CCC: Catalyzing and Enabling Computing Research

Gregory D. Hager

CCC Vice-Chair Elect

Johns Hopkins University

An Overview of the Computing Community Consortium

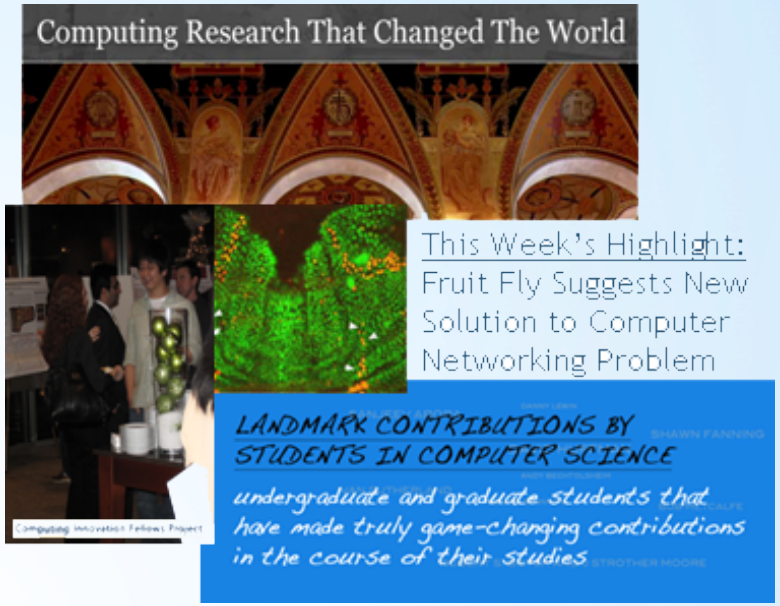
- A standing committee of the Computing Research Association
- Funded by NSF under a Cooperative Agreement
- Facilitates the development of a bold, multi-themed vision for computing research – and communicates this vision to stakeholders
- Led by a broad-based Council
- Chaired by Ed Lazowska and Susan Graham
- Staffed by CRA

The CCC Council

- Leadership
  - Ed Lazowska, Univ. Washington (Chair)
  - Susan Graham, UC Berkeley (Vice Chair)
  - Ann Drobnis, Director
  - Kenneth Hines, Program Associate
  - Andy Bernat, CRA Executive Director
- Terms ending 6/2015
  - Liz Bradley, Univ. Colorado
  - Sue Davidson, Univ. Pennsylvania
  - Joe Evans, Univ. Kansas
  - Ran Libeskind-Hadas, Harvey Mudd College
  - Shashi Shekhar, Univ. Minnesota
- Terms ending 6/2014
  - Deborah Crawford, Drexel
  - Gregory Hager, Johns Hopkins
  - Anita Jones, Univ. Virginia
  - John Mitchell, Stanford
  - Bob Sproull, Sun Labs Oracle (ret.)
  - Josep Torrellas, Univ. Illinois
- Terms ending 6/2013
  - Randy Bryant, Carnegie Mellon
  - Lance Fortnow, Northwestern -> Georgia Tech
  - Hank Korth, Lehigh
  - Eric Horvitz, Microsoft Research
  - Beth Mynatt, Georgia Tech
  - Fred Schneider, Cornell
  - Margo Seltzer, Harvard
- Former members
  - Stephanie Forrest, Univ. New Mexico, 2012
  - Chris Johnson, Univ. Utah, 2012
  - Frans Kaashoek, MIT, 2012
  - Robin Murphy, Texas A&M, 2012
  - Bill Feiereisen, LANL, 2011
  - Dave Kaeli, Northeastern, 2011
  - John King, Univ. Michigan, 2011
  - Dick Karp, UC Berkeley, 2010
  - Andrew McCallum, Univ. Massachusetts, 2010
  - Dave Waltz, Columbia, 2010
  - Greg Andrews, Univ. Arizona, 2009
  - Peter Lee, Carnegie Mellon, 2009
  - Karen Sutherland, Augsburg College, 2009

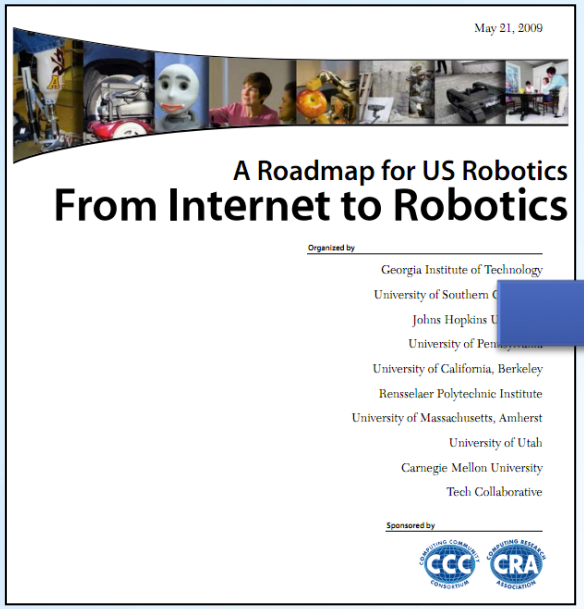
A Multitude of Activities

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



- **Public relations efforts:**
  - Library of Congress symposia
  - 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

Example: Robotics


May 21, 2009

A Roadmap for US Robotics

From Internet to Robotics

Organized by

Georgia Institute of Technology

University of Southern C

Johns Hopkins U

University of Pen

University of California, Berkeley

Rensselaer Polytechnic Institute

University of Massachusetts, Amherst

University of Utah

Carnegie Mellon University

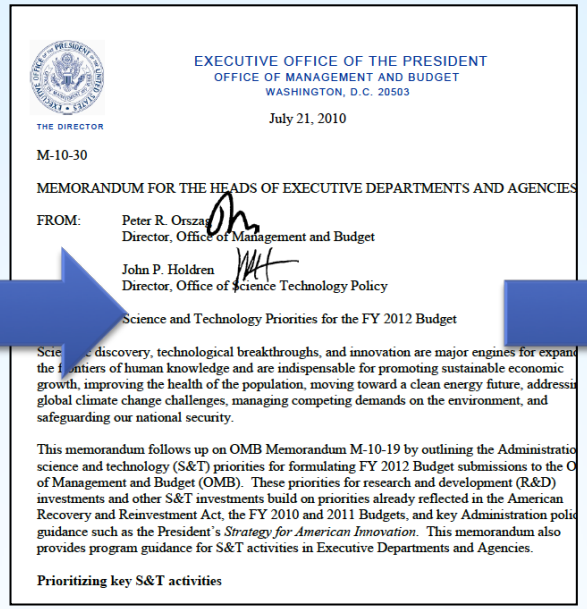
Tech Collaborative

Sponsored by

4 meetings during summer 2008

Roadmap published May 2009

Extensive discussions between visioning leaders & agencies


EXECUTIVE OFFICE OF THE PRESIDENT

OFFICE OF MANAGEMENT AND BUDGET

WASHINGTON, D.C. 20503

THE DIRECTOR

July 21, 2010

M-10-30

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

FROM: Peter R. Orszag
Director, Office of Management and Budget

John P. Holdren
Director, Office of Science Technology Policy

Science and Technology Priorities for the FY 2012 Budget

Scie discovery, technological breakthroughs, and innovation are major engines for expand the f ntiers of human knowledge and are indispensable for promoting sustainable economic growth, improving the health of the population, moving toward a clean energy future, addressi global climate change challenges, managing competing demands on the environment, and safeguarding our national security.

This memorandum follows up on OMB Memorandum M-10-19 by outlining the Administratio science and technology (S&T) priorities for formulating FY 2012 Budget submissions to the O of Management and Budget (OMB). These priorities for research and development (R&D) investments and other S&T investments build on priorities already reflected in the American Recovery and Reinvestment Act, the FY 2010 and 2011 Budgets, and key Administration polic guidance such as the President's *Strategy for American Innovation*. This memorandum also provides program guidance for S&T activities in Executive Departments and Agencies.

Prioritizing key S&T activities

OSTP issues directive to all agencies in summer 2010 to include robotics in FY 12 budgets


Office of Science and Technology Po

About OSTP | OSTP Blog | Pressroom | Divisions | R&D Budgets | Re

Developing the Next Generation of Robots

Posted by Tom Kalil and Sridhar Kota on June 24, 2011 at 10:14 AM EDT

E- Tweet Share +

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

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

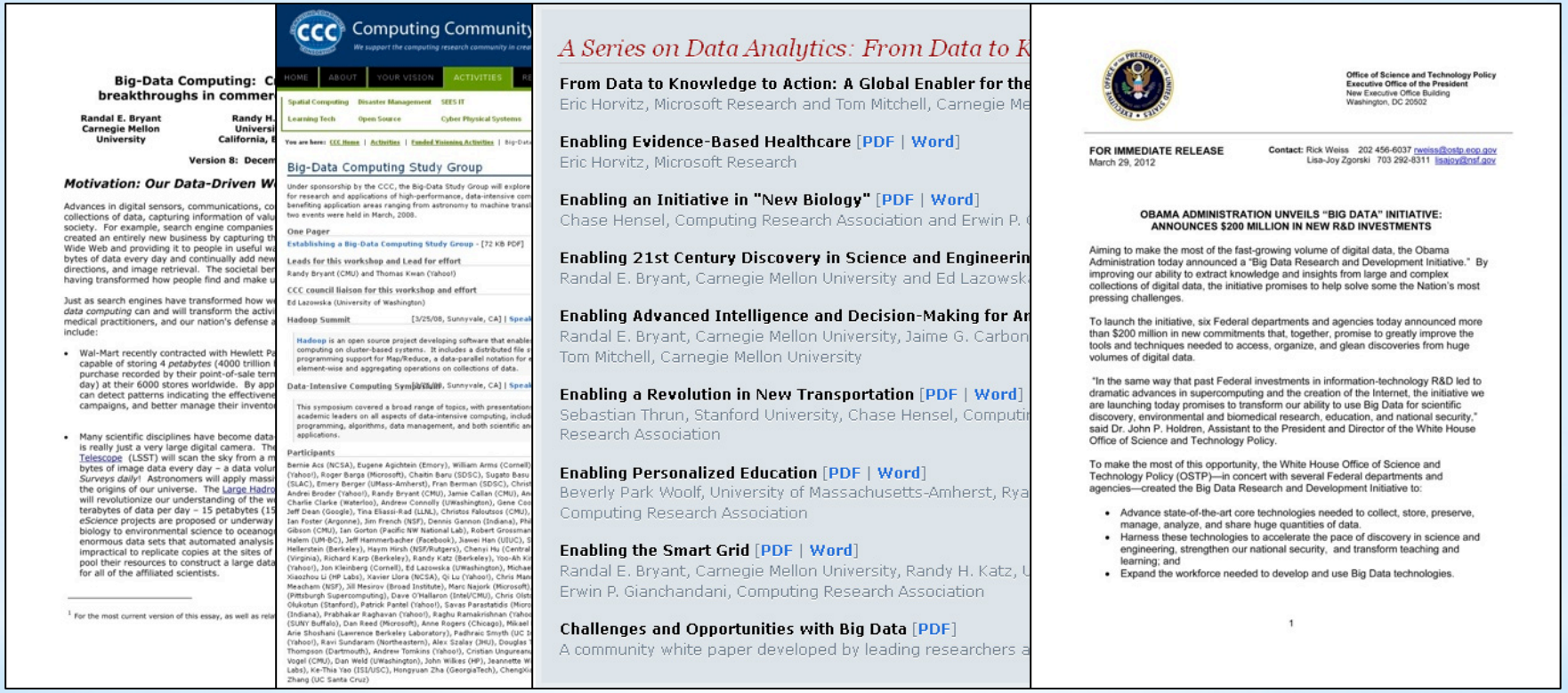
But they could do even more, and that's what the National Robotics Initiative is all about. So t (the National Science Foundation, the National Institutes of Health, NASA, and the United Sta Agriculture) are issuing a joint solicitation that will provide up to $70 million in research fundin generation robotics.

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

National Robotics Initiative announced in summer 2011

Henrik Chistensen
Georgia Tech

Example: Big Data



Big-Data Computing: C
breakthroughs in commer

Randal E. Bryant
Carnegie Mellon
University

Randy H.
Universi
California, E

Version 8: Decem

Motivation: Our Data-Driven W

Advances in digital sensors, communications, co
collections of data, capturing information of valu
society. For example, search engine companies
created an entirely new business by capturing th
Wide Web and providing it to people in useful wa
bytes of data every day and continually add new
directions, and image retrieval. The societal ben
having transformed how people find and make u

Just as search engines have transformed how w
data computing can and will transform the activi
medical practitioners, and our nation's defense a
include:

- Wal-Mart recently contracted with Hewlett Pa
capable of storing 4 *petabytes* (4000 trillion
purchase recorded by their point-of-sale term
day) at their 6000 stores worldwide. By appl
can detect patterns indicating the effectivene
campaigns, and better manage their inventor

- Many scientific disciplines have become data-
is really just a very large digital camera. The
Telescope (LSST) will scan the sky from a m
bytes of image data every day – a data volu
Surveys daily! Astronomers will apply massi
the origins of our universe. The Large Hadro
will revolutionize our understanding of the w
terabytes of data per day – 15 petabytes (15
eScience projects are proposed or underway
biology to environmental science to oceanog
enormous data sets that automated analysis
impractical to replicate copies at the sites of
pool their resources to construct a large data
for all of the affiliated scientists.

[1] For the most current version of this essay, as well as relat

Computing Community

We support the computing research community in crea

HOME | ABOUT | YOUR VISION | ACTIVITIES | RE

Spatial Computing | Disaster Management | SEES IT
Learning Tech | Open Source | Cyber Physical Systems

You are here: CCC Home | Activities | Funded Visioning Activities | Big-Data

Big-Data Computing Study Group

Under sponsorship by the CCC, the Big-Data Study Group will explore
for research and applications of high-performance, data-intensive com
benefiting application areas ranging from astronomy to machine transl
two events were held in March, 2008.

One Pager
Establishing a Big-Data Computing Study Group - [72 KB PDF]

Leads for this workshop and Lead for effort
Randy Bryant (CMU) and Thomas Kwan (Yahoo!)

CCC council liaison for this workshop and effort
Ed Lazowska (University of Washington)

Hadoop Summit [3/25/08, Sunnyvale, CA] | Speak

Hadoop is an open source project developing software that enables
computing on cluster-based systems. It includes a distributed file s
programming support for Map/Reduce, a data-parallel notation for e
element-wise and aggregating operations on collections of data.

Data-Intensive Computing Symposium [3/26/08, Sunnyvale, CA] | Speak

This symposium covered a broad range of topics, with presentation
academic leaders on all aspects of data-intensive computing, includ
programming, algorithms, data management, and both scientific an
applications.

Participants

Bernie Acs (NCSA), Eugene Agichtein (Emory), William Arms (Cornell),
(Yahoo!), Roger Barga (Microsoft), Chaitin Baru (SDSC), Sugato Basu
(SLAC), Emery Berger (UMass-Amherst), Fran Berman (SDSC), Christ
Andrei Broder (Yahoo!), Randy Bryant (CMU), Jamie Callan (CMU), An
Charlie Clarke (Waterloo), Andrew Connolly (UWashington), Gene Coo
Jeff Dean (Google), Tina Eliassi-Rad (LLNL), Christos Faloutsos (CMU),
Ian Foster (Argonne), Jim French (NSF), Dennis Gannon (Indiana), Phi
Gibson (CMU), Ian Gorton (Pacific NW National Lab), Robert Grossman
Halem (UM-BC), Jeff Hammerbacher (Facebook), Jiawei Han (UIUC), S
Hellerstein (Berkeley), Haym Hirsh (NSF/Rutgers), Chenyi Hu (Central
(Virginia), Richard Karp (Berkeley), Randy Katz (Berkeley), Yoo-Ah Ki
(Yahoo!), Jon Kleinberg (Cornell), Ed Lazowska (UWashington), Michae
Xiaozhou Li (HP Labs), Xavier Llora (NCSA), Qi Lu (Yahoo!), Chris Mani
Meacham (NSF), Jill Mesirov (Broad Institute), Marc Najork (Microsoft),
(Pittsburgh Supercomputing), Dave O'Hallaron (Intel/CMU), Chris Olst
Olukotun (Stanford), Patrick Pantel (Yahoo!), Savas Parastatidis (Micro
(Indiana), Prabhakar Raghavan (Yahoo!), Raghu Ramakrishnan (Yahoo
(SUNY Buffalo), Dan Reed (Microsoft), Anne Rogers (Chicago), Mikael
Arie Shoshani (Lawrence Berkeley Laboratory), Padhraic Smyth (UC I
(Yahoo!), Ravi Sundaram (Northeastern), Alex Szalay (JHU), Douglas
Thompson (Dartmouth), Andrew Tomkins (Yahoo!), Cristian Ungureanu
Vogel (CMU), Dan Weld (UWashington), John Wilkes (HP), Jeannette W
Labs), Ke-Thia Yao (ISI/USC), Hongruan Zha (GeorgiaTech), ChengXi
Zhang (UC Santa Cruz)

A Series on Data Analytics: From Data to K

From Data to Knowledge to Action: A Global Enabler for the
Eric Horvitz, Microsoft Research and Tom Mitchell, Carnegie Me

Enabling Evidence-Based Healthcare [PDF | Word]
Eric Horvitz, Microsoft Research

Enabling an Initiative in "New Biology" [PDF | Word]
Chase Hensel, Computing Research Association and Erwin P.

Enabling 21st Century Discovery in Science and Engineerin
Randal E. Bryant, Carnegie Mellon University and Ed Lazowsk

Enabling Advanced Intelligence and Decision-Making for Ar
Randal E. Bryant, Carnegie Mellon University, Jaime G. Carbon
Tom Mitchell, Carnegie Mellon University

Enabling a Revolution in New Transportation [PDF | Word]
Sebastian Thrun, Stanford University, Chase Hensel, Computi
Research Association

Enabling Personalized Education [PDF | Word]
Beverly Park Woolf, University of Massachusetts-Amherst, Rya
Computing Research Association

Enabling the Smart Grid [PDF | Word]
Randal E. Bryant, Carnegie Mellon University, Randy H. Katz,
Erwin P. Gianchandani, Computing Research Association

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

Office of Science and Technology Policy
Executive Office of the President
New Executive Office Building
Washington, DC 20502

FOR IMMEDIATE RELEASE
March 29, 2012

Contact: Rick Weiss 202 456-6037 rweiss@ostp.eop.gov
Lisa-Joy Zgorski 703 292-8311 lisajoy@nsf.gov

**OBAMA ADMINISTRATION UNVEILS "BIG DATA" INITIATIVE:
ANNOUNCES $200 MILLION IN NEW R&D INVESTMENTS**

Aiming to make the most of the fast-growing volume of digital data, the Obama Administration today announced a "Big Data Research and Development Initiative." By improving our ability to extract knowledge and insights from large and complex collections of digital data, the initiative promises to help solve some the Nation's most pressing challenges.

To launch the initiative, six Federal departments and agencies today announced more than $200 million in new commitments that, together, promise to greatly improve the tools and techniques needed to access, organize, and glean discoveries from huge volumes of digital data.

"In the same way that past Federal investments in information-technology R&D led to dramatic advances in supercomputing and the creation of the Internet, the initiative we are launching today promises to transform our ability to use Big Data for scientific discovery, environmental and biomedical research, education, and national security," said Dr. John P. Holdren, Assistant to the President and Director of the White House Office of Science and Technology Policy.

To make the most of this opportunity, the White House Office of Science and Technology Policy (OSTP)—in concert with several Federal departments and agencies—created the Big Data Research and Development Initiative to:

- Advance state-of-the-art core technologies needed to collect, store, preserve, manage, analyze, and share huge quantities of data.
- Harness these technologies 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 develop and use Big Data technologies.

1

2008 2008 2010 2012

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

Computing Community Consortium

We support the computing research community in creating compelling research visions and the mechanisms to realize these visions.

HOME | ABOUT | YOUR VISION | ACTIVITIES | RESOURCES | CONTACT | GO

CCC Leadership in Science Policy Institute

Agenda

8:30 am - 9:00 am
Welcome [180 KB PDF] [Referenced videos - Lazowska | Bartlett | Brooks]
(Fred Schneider, Cornell, Workshop Chair)

Lay out the goals of the workshop: to provide a crash-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 opportunities 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 rotation as a program manager, division director, or office director. This session will cover the agency budget process and will discuss opportunities 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 site. Please check back periodically. The last change was made on: **December 13, 2011**.

Logistics

Date: November 7, 2011
Location: Hyatt Regency Capitol Hill, Washinton, DC

Participation in the workshop will include breakfast and lunch 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 airfare and other travel expenses will be provided by the workshop (through funding from CCC).

Agenda

List of Sessions and Speakers and Slides


Milt Corn, NIH


Henry Kelly, DoE


Attendees

Example: Computing Innovation Fellows Project -> Postdoc Best Practices

Computing Innovation Fellows Project

Home CRA CCC CISE

The Computing Innovation Fellows (CIFellows) Project was intended to be a short-term initiative to respond to employment issues in the field resulting from the economic downturn.

Currently we do not expect to offer new CIFellows positions in the future.

However, we encourage prospective postdoctoral fellows and mentors to utilize our matching websites:

Postdoc Job Opportunities

A courtesy website where employers can post available positions suitable for new computing PhD's.

Computing Postdoc Profiles

An additional courtesy website for computing PhD's to post their profiles and availability.

The CIFellows Project was an activity of the Computing Community Consortium. For current CCC activities, click here.

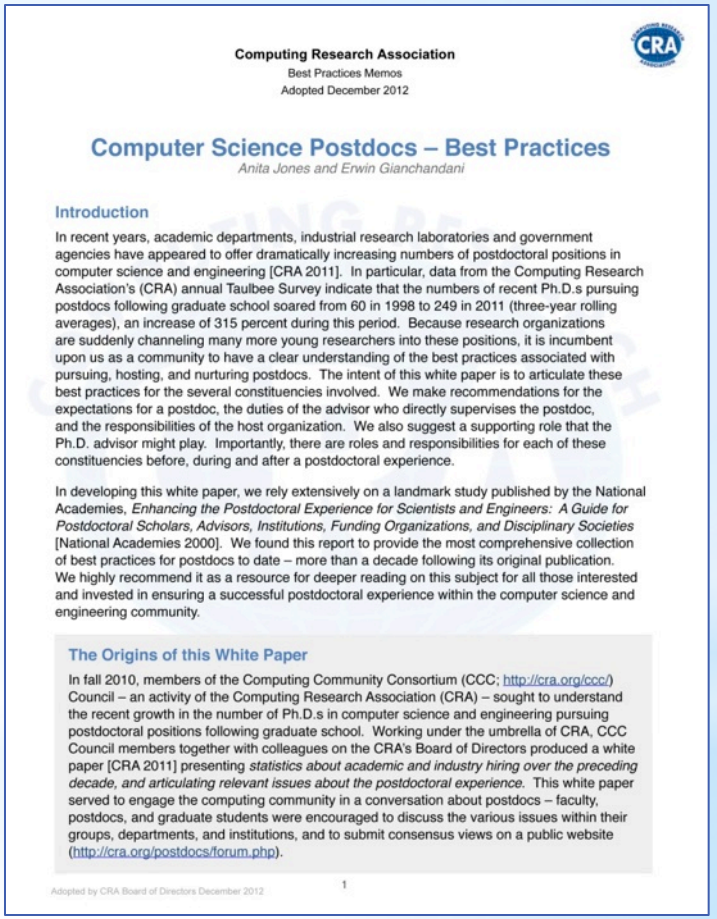
2011 Class of Computing Innovation Fellows

2010 Class of Computing Innovation Fellows

2009 Class of Computing Innovation Fellows

The call for applications that was issued for fall 2011 is available here.

1828 L STREET, NW SUITE 800, WASHINGTON, DC 20036-4632 Phone: 202-234-2111 | Fax: 202-667-1066 | E-mail: contact @ cifellows.org



Computing Research Association
Best Practices Memos
Adopted December 2012

Computer Science Postdocs – Best Practices

Anita Jones and Erwin Gianchandani

Introduction

In recent years, academic departments, industrial research laboratories and government agencies have appeared to offer dramatically increasing numbers of postdoctoral positions in computer science and engineering [CRA 2011]. In particular, data from the Computing Research Association's (CRA) annual Taulbee Survey indicate that the numbers of recent Ph.D.s pursuing postdocs following graduate school soared from 60 in 1998 to 249 in 2011 (three-year rolling averages), an increase of 315 percent during this period. Because research organizations are suddenly channeling many more young researchers into these positions, it is incumbent upon us as a community to have a clear understanding of the best practices associated with pursuing, hosting, and nurturing postdocs. The intent of this white paper is to articulate these best practices for the several constituencies involved. We make recommendations for the expectations for a postdoc, the duties of the advisor who directly supervises the postdoc, and the responsibilities of the host organization. We also suggest a supporting role that the Ph.D. advisor might play. Importantly, there are roles and responsibilities for each of these constituencies before, during and after a postdoctoral experience.

In developing this white paper, we rely extensively on a landmark study published by the National Academies, *Enhancing the Postdoctoral Experience for Scientists and Engineers: A Guide for Postdoctoral Scholars, Advisors, Institutions, Funding Organizations, and Disciplinary Societies* [National Academies 2000]. We found this report to provide the most comprehensive collection of best practices for postdocs to date – more than a decade following its original publication. We highly recommend it as a resource for deeper reading on this subject for all those interested and invested in ensuring a successful postdoctoral experience within the computer science and engineering community.

The Origins of this White Paper

In fall 2010, members of the Computing Community Consortium (CCC; http://cra.org/ccc/) Council – an activity of the Computing Research Association (CRA) – sought to understand the recent growth in the number of Ph.D.s in computer science and engineering pursuing postdoctoral positions following graduate school. Working under the umbrella of CRA, CCC Council members together with colleagues on the CRA's Board of Directors produced a white paper [CRA 2011] presenting *statistics about academic and industry hiring over the preceding decade, and articulating relevant issues about the postdoctoral experience.* This white paper served to engage the computing community in a conversation about postdocs – faculty, postdocs, and graduate students were encouraged to discuss the various issues within their groups, departments, and institutions, and to submit consensus views on a public website (http://cra.org/postdocs/forum.php).

Computing and Medicine: A National Priority

CCC Health Task Force:
Beth Mynatt, Susan Graham, Eric Horvitz, Greg Hager

Costs

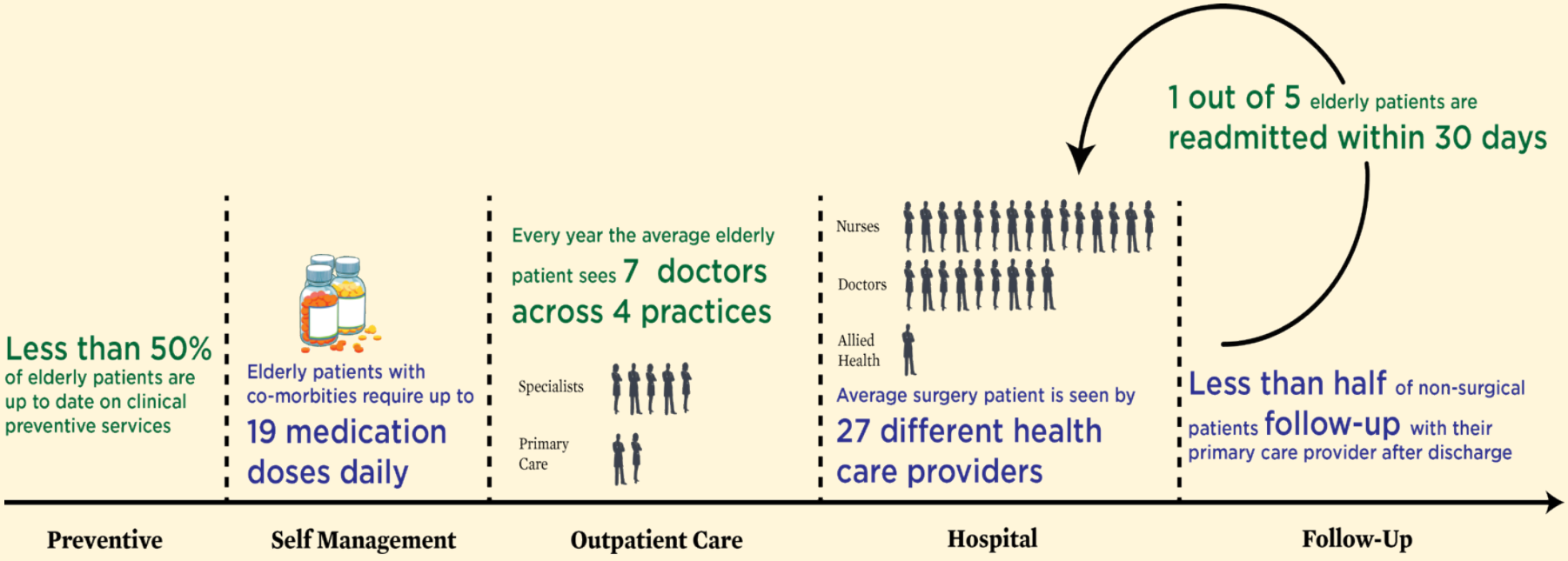
Absolute, relative, wasted, opportunity

Dr. J. Michael McGinnis

- **Absolute expenditures** – $2.6 trillion 18% GDP
- **Relative expenditures –** 76% increase health costs in past 10 years, overwhelming the 30% gain in personal income
- **Wasted expenditures** – $750 billion (2009)
- **Opportunity costs –** e.g. total waste could pay salaries of all first response personnel for 12 years – and fund a great deal of biomedical research.

Complexity

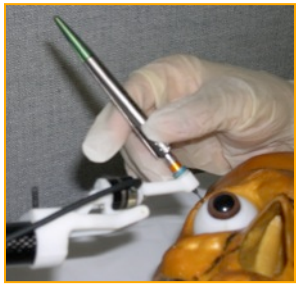
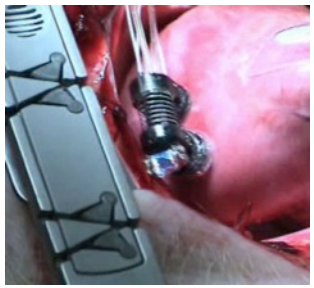
Representative timeline of a patient's experiences in the U.S. health care system

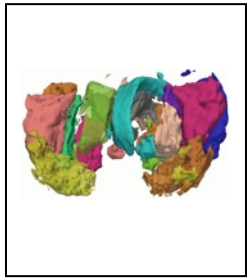


INSTITUTE OF MEDICINE
OF THE NATIONAL ACADEMIES
Advising the nation / Improving health

Personal Background





http://www.cisst.org

The CISST ERC is developing a family of surgical systems that combine innovative algorithms, robotic devices, imaging systems, sensors, and human-machine interfaces to work cooperatively with surgeons in the planning and execution of surgical procedures.

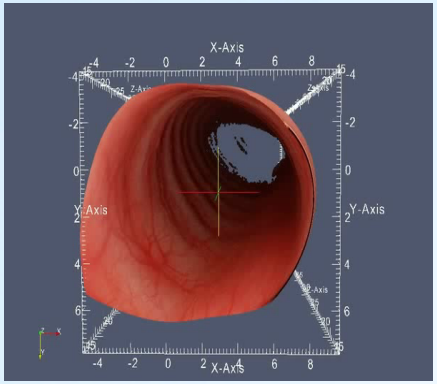
Areas of Research

- Robotic surgical assistants
- Image-guided interventional systems
- Focused interdisciplinary research in algorithms, imaging, robotics, sensors, human-machine systems

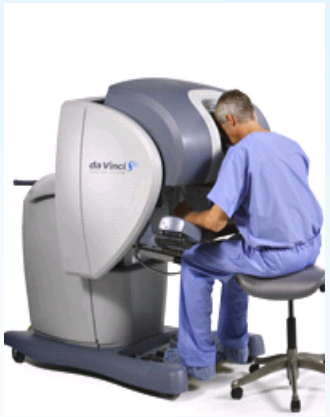
Institutions & Funding

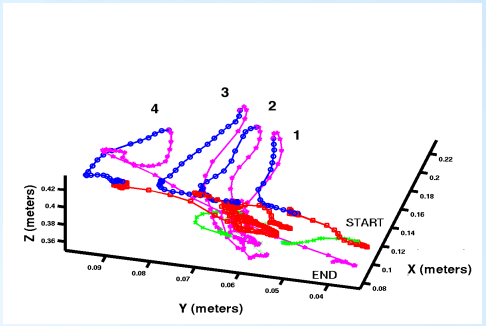
- Johns Hopkins, MIT, CMU, BWH, Harvard, Penn, Morgan State, Columbia
- Years 1-11: NSF = $32.7M;
- Total = ~$64.7M
  In-kind support = ~$13.9M

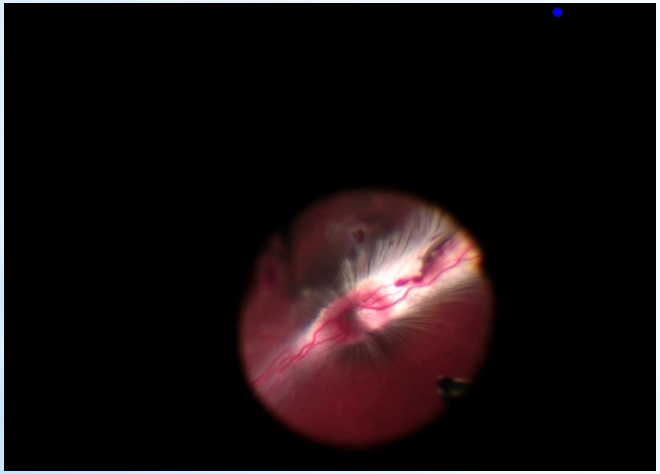
Personal Background



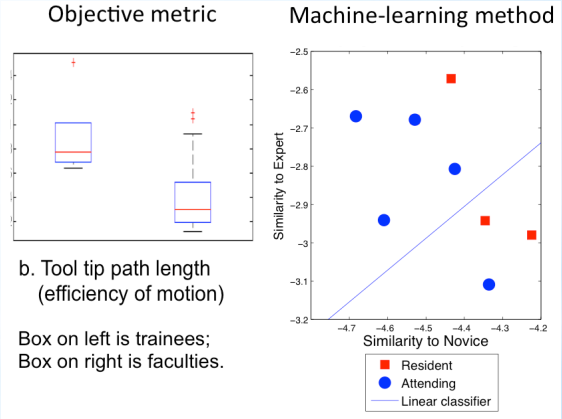
Quantitative Sensing







Information Augmentation



Language of Surgery

CCC Healthcare Activities

- Identify research challenges and opportunities
- Connect researchers, practitioners, industry
- Identify proof-of-concept models to drive research and translation

Facilitating Research Progress

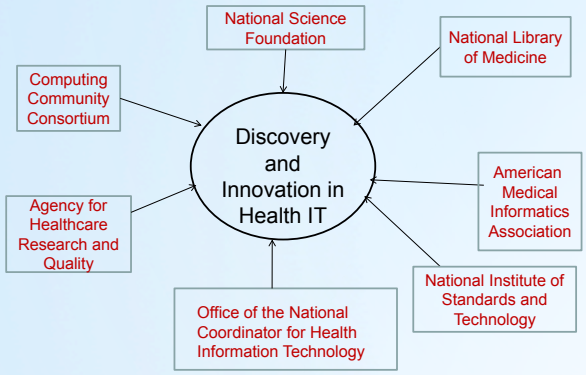
- Publically available de-identified data sets
- Open research infrastructures
- Mechanisms for migration of research results to deployment
- Lowering of legal barriers to research
- Coupled computing and medical expertise
- Appropriate forums to report multi-disciplinary research results

Snowbird 2010

And funding, of course

CCC Healthcare Activities

October 2009 Workshop



National Science Foundation
WHERE DISCOVERIES BEGIN

Directorate for Computer & Information Science & Engineering

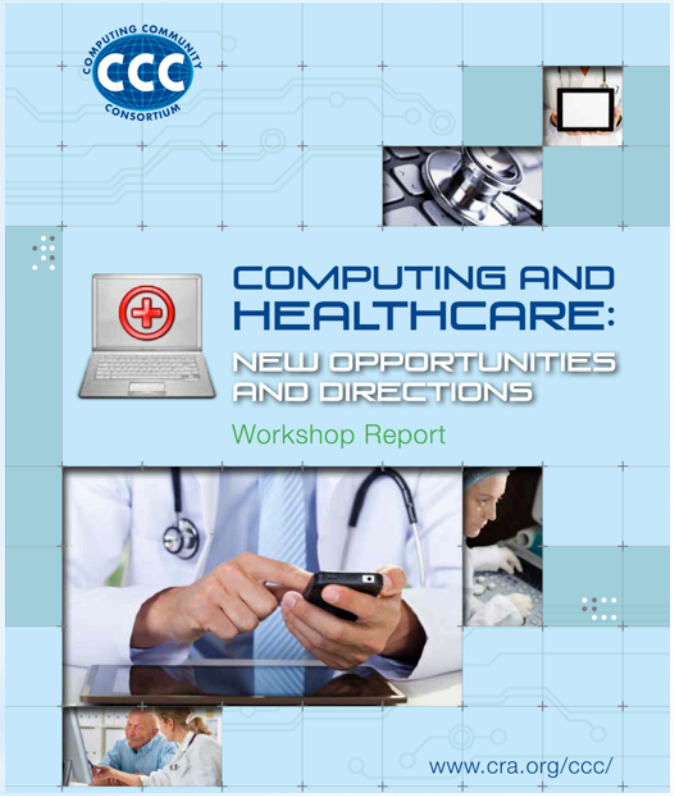
SMART HEALTH AND WELLBEING (SHW)

CONTACTS

See program guidelines for contact information.

SYNOPSIS

CCC Healthcare Activities



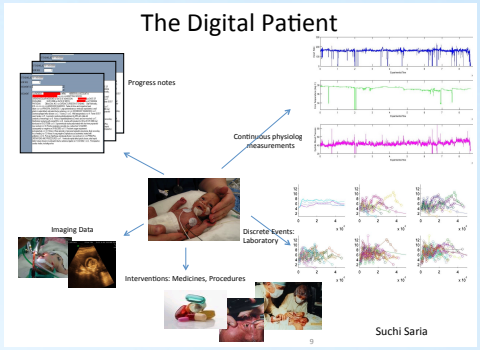
October 2012 Workshop

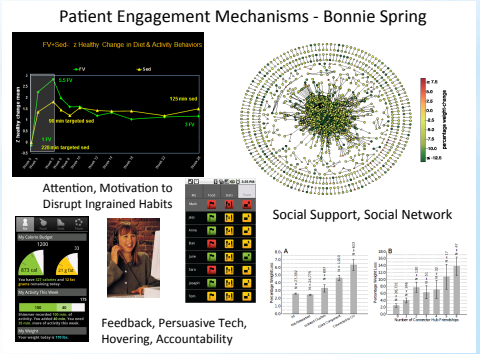
Beth Mynatt, Greg Hager
Susan Graham, Eric Horvitz
Deborah Estrin, Kevin Johnson
Christopher Chute, Kevin Patrick

2012 Meeting

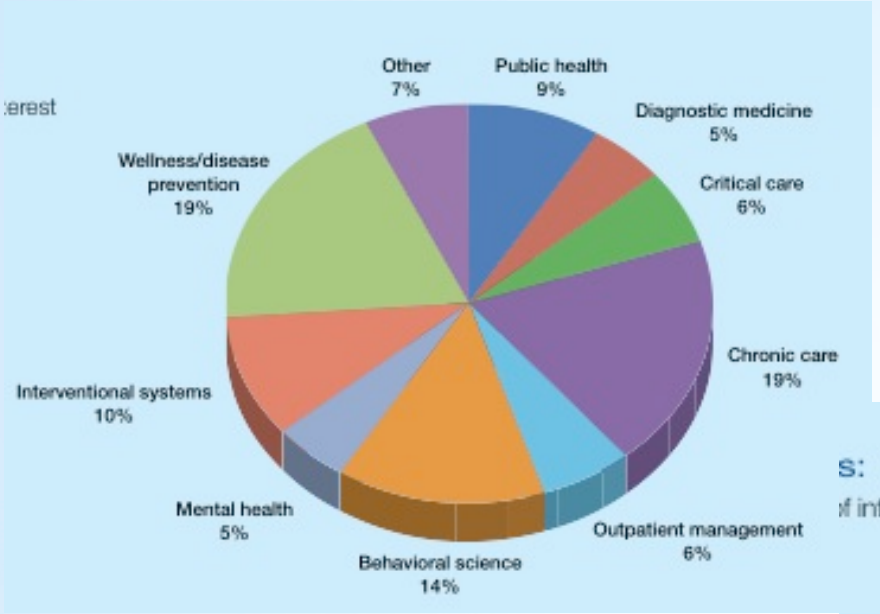
- Three Major Themes
  - Exploiting Data in Abundance
  - Creating Systems for Collaborative Care
  - Focusing on Patient Engagement

- Mechanism:
  - Look for barriers to progress
  - Elicit the problems/questions to address these barriers
  - Determine how we can measure progress



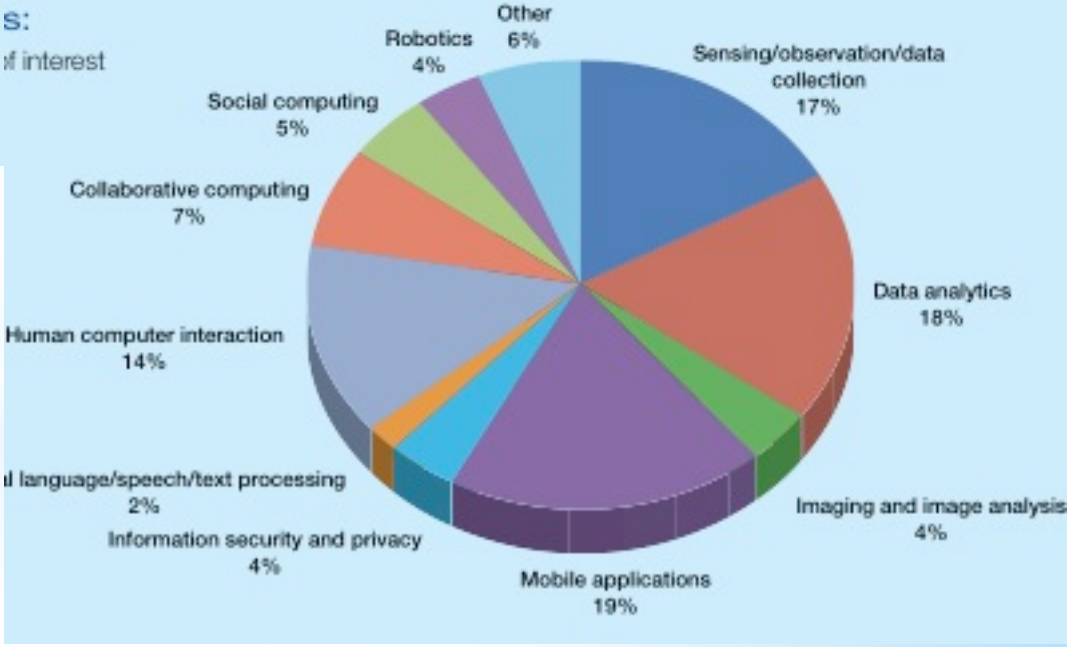


A Broad Conversation



Health Interests

Technology Interests

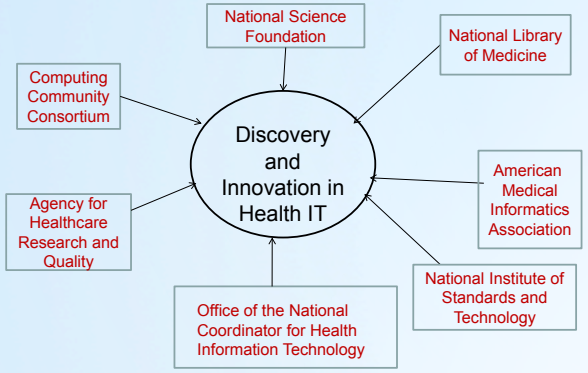


A Few Conclusions from 2012

- Common data, data standards, and related platforms is (still) essential for the field
  - Key are the value propositions within health-care economy
- Coordinated care requires “systems thinking” that crosses traditional healthcare boundaries and must be supported by new methods of information-sharing
  - Need projects at ERC scale and up!
- Mobile systems design is an enormous opportunity, but requires new paradigms of investigation that to allow rapid iteration with assessment and validation
  - This is a research and *education* process!

CCC Healthcare Activities

October 2009 Workshop



National Science Foundation
WHERE DISCOVERIES BEGIN

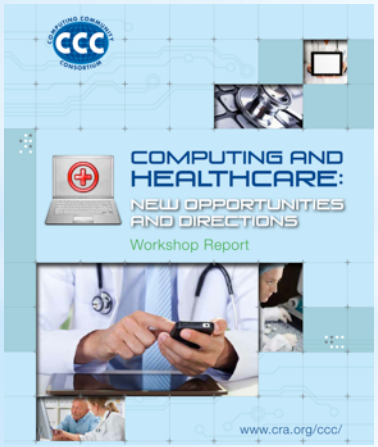
Directorate for Computer & Information Science & Engineering

SMART HEALTH AND WELLBEING (SHW)

CONTACTS

See program guidelines for contact information.

SYNOPSIS



October 2012 Workshop

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
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Help Us To Develop This Community!

- Propose visioning activities, white papers, Challenges & Visions tracks at research conferences
- Put together short research videos for undergraduates
- Contribute to the CCC Blog
- Send us a research highlight for the Highlight of the Week

Get involved:
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http://cra.org/ccc or http://cccblog.org/