIREMENTS

General Information

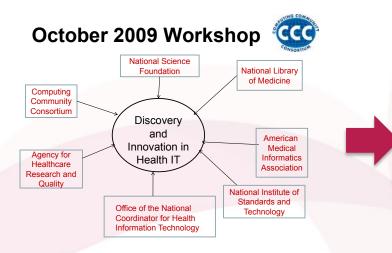
Exploiting Parallelism and Scalability (XPS)

is of Proprog

izant Program Officer(s):

2013

CATALYZING AND ENABLING: HEALTH IT





October 2012 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



Computing Community Consortium Catalyst

COMPUTING VISIONS 2025

- Joint Venture of NSF CISE Advisory Committee and CCC
- Articulate future trends and opportunities in computing research. Envision evolution and growth over the next 10 to 15 years.
- 3 Initial Workshops:
 - Interacting with the Computers All Around Us
 - Look at how technology could change how computers interface with people and the world around them.
 - The New Making Renaissance: Programmable Matter & Things
 - Explore the way items are designed, programmed, manufactured, and delivered/deployed.
 - Summarizing roundtable(forthcoming)
 - Discuss emerging themes from prior workshops and deliver a summarizing report.
- Panel session at Snowbird 2014



SOME RECENT AND UPCOMING EVENTS

- Aging in Place (with NIH)
- Uncertainty in Computation (Community driven)
- BRAIN (with CISE)
- Privacy by Design (Community driven)
- CS Visions 2025 (with CISE AC)





CCC WORKING GROUPS

Topic areas stemming from societal priorities and the needs of our community

- Computing and the Physical World
- Data Analytics
- Education
- Health IT
- Industry
- Manufacturing
- High Performance Computing



BLUE SKY IDEAS CONFERENCE TRACKS

- Special "Blue Sky Ideas" tracks at leading conferences
 - Reach beyond usual papers
- CCC provides prize money for top 3 papers
 - Papers should be:
 - open-ended
 - "outrageous" or "wacky"
 - Present new problems, new application domains or new methodologies
 - Relatively short (4-6 pages)
 - Published after the conference



DETAILS

- Conference Organizers write a proposal, indicating how papers will be solicited and reviewed
- Blue Sky Chair and Director read proposals and determine viability
- Once Track is approved, a CCC liaison is assigned
- BS Chair or liaison may attend the Conference to present information about the CCC and the awards



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)
- Foundations of Software Engineering 2014
- Upcoming:
 - Association for the Advancement of Artificial Intelligence 2015
 - SIGSPATIAL 2015

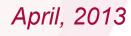


LEADERSHIP IN SCIENCE POLICY INSTITUTE

To educate a cadre of computing researchers on how science policy in the U.S. is formulated and how our government works

November, 2011

- 34 attendees
- 7 women
- 19 received financial aid
- 24 institutions represented
- 23 participants from public institutions, 7 from private, 4 from industry



- 53 attendees
- 12 women



- 6 received financial aid
- 47 institutions represented
- 40 participants from public institutions, 12 from private, 1 from industry

Next LISPI: April, 2015





CCC: CATALYZING AND ENABLING COMPUTING RESEARCH

www.cra.org/ccc www.cccblog.org



Computing Community Consortium Catalyst