## What is PCAST?

#### LEADERSHIP SUMMIT PRESENTATION

SUSAN L. GRAHAM FEBRUARY 24, 2014

#### The President has a National Science Advisor



John Holdren chairs both OSTP and PCAST

#### Office of Science and Technology Policy (OSTP)

- In White House Executive Office of the President
- Our community's primary contacts are
  - o Director: John P. Holdren
  - o U.S. Chief Technology Officer: Todd Park
  - Deputy Director for Technology and Innovation: Tom Kalil
  - Ass't Director, Robotics and Cyber-Physical Systems: Vijay Kumar (Penn)
  - Assistant Director, Advanced Manufacturing: Alex Slocum (MIT)
  - Associate Director for Nat'l Security and Int'l Affairs: Patricia
     Falcone

## President's Council of Advisors on Science and Technology (PCAST)



## PCAST is co-chaired by John Holdren and Eric Lander (MIT and Harvard)

- Twenty members; mostly since 2009
- Members with professional computing-related roles are
  - Mark Gorenberg (Zetta Venture Partners)
  - Susan Graham (UC Berkeley)
  - Eric Schmidt (Google)
  - William Press, vice-chair (UT Austin)
  - Craig Mundie (Microsoft)
  - Executive director: Marjory Blumenthal

#### Recent Reports

- Dec. 2012 Agricultural Preparedness & the United States Agricultural Research Enterprise
- Jan 2013 <u>Designing a Digital Future: Federally</u>
   Funded Research and Development in Networking and Information Technology
- March 2013 Letter Report on Climate Change
- Nov 2013 Immediate Opportunities for Strengthening the Nation's Cybersecurity
- Dec 2013 Letter Report on Education Technology

## Networking and Information Technology R&D (NITRD) program

- 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 George Strawn

#### Communicating: 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



#### 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



#### Communicating: PCAST NITRD Report - 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

#### REPORT TO THE PRESIDENT AND CONGRESS

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## The President Makes a Speech

- I have also asked my Counselor, John Podesta, to lead a comprehensive review of big data and privacy. This group will consist of government officials who-along with the President's Council of Advisors on **Science and Technology**—will reach out to privacy experts, technologists and business leaders, and look at how the challenges inherent in big data are being confronted by both the public and private sectors; whether we can forge international norms on how to manage this data; and how we can continue to promote the free flow of information in ways that are consistent with both privacy and security.
- - President Barack Obama, 17 January 2014

# The Computing Community Consortium Catalyzing and Enabling Computing Research

Susan Graham Chair Gregory D. Hager Vice-Chair

Ann Drobnis
Director



## An Overview of the Computing Community Consortium

- A standing committee of the Computing Research Association founded in 2006
- 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
- 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.



#### The CCC Council





- Susan Graham, UC Berkeley (Chair)
- Greg Hager, Johns Hopkins (Vice Chair)
- Ed Lazowska, U. Washington (Past Chair)
- Elizabeth Mynatt, Georgia Tech
- Fred Schneider, Cornell
- Sue Davidson, Univ. Pennsylvania
- Ann Drobnis, Director
- Andy Bernat, CRA Executive Director















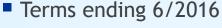






#### The CCC Council





- Randy Bryant, CMU
- Limor Fix, Intel
- Mark Hill, U. Wisconsin, Madison
- Tal Rabin, IBM Research
- Daniela Rus, MIT
- Ross Whitaker, Univ. Utah



- Terms ending 6/2015
  - Liz Bradley, Univ. Colorado
  - Joe Evans, Univ. Kansas
  - Ran Libeskind-Hadas, Harvey Mudd
  - Shashi Shekhar, Univ. Minnesota



- Terms ending 6/2014
  - Deborah Crawford, Drexel
  - Anita Jones, Univ. Virginia
  - Bob Sproull, Sun Labs Oracle (ret.)
  - Josep Torrellas, Univ. Illinois

















#### The CCC Council

#### Past Members

- Stephanie Forrest, Univ. New Mexico
- Chris Johnson, Univ. Utah
- Frans Kaashoek, MIT
- Robin Murphy, Texas A&M
- Bill Feiereisen, LANL
- Dave Kaeli, Northeastern
- John King, Univ. Michigan
- Dick Karp, UC Berkeley
- Andrew McCallum, Umass
- Dave Waltz, Columbia
- Greg Andrews, Univ. Arizona
- Peter Lee, Carnegie Mellon
- Karen Sutherland, Augsburg College



### 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

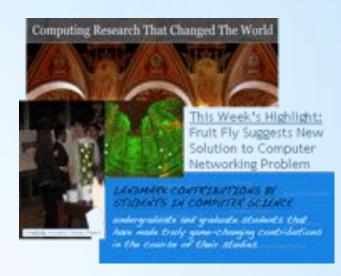
#### Leadership incubator

Everyone is expected to do something!



#### A Multitude of Activities

- Community-initiated visioning:
  - Workshops to discuss "out-of-the-box" ideas
  - Challenges & Visions tracks at conferences
- Outreach to White House, funding agencies:
  - Outputs of visioning activities
  - Short reports to inform policy makers
  - Task Forces Health IT, Sustainability IT, Data Analytics



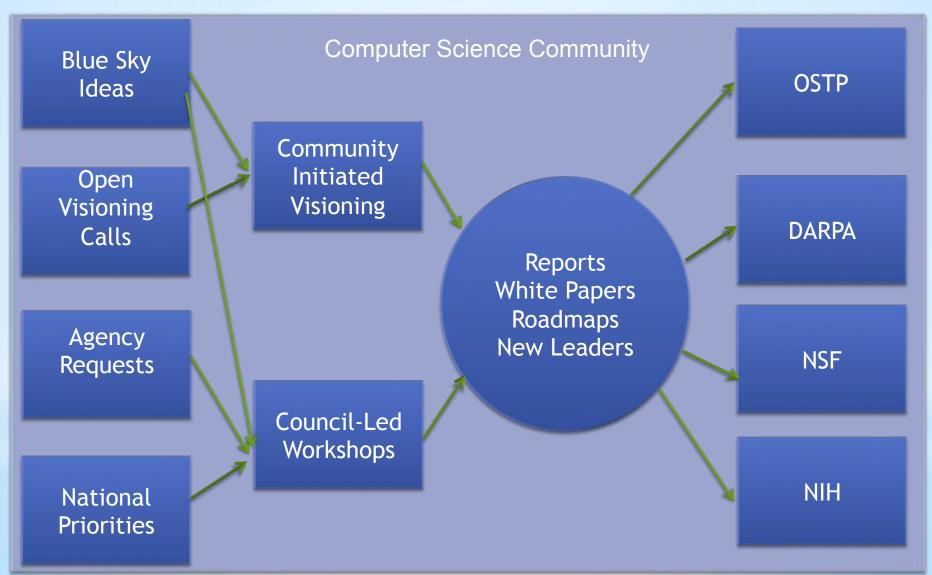


- Communicating CS Research:
  - "The Impact of NITRD" symposium
  - Research "Highlight of the Week"
  - CCC Blog [http://cccblog.org/]
- Nurturing the next generation of leaders:
  - Computing Innovation Fellows Project
  - "Landmark Contributions by Students"
  - Leadership in Science Policy Institute





## Catalyzing: Visioning Activities





## Catalyzing: Visioning Activities

- Over 20 Workshops to date
- More than 1,500 participants

Extreme Scale Design Automation

Sustainability & IT Financial Cyberinfrastructure

Computing and Healthcare

Privacy R&D

Cyber-physical systems Spatial Computing

Big Data Computing ROBOT

Disaster Management Online Education

Free & Open Source Software

Learning Technologies Global Development



#### Catalyzing and Enabling: Big Data



2008 2008 2010 2012





## Catalyzing and Enabling: Past Efforts



Office of Science and Technology Po About OSTP | OSTP Blog | Pressroom | Divisions | R&D Budgets | Res Developing the Next Generation of Robots Poeted by Tom Kall and Sridhar Kota on June 24, 2011 at 10:14 AM EDT CB E-Mail - Franct | | Share | 4 Today, in a speech at Camegie Mellon University, President Obama is launching the Advance Partnership, a research initiative that will promote a renaissance of American manufacturing. One exciting 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 battlefix increasingly lifting the burdens of tasks that are dull, dirty, or dangerous. they could do even more, and that's what the National Robotics Initiative is all about. So to National Science Foundation, the National Institutes of Health, NASA, and the United Sta foulture) are issuing a joint solicitation that will provide up to \$70 million in research fundir

Henrik Chistensen Georgia Tech

Smart Health Program announced, 2010

National Robotics
Initiative announced
in summer 2011

Big Data Initiative announced, spring 2012

FOR IMMEDIATE RELEASE

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Office of Science and Technology Policy.

Corner Sci Wess 202 495 5007 pages (200 page

OBAMA ADMINISTRATION UNVEILS "BIG DATA" INTIATIVE:

AMPOUNCES \$200 MILLION IN NEW RED INVESTMENTS

Administration today announced a "Big Data Research and Development Initiative." By

catestions of digital data, the inflative provises to hop solve some the Nation's most

To burnch the initiative, six Federal departments and agencies today announced stors

In the same way that past Federal investments in information-technology R&D lod to

dramatic advances in supercomputing and the creation of the Internet, the initiative we

are learnthing today promises to inereffore our ability to use Big Data for scientific discovery, environmental and biomedical research, education, and national security."

To make the most of this opportunity, the White House Office of Science and Technology Policy (OSTP)—is concert with several Fuderal departments and approxime—created the Big Data Research and Development Institutive ts:

manage, analyse, and share huge quantities of data.

said Dr. John P. Holdren, Assistant to the President and Director of the White House

Advance state-of-the-art core ischnologies needed to collect, store, preserve.

Harness those lechnologies to accelerate the pace of discovery in science and

engineering, strengthen our national security, and transform teaching and learning and • Expand the workforce needed to dovelop and use Sig Data technologies.

those \$200 million in new commitments that, together, promise to greatly improve the

tools and techniques needed to access, organize, and glean discoveries from huge

Aiming to make the most of the fast-growing volume of digital data, the Obama:

improving our ability to extract knowledge and insights from large and complex

Little-You Zigorski 190 (90)-40711 (6000+@ngl. 40+





## 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 (University of Washington).

Steering Committee: Chita Das (NSF and Pennsylvania State University), William Harrod (DaRPA), Mark Hill (University of Wisconsis), Junes La (Microsoft Research), Margaret Martenosi (Princeton University), Jose Mo (IBM Research), and Kunie Obskotan (Stanford University).

Written by: Josep Torrellus, Mark. Almafena Chtchelkaross, Chita D. Jon Hiller, Sampath Kannan, Krish Richard Murphy, Oeur Muffu, Smit Anand Swandramaniam, Kevin Schoone, Karni-Strauss, Steve Dean Tulbes.

Funded by the Computing Research Association's (CRA) Computing Co 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: torrellafoillinois.edu; oskinifics.washington.edu Websites: http://www.cra.org/ecc/acar.php;.http://acoms.cs.uiuc.edu/acar/

August 2016

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 Tom (University of Kingis).

Seering Committee: Chita Das (Pennsylvania State University), M (University of Wisconsin), James Larus (Microsoft Research), Margi Martonosi (Princeton University), Jose Moreira (IBM Research), and Oskobun (Stanford University).

Written by: Mark Oskin, Josep Torrelles, Chita Das, John Davis, St Dwarkadas, Lieven Eeckhout, Bit Fearmisert, Daniel Jimenez, Mari Martha Kim, James Larus, Margaret Martonosi, Orur Muthu, Konti Andrew Putham, Tim Sherwood, James Smith, David Wood, Crai

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

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

#### 21st Century Computer Architectu

A community white paper May 25, 2012

#### 1. Introduction and Summary

Information and communication lacthology (ECT) is transforming our world healthcare, education, science, commerce, government, defense, and enfentament to remember that 20 years ago the first stag in information search involved a trip to 10 years ago social networks were mostly physical, and 6 years ago "berets" centron characteristics.

Importantly, much evidence suggests that SCT recordant is accelerately with many vivene manying from science from travel readily. Appendix A both Statellers sport the and seales to dreld their attributes. Failure viviens mediate personalized medicine to dred dreps to an individual, suphisticated acceler selector interplant of portional terrene self-terreness of the self-terreness of terreness of terreness

Two key—but often invisible—enablers fechnology and computer architecture. Se framilitors (Moore's Law) for roughly or Computer architects took these rapid to

Computer architects book these rapid to techniques to scale processor performance and magaze memory system losses effect of technology and serbitecture has provided ICT innovators with exponential growth at least constant cost.

Because most bednedage and computer actification invasions were interincially legion again, separation and other advantages and respirate personal respirate benefits of a without employee and respirate benefits of a without employee in it. Higher performance has both make more computationally applications believed (e.g., small assistant, computer vision) and make a population easier to develop by emailing higher-level programming abstractions of a larguages and resulted components (impressments in computer system control and could never have there integred by the field's flow distribution who separative software covered by whether flow.

#### Exploiting Parallelism and Scalability (XPS)

PROGRAM SOLICITATION

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#### INFORTANT INFORMATION AND REVISION NO

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SURMARY OF PROGRAM REQUIREMENTS

#### Secretary Vision

Exploring Parameters and Espapering (PPS)

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2013

2010

2010



Mark Oskin Washington



2012

Mark Hill Wisconsin



Josep Torrellas
UIUC



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## Catalyzing and Enabling: Health IT

#### October 2009 Workshop













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** 

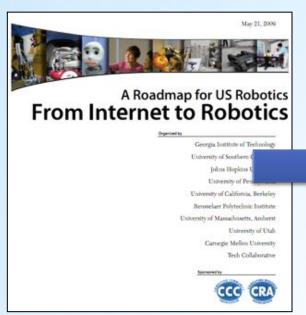


### **Recent CCC Workshop Activity**

- Spatial Computing Workshop Report
  - From GPS and Virtual Globes to Spatial Computing -2020: The Next Transformative Technology
- Robotics, Automation, and Computer Science
  - Sponsored by Robotics-VO, NSF, OSTP, and CCC
  - Goal: frame concrete problems used to guide basic and applied research through the National Robotics Initiative
- Extreme Scale Design Automation #3
  - Sponsored by ACM and CCC
  - Goal: concrete action items for the EDA community to re-invigorate the field



### Catalyzing and Enabling: 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

Henrik Chistensen Georgia Tech



National Robotics
Initiative announced
in summer 2011





## Catalyzing and Enabling: Upcoming Workshops

- Computing Visions 2025
  - Joint Venture of NSF CISE Advisory Committee and CCC
  - 3 Initial Workshops:
    - Interactions
      - Look at how technology could change how computers interface with people and the world around them.
    - New Renaissance of Indy Manufacturing: Programmable Matter and Things
      - Explore the way items are designed, manufactured, and delivered
    - Computing and the Smart World
      - Look at the massive amounts of data and advanced analytical techniques to "make the world smart"





## Catalyzing and Enabling: Upcoming Workshops

- Community Visioning Workshops:
  - Human Computation Roadmap
  - Uncertainty in Computation
- BRAIN (NSF, NIH)
- Aging in Place (NIH)





#### Catalyzing: Blue Sky Ideas Conference Tracks

- Special tracks at major research conferences organized by faculty, graduate students, postdocs
- CCC provides prizes to three Best Papers
- "Reach out beyond the usual research papers that present completed work to seek out papers that present ideas and visions that can stimulate the research community to pursue new directions"
- Past Year:
  - 12<sup>th</sup> International Conference on Autonomous Agents and Multiagent Systems (AAMAS)
- Coming Year:
  - 13<sup>th</sup> International Conference on Autonomous Agents and Multiagent Systems (AAMAS)
  - 22<sup>nd</sup> ACM SIGSOFT International Symposium on Foundations of Software Engineering (SIGSOFT)

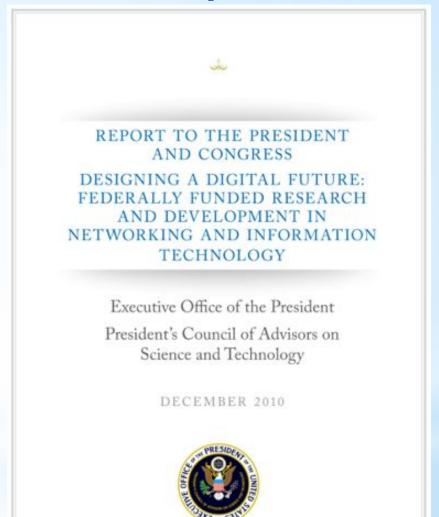
## Research Visions





## Communicating: PCAST NITRD Report - 2010

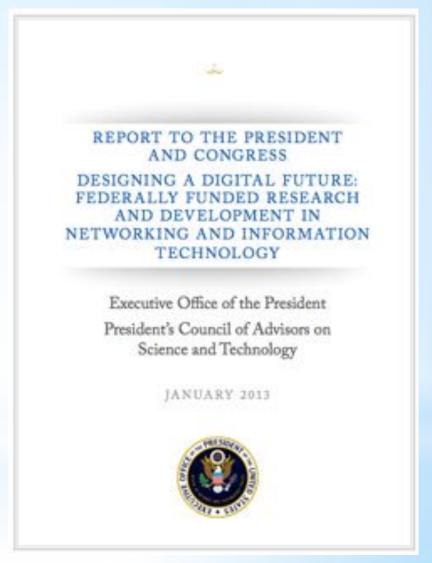
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- An excellent review of progress from 2010 report
- The challenge now: continuing to translate it into action





## Communicating: NITRD Symposium (2/16/2012)















































## Communicating: Leadership in Science Policy Inst. (November 2011, April 2013)



#### CCC Leadership in Science Policy Institute



#### Agenda

8:30 am - 9:00 am Welcome [100 KB PDF] [Referenced videos - Lazovska | Bartlett | Brooks] (Fred Schneider, Cornell, Workshop Chair)

Lay out the goals of the workshop: to provide a cresh-course in relevant science policy issues and the mechanics of policymaking, including a sense of how federal science policy is crafted, how it's implemented, and where are the apportunities for members of the community to participate in the policy-making process.

9:00 am - 10:30 am Interacting with Agencies/Creating New Initiatives (Jeannette Wing, CMU [434 KB PDF]; Milt Corn, NIH [242 KB PDF]; Henry Kelly, DOE)

The agencies are where the science-policy rubber hits the road, where decisions made in both the Administrative and Legislative branches get implemented, and the most common avenue for individuals in the science community to interact with the federal government. Influencing policy decisions at the agency level can require a somewhat different skill set and somewhat different approach than influencing your faculty peers, the Congress, or the White House. Agencies also provide opportunities for individuals in the community to directly shape federal policy in their field, by serving on an agency advisory committee, or by taking a notation as a program manager, division director, or office director. This session will cover the agency budget process and will discuss apportunities for scientists to advise and engage federal science agencies like NSF, DOE, and NIH. The speakers will discuss the mechanics of how agency new initiatives get started, focusing on the culture and traditions that constitute the lens through which agencies view themselves and are viewed by others. In practical terms, how is success measured? To what extent is outside advice sought and in support of what kinds of activities? What kinds of advice and modes of engagement are unlikely to be effective?

#### Back to Main Page

Content is still being added to this abs. Hease check back periodically. The last change was made on: December 13, 2011.

#### Logistics

Date: November 7, 2011 Location: Hyst Regency Capital Hill, Washinton, DC

Participation in the workshop will include breakfast and winch at the workshop, as well as a reception with workshop speakers and other interested guests at the conclusion of the meeting. Hotel accommodations for two nights (before and after the workshop) as well as reimbursement for einfans and other travel expenses will be provided by the workshop (through funding from CCC).

#### Agenda

List of Sessions and Speakers and Slides

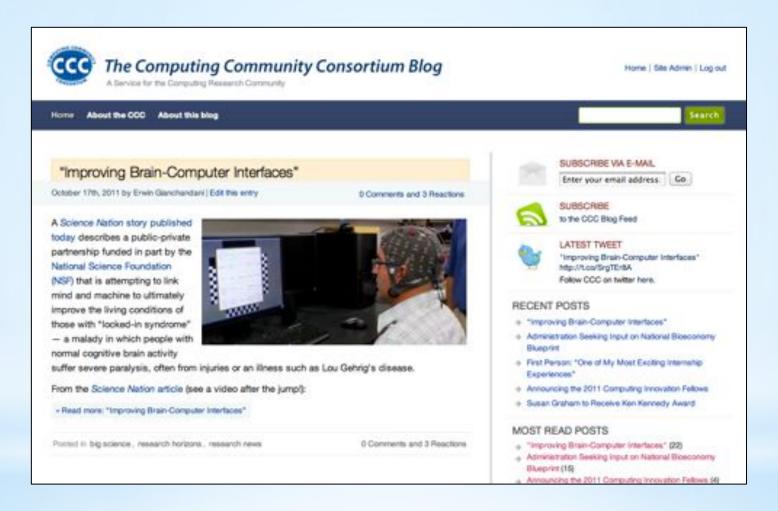








### Communicating: CCC Blog



#### On average, 300 hits/day





## Communicating: Computing Research in Action

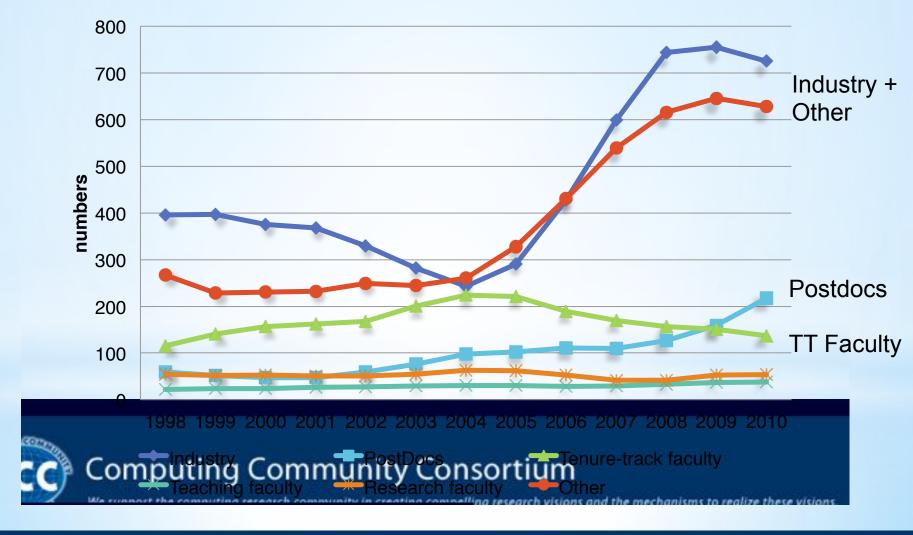
- SmartGeo at the Colorado School of Mines
- Ubiquitous Computing Lab at The University of Washington.





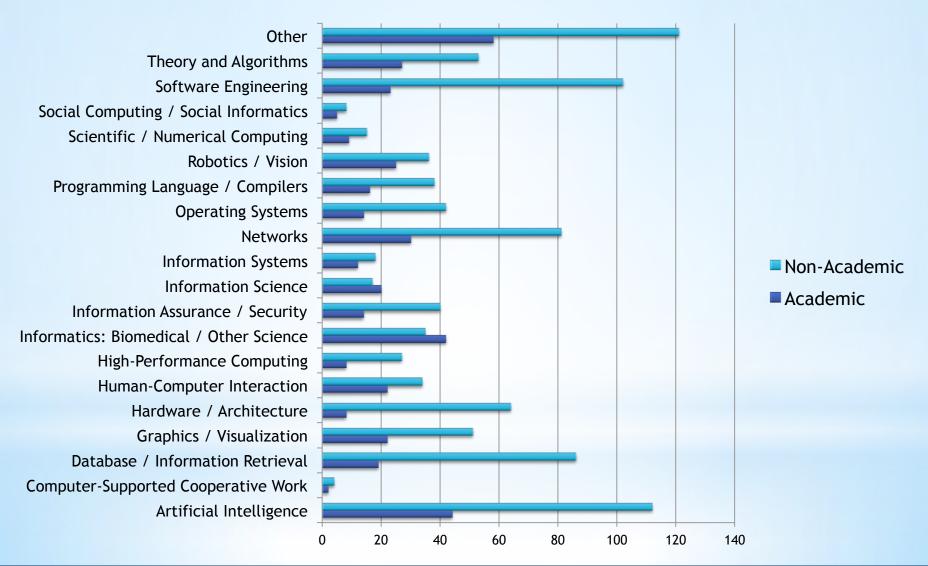
## **People: Changing Complexion of Computing**

Numbers of New Ph.D.s Hired



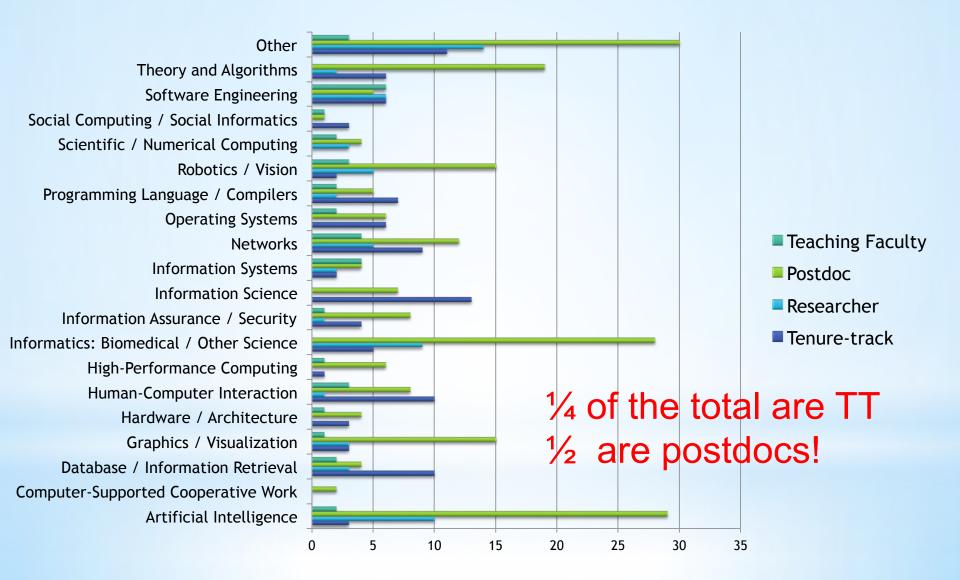


#### 2011-2012 Employment Data by Sector



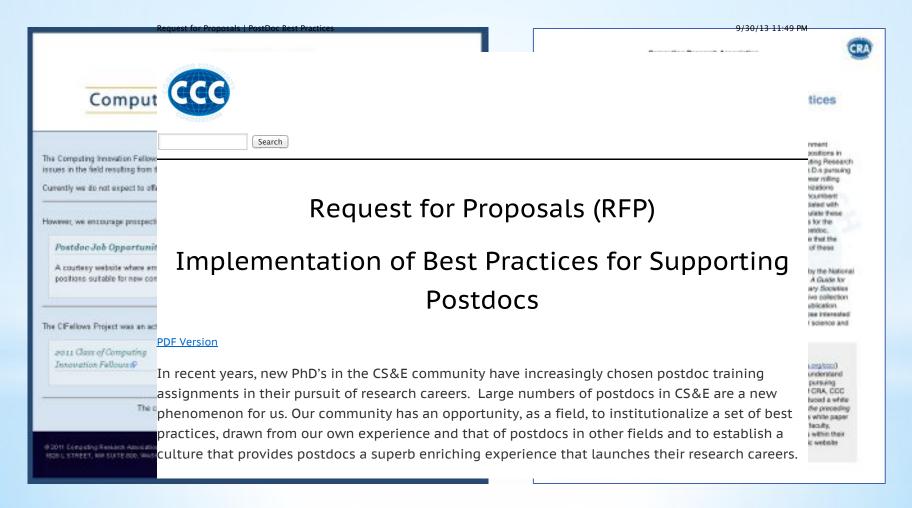


#### 2011-2012 Employment for PhD Graduates by Sector





## Enabling: Computing Innovation Fellows Project -> Postdoc Best Practices





#### **Enabling: Postdoc Best Practices**

- Projects to be awarded soon for implementation in 2014 - 2017
  - 1 consortia across a city / state
    - Virtual Engagement
  - 1 focusing on Postdoc Independence
  - 1 focusing on Postdoc Community



### **Looking Ahead**

CI Fellows Workshop, May 22-23

#### NOMINATIONS for CCC DUE March 6!

We are in the process of soliciting nominations for new council members more information at:

http://www.cccblog.org/2014/02/11/nominations-sought-for-new-ccc-council-members-2/



## CCC: Catalyzing and Enabling Computing Research

Susan Graham Chair Gregory D. Hager Vice-Chair

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Director

