The Computing Community Consortium

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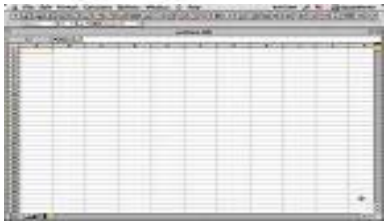
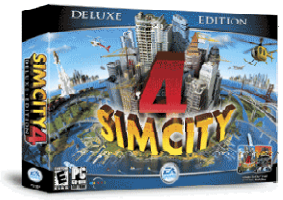
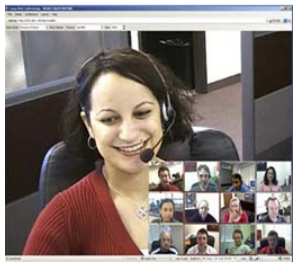
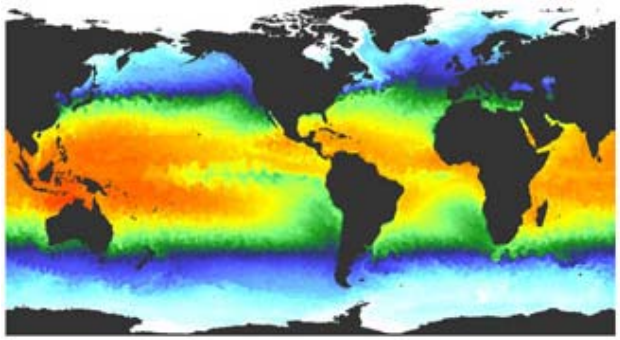
http://lazowska.cs.washington.edu/ccc.overview.pdf

Computing has changed the world

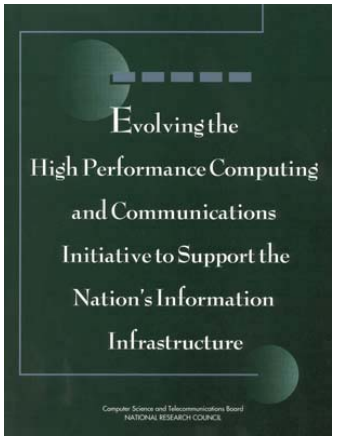
- Advances in computing change the way we live, work, learn, and communicate
- Advances in computing drive advances in nearly all other fields
- Advances in computing power our economy
  - Not just through the growth of the IT industry – through productivity growth across the entire economy

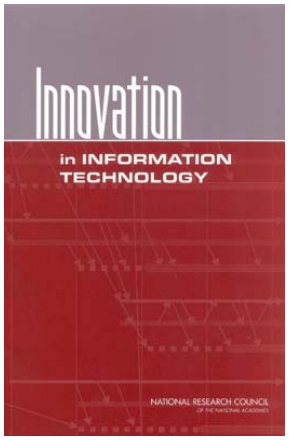


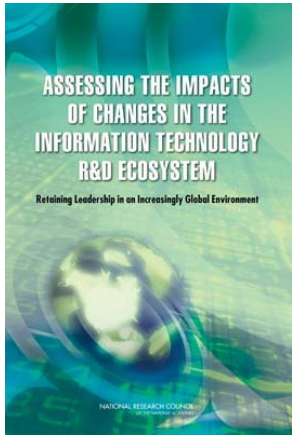



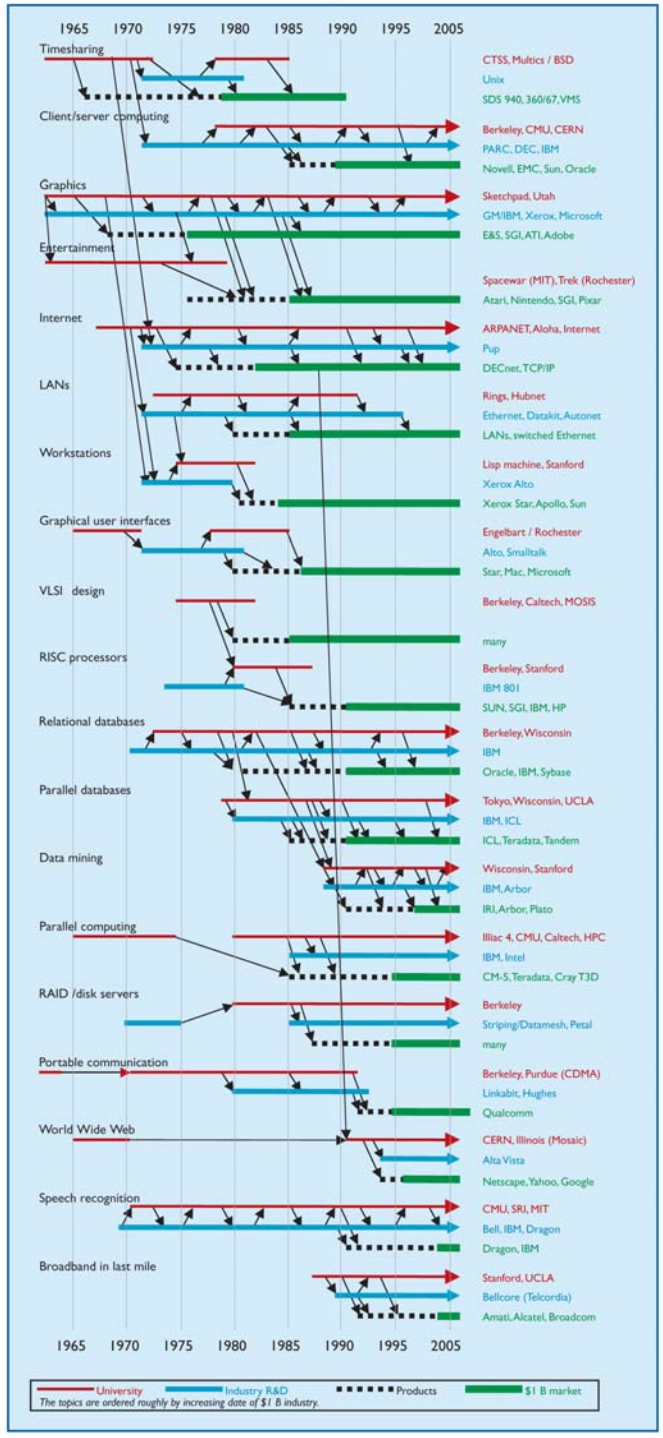



Research has built the foundation



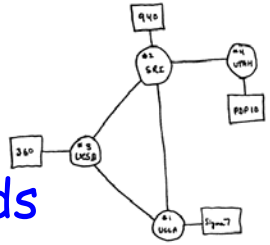


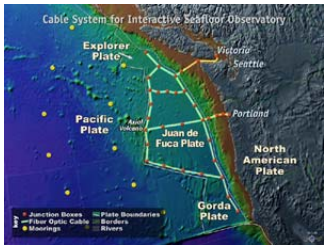


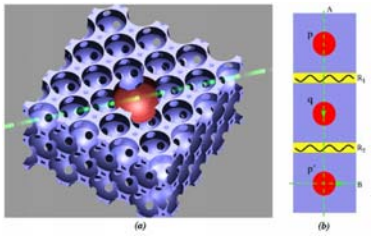


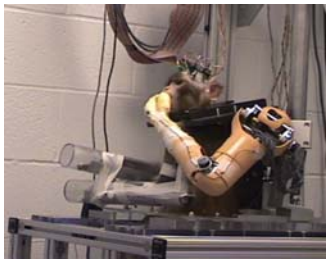
The future is full of opportunity

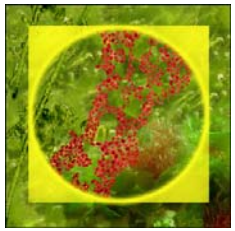
- Creating the future of networking
- Driving advances in all fields of science and engineering
- Revolutionizing transportation
- Personalized education
- The smart grid
- Predictive, preventive, personalized medicine
- Quantum computing
- Empowerment for the developing world
- Personalized health monitoring => quality of life
- Harnessing parallelism
- Neurobotics
- Synthetic biology











We must work together to establish, articulate, and pursue visions for the field

- The challenges that will shape the intellectual future of the field
- The challenges that will catalyze research investment and public support
- The challenges that will attract the best and brightest minds of a new generation

To this end, NSF asked CRA to create the Computing Community Consortium

- To catalyze the computing research community to consider such questions
  - To envision long-range, more audacious research challenges
  - To build momentum around such visions
  - To state them in compelling ways
  - To move them towards funded initiatives
  - To ensure "science oversight" of large-scale initiatives
- A "cooperative agreement" with NSF
  - Close coordination
- A "standing committee" of CRA
- Launched in 2007

CCC structure

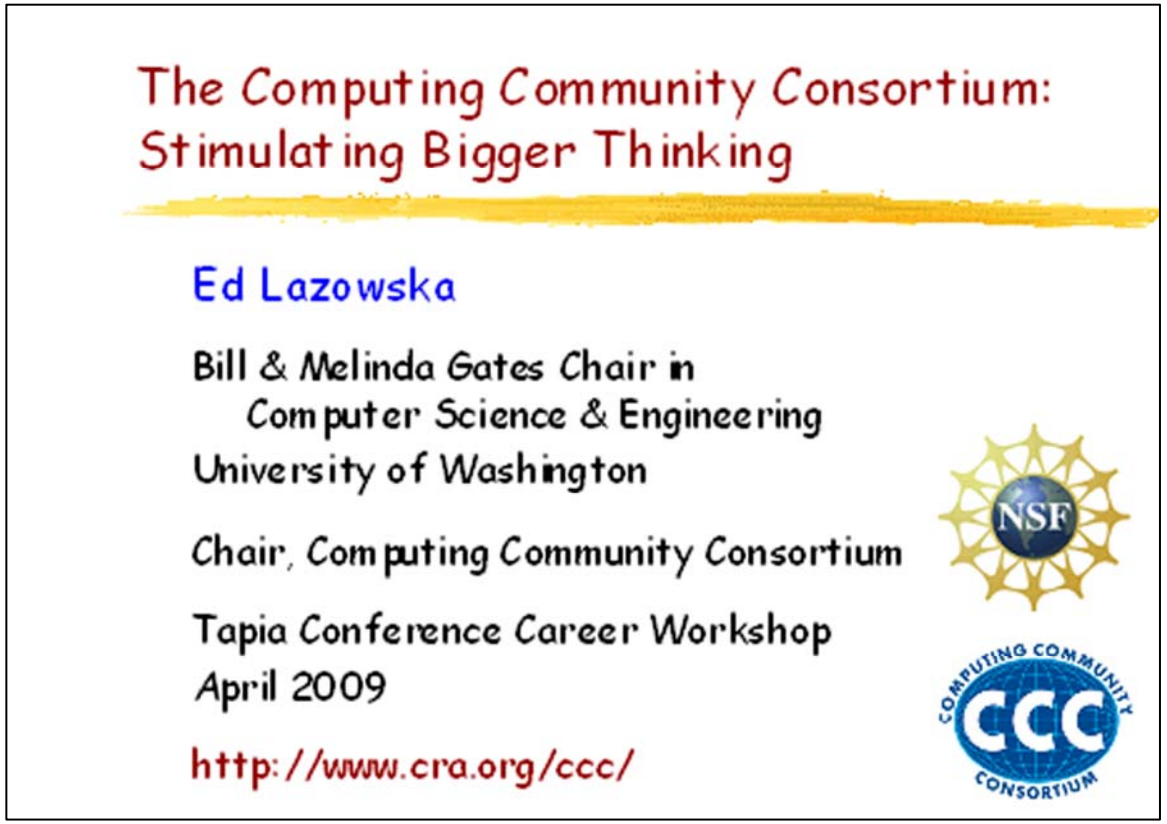
- CCC is all of us!
  - This process *must* succeed, and it *can't* succeed without broad community engagement
- There is a CCC Council to guide the effort
  - The Council *stimulates* and *facilitates* – it doesn't "own"
  - Chosen through an open process under CRA auspices (Randy Bryant chaired 1st search, Eric Grimson chaired 2nd and 3rd)
- The Council is led by a Chair
  - Ed Lazowska, University of Washington
    - Susan Graham, UC Berkeley, serves as Vice Chair
  - 50% effort – not titular
- The CCC is staffed by CRA
  - Andy Bernat serves as Director, => Erwin Gianchandani

The CCC Council – broad representation

- Chair
  - Ed Lazowska, Washington
- Terms ending 2013
  - Randy Bryant, CMU
  - Lance Fortnow, Northwestern
  - Hank Korth, Lehigh
  - Eric Horvitz, Microsoft Research
  - Beth Mynatt, Ga Tech
  - Fred Schneider, Cornell
  - Margo Seltzer, Harvard
- Terms ending 2012
  - Stephanie Forrest, New Mexico
  - Chris Johnson, Utah
  - Anita Jones, UVa
  - M. Frans Kaashoek, MIT
  - Ran Libeskind-Hadas, Harvey Mudd
  - Robin Murphy, Texas A&M
- Terms ending 2011
  - Bill Feiereisen, Lockheed Martin
  - Susan Graham (v ch), Berkeley
  - Dave Kaeli, Northeastern
  - John King, Michigan
  - Bob Sproull, Sun
- Ex Officio
  - Andy Bernat, CRA
- Rotated off
  - Dick Karp, Berkeley, 2010
  - Andrew McCallum, UMass, 2010
  - Dave Waltz, Columbia, 2010
  - Greg Andrews, Arizona, 2009
  - Peter Lee, CMU, 2009
  - Karen Sutherland, Augsburg, 2009

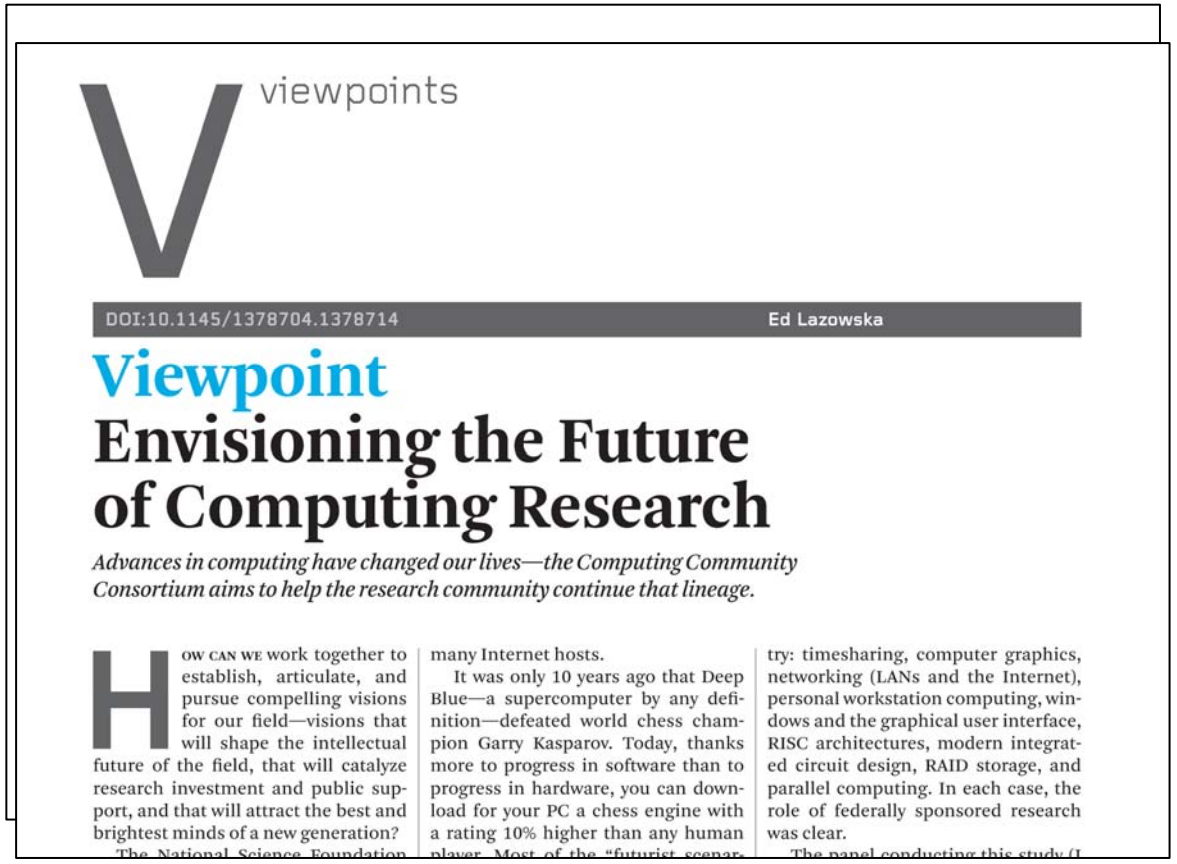
Major continuing activities

- Countless talks



Major continuing activities

- Countless talks
- Countless articles



viewpoints

DOI:10.1145/1378704.1378714

Ed Lazowska

Viewpoint

Envisioning the Future of Computing Research

Advances in computing have changed our lives—the Computing Community Consortium aims to help the research community continue that lineage.

How can we work together to establish, articulate, and pursue compelling visions for our field—visions that will shape the intellectual future of the field, that will catalyze research investment and public support, and that will attract the best and brightest minds of a new generation?

The National Science Foundation

many Internet hosts.

It was only 10 years ago that Deep Blue—a supercomputer by any definition—defeated world chess champion Garry Kasparov. Today, thanks more to progress in software than to progress in hardware, you can download for your PC a chess engine with a rating 10% higher than any human player. Most of the "futurist scenar-

try: timesharing, computer graphics, networking (LANs and the Internet), personal workstation computing, windows and the graphical user interface, RISC architectures, modern integrated circuit design, RAID storage, and parallel computing. In each case, the role of federally sponsored research was clear.

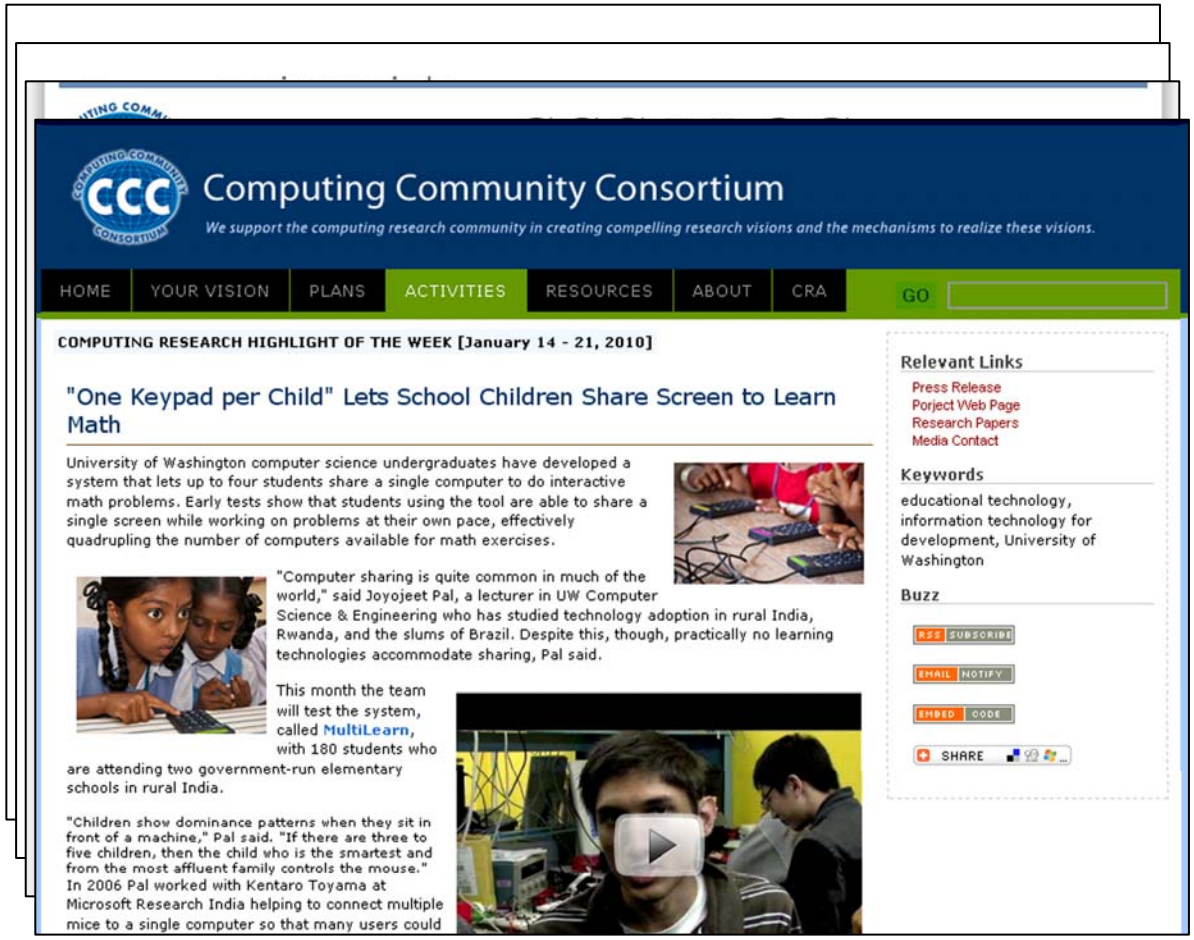
The panel conducting this study (I

Major continuing activities

- Countless talks
- Countless articles
- CCC blog

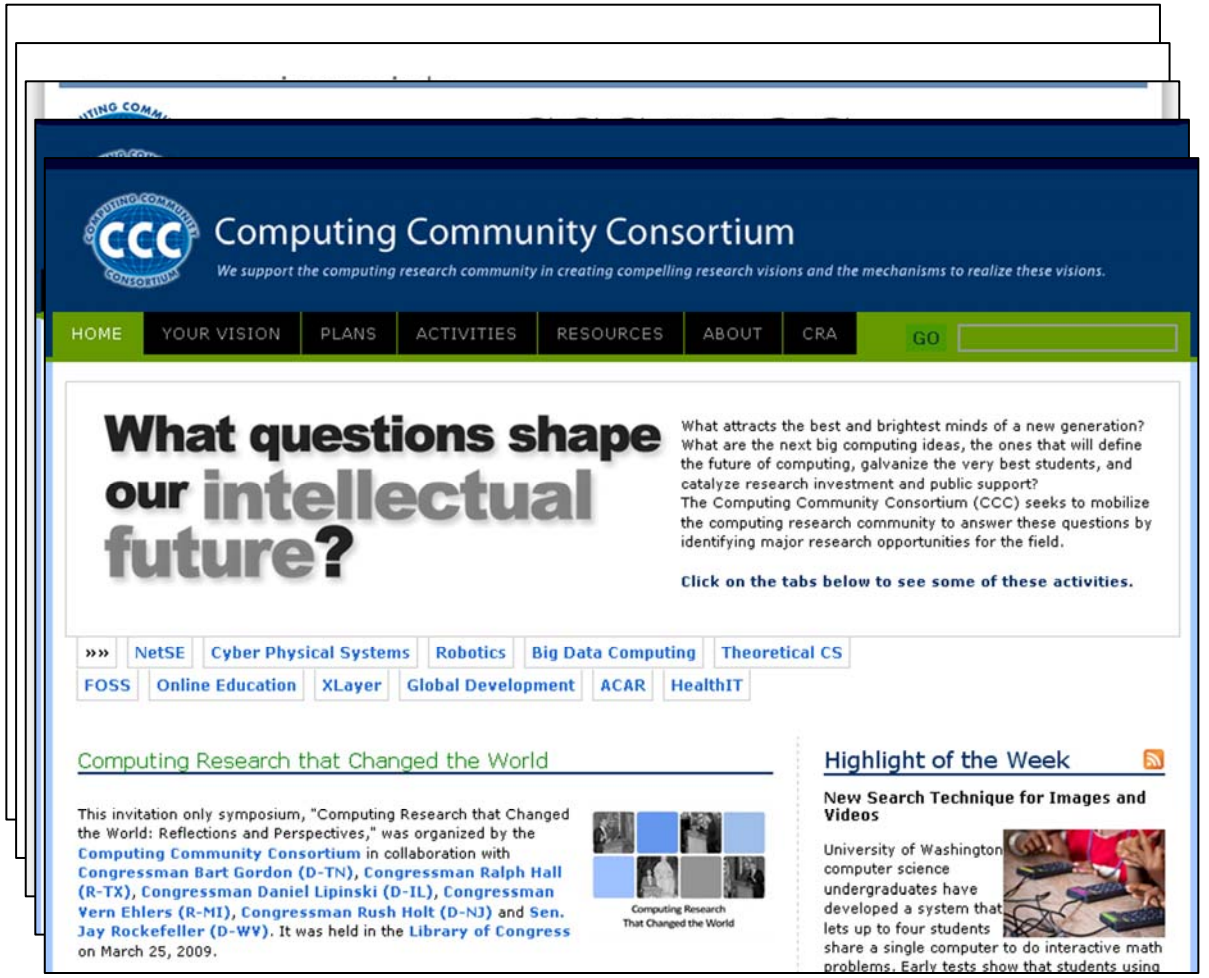
Major continuing activities

- Countless talks
- Countless articles
- CCC blog
- Computing research highlight of the week



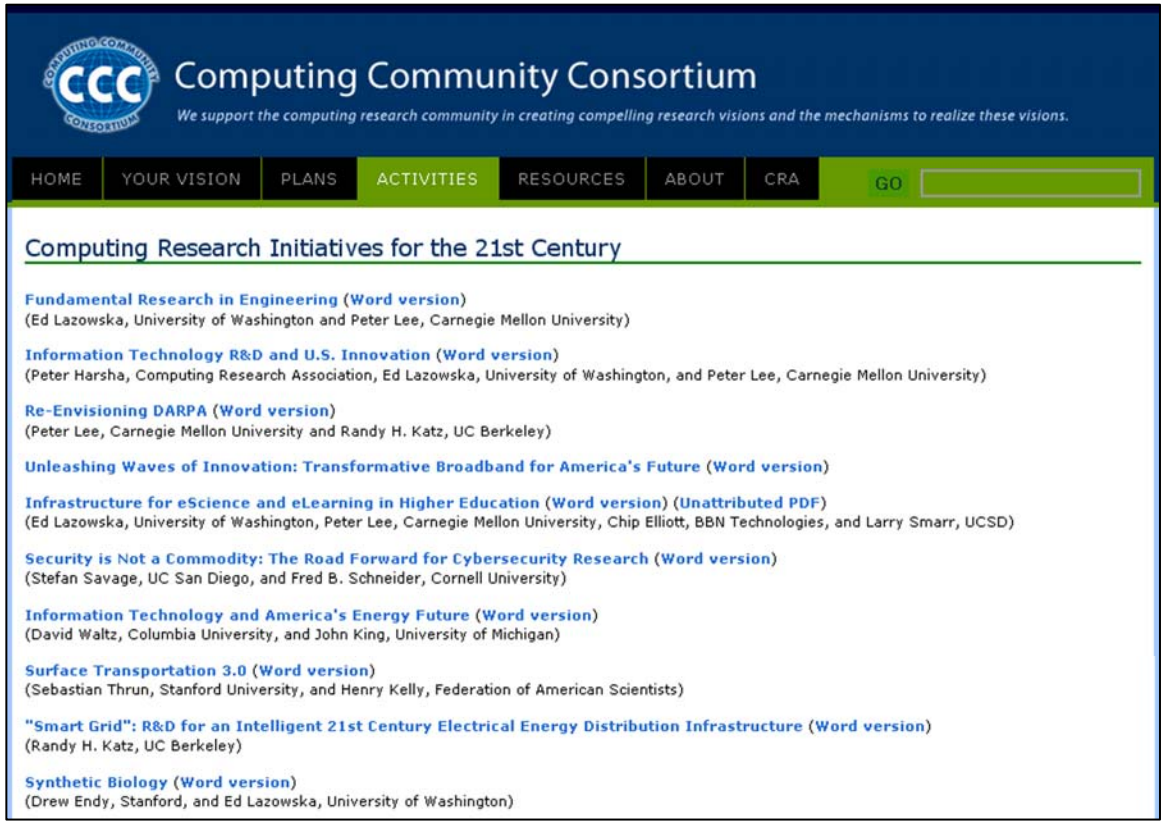
Major continuing activities

- Countless talks
- Countless articles
- CCC blog
- Computing research highlight of the week
- Community visioning exercises



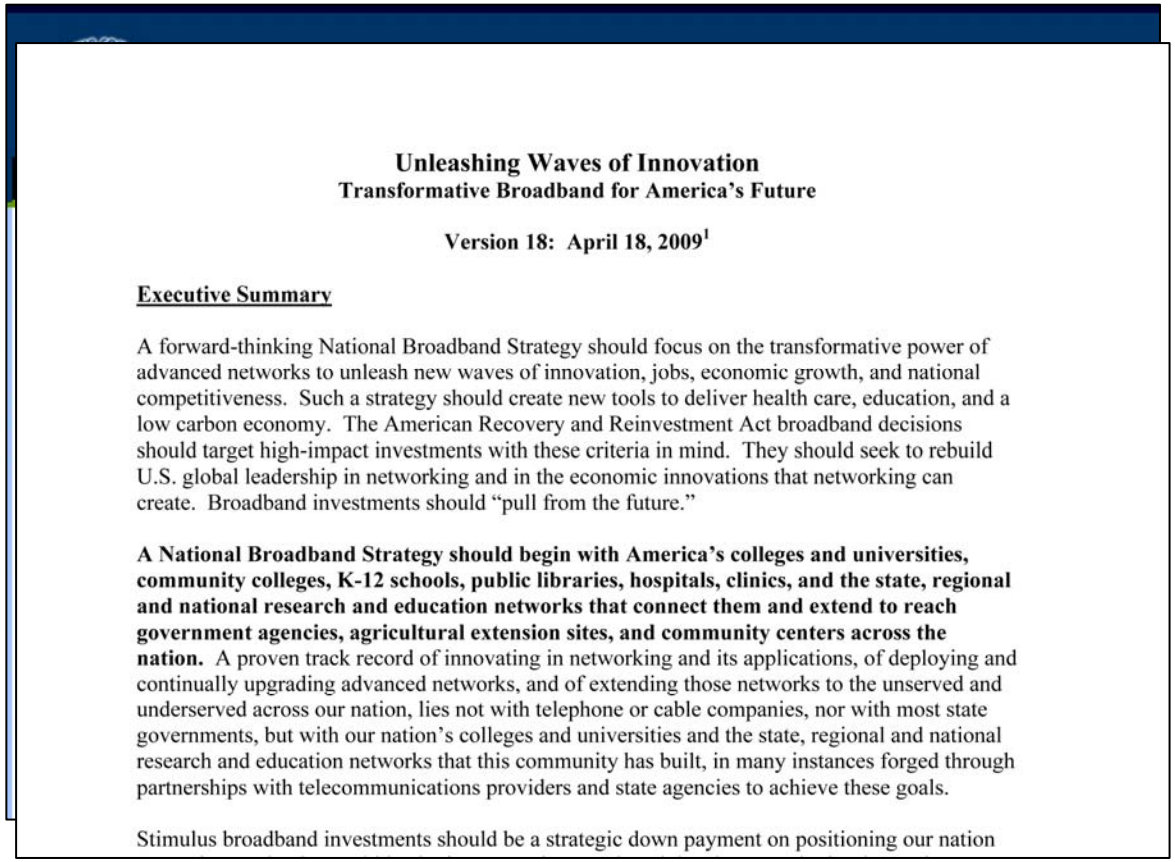
Major special initiatives

- Transition Team white papers



Major special initiatives

- Transition Team white papers
  - Unleashing Waves of Innovation



Unleashing Waves of Innovation
Transformative Broadband for America's Future

Version 18: April 18, 2009[1]

Executive Summary

A forward-thinking National Broadband Strategy should focus on the transformative power of advanced networks to unleash new waves of innovation, jobs, economic growth, and national competitiveness. Such a strategy should create new tools to deliver health care, education, and a low carbon economy. The American Recovery and Reinvestment Act broadband decisions should target high-impact investments with these criteria in mind. They should seek to rebuild U.S. global leadership in networking and in the economic innovations that networking can create. Broadband investments should "pull from the future."

A National Broadband Strategy should begin with America's colleges and universities, community colleges, K-12 schools, public libraries, hospitals, clinics, and the state, regional and national research and education networks that connect them and extend to reach government agencies, agricultural extension sites, and community centers across the nation. A proven track record of innovating in networking and its applications, of deploying and continually upgrading advanced networks, and of extending those networks to the unserved and underserved across our nation, lies not with telephone or cable companies, nor with most state governments, but with our nation's colleges and universities and the state, regional and national research and education networks that this community has built, in many instances forged through partnerships with telecommunications providers and state agencies to achieve these goals.

Stimulus broadband investments should be a strategic down payment on positioning our nation

Major special initiatives

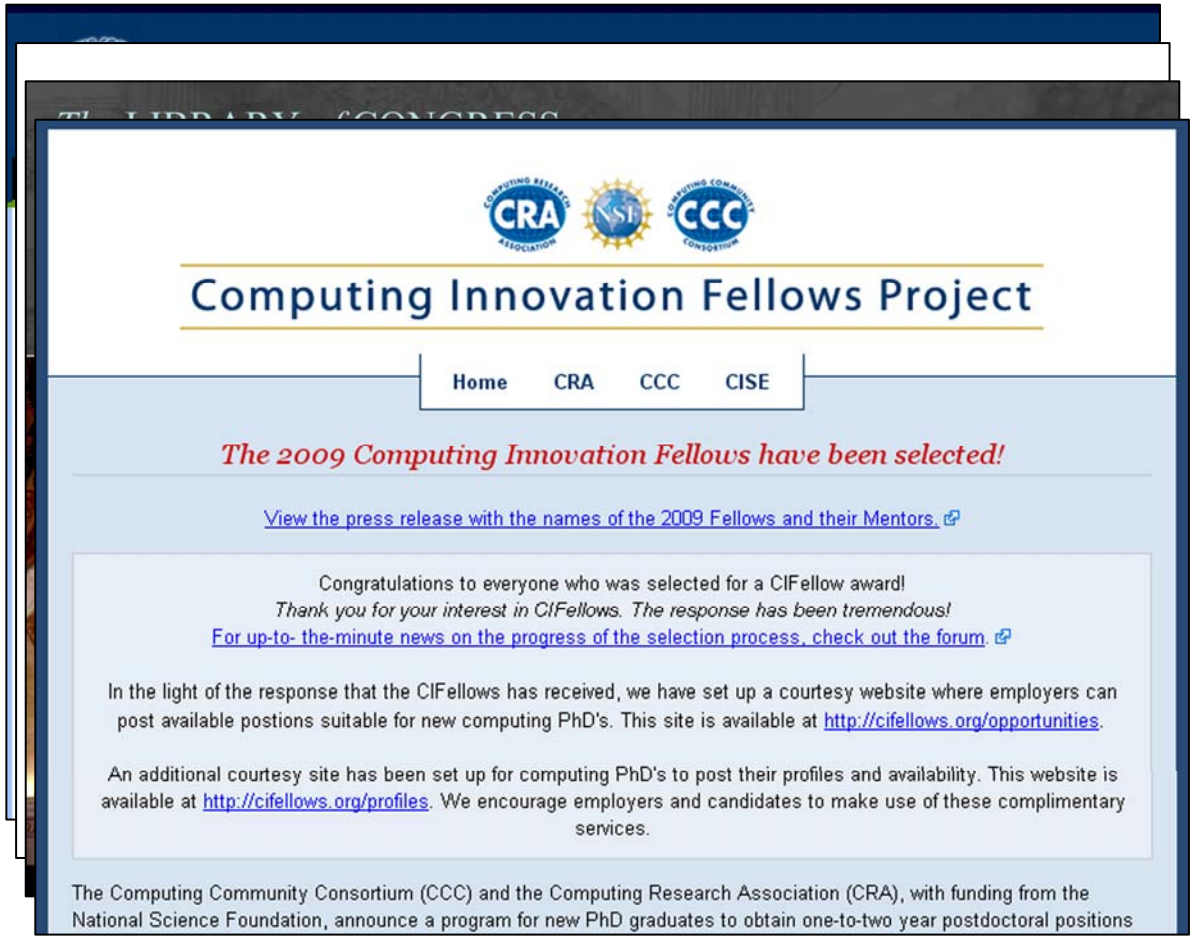
- Transition Team white papers
  - Unleashing Waves of Innovation
- Library of Congress Symposium

Major special initiatives

- Transition Team white papers
  - Unleashing Waves of Innovation
- Library of Congress Symposium
  - >60,000 video views

Major special initiatives

- Transition Team white papers
  - Unleashing Waves of Innovation
- Library of Congress Symposium
- Computing Innovation Fellows project

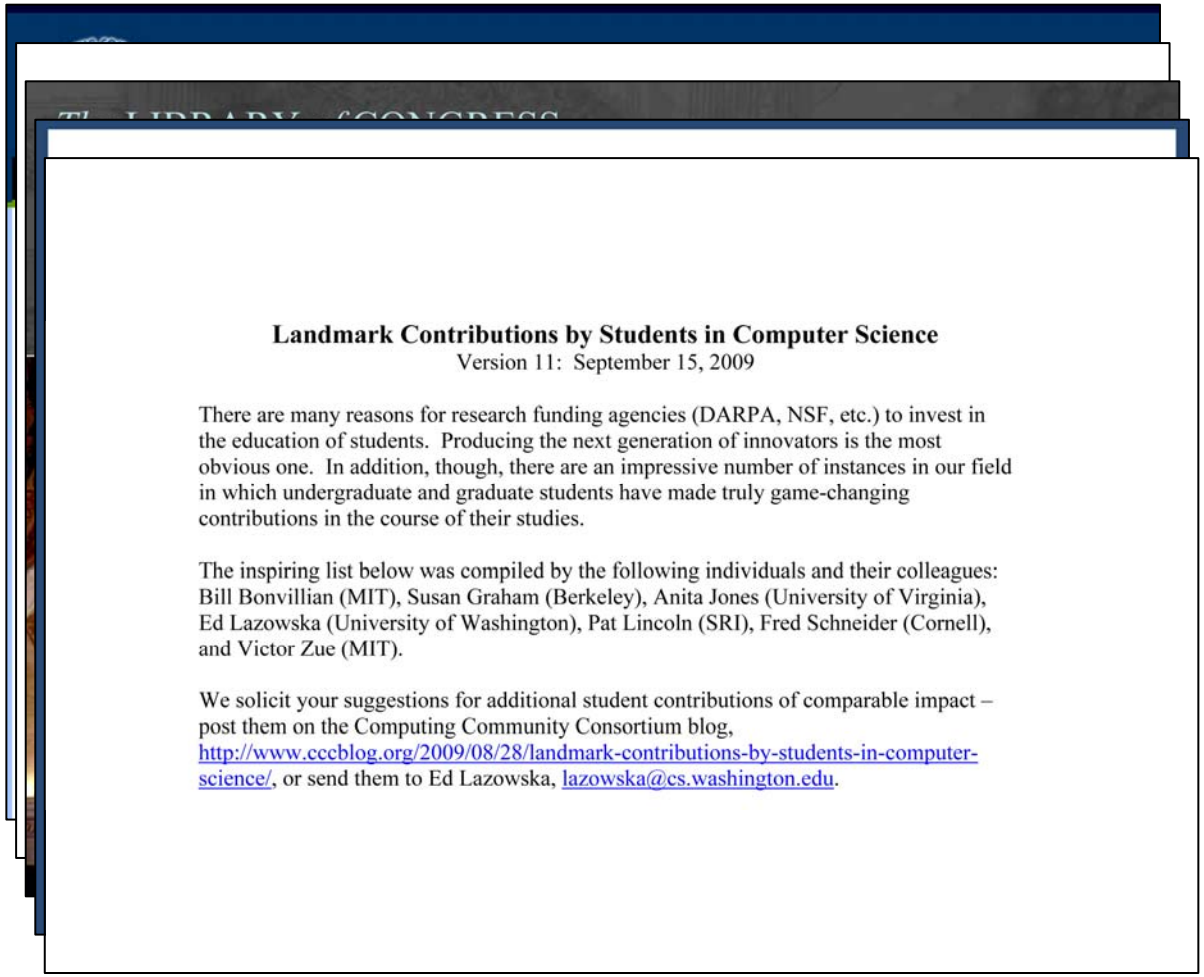


Major special initiatives

- Transition Team white papers
  - Unleashing Waves of Innovation
- Library of Congress Symposium
- Computing Innovation Fellows project
  - 1,209 mentors
  - 526 applicants

Major special initiatives

- Transition Team white papers
  - Unleashing Waves of Innovation
- Library of Congress Symposium
- Computing Innovation Fellows project
- Landmark Contributions by Students



Landmark Contributions by Students in Computer Science
Version 11: September 15, 2009

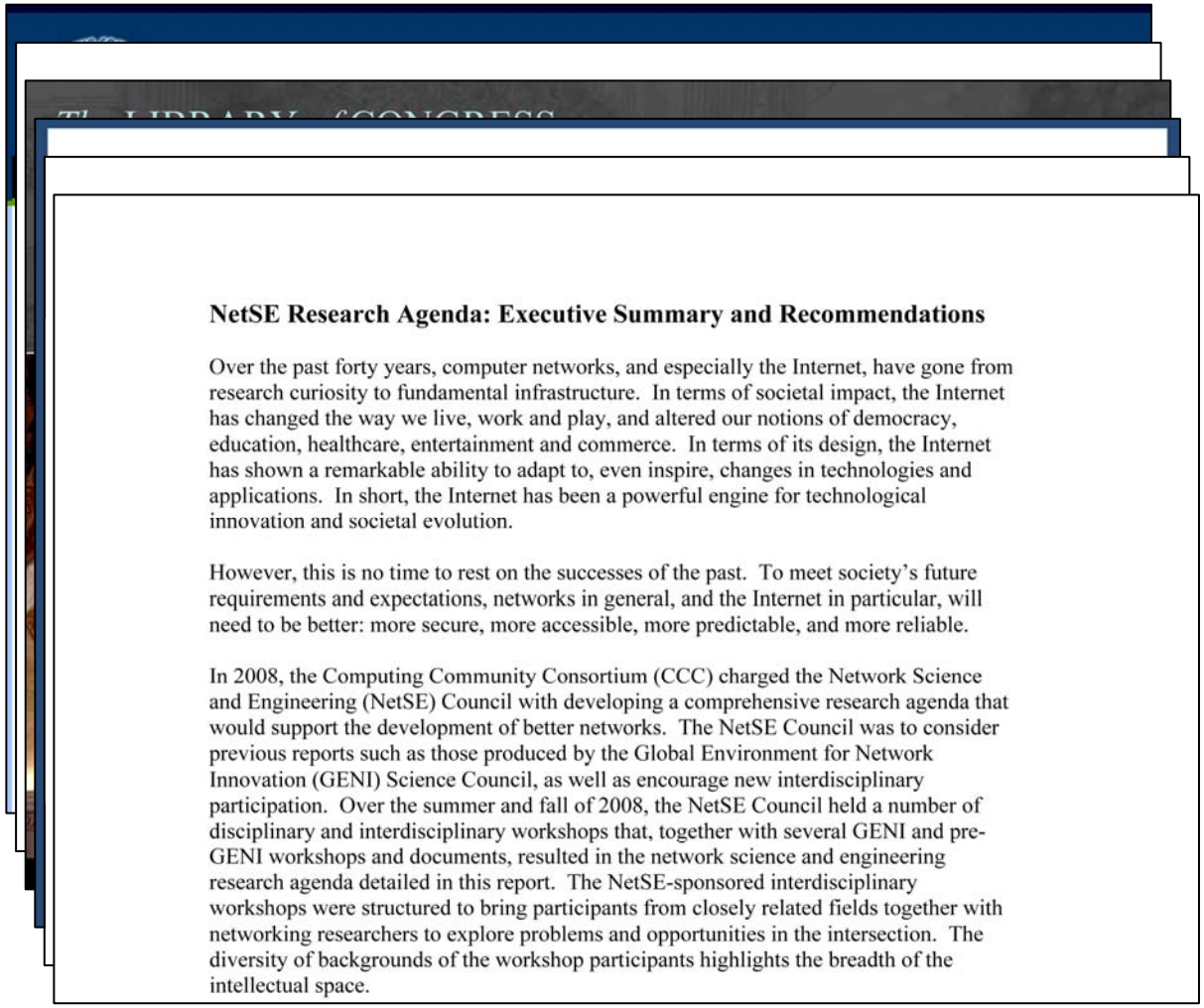
There are many reasons for research funding agencies (DARPA, NSF, etc.) to invest in the education of students. Producing the next generation of innovators is the most obvious one. In addition, though, there are an impressive number of instances in our field in which undergraduate and graduate students have made truly game-changing contributions in the course of their studies.

The inspiring list below was compiled by the following individuals and their colleagues: Bill Bonvillian (MIT), Susan Graham (Berkeley), Anita Jones (University of Virginia), Ed Lazowska (University of Washington), Pat Lincoln (SRI), Fred Schneider (Cornell), and Victor Zue (MIT).

We solicit your suggestions for additional student contributions of comparable impact – post them on the Computing Community Consortium blog, http://www.cccblog.org/2009/08/28/landmark-contributions-by-students-in-computer-science/, or send them to Ed Lazowska, lazowska@cs.washington.edu.

Major special initiatives

- Transition Team white papers
  - Unleashing Waves of Innovation
- Library of Congress Symposium
- Computing Innovation Fellows project
- Landmark Contributions by Students
- NetSE Research Agenda



NetSE Research Agenda: Executive Summary and Recommendations

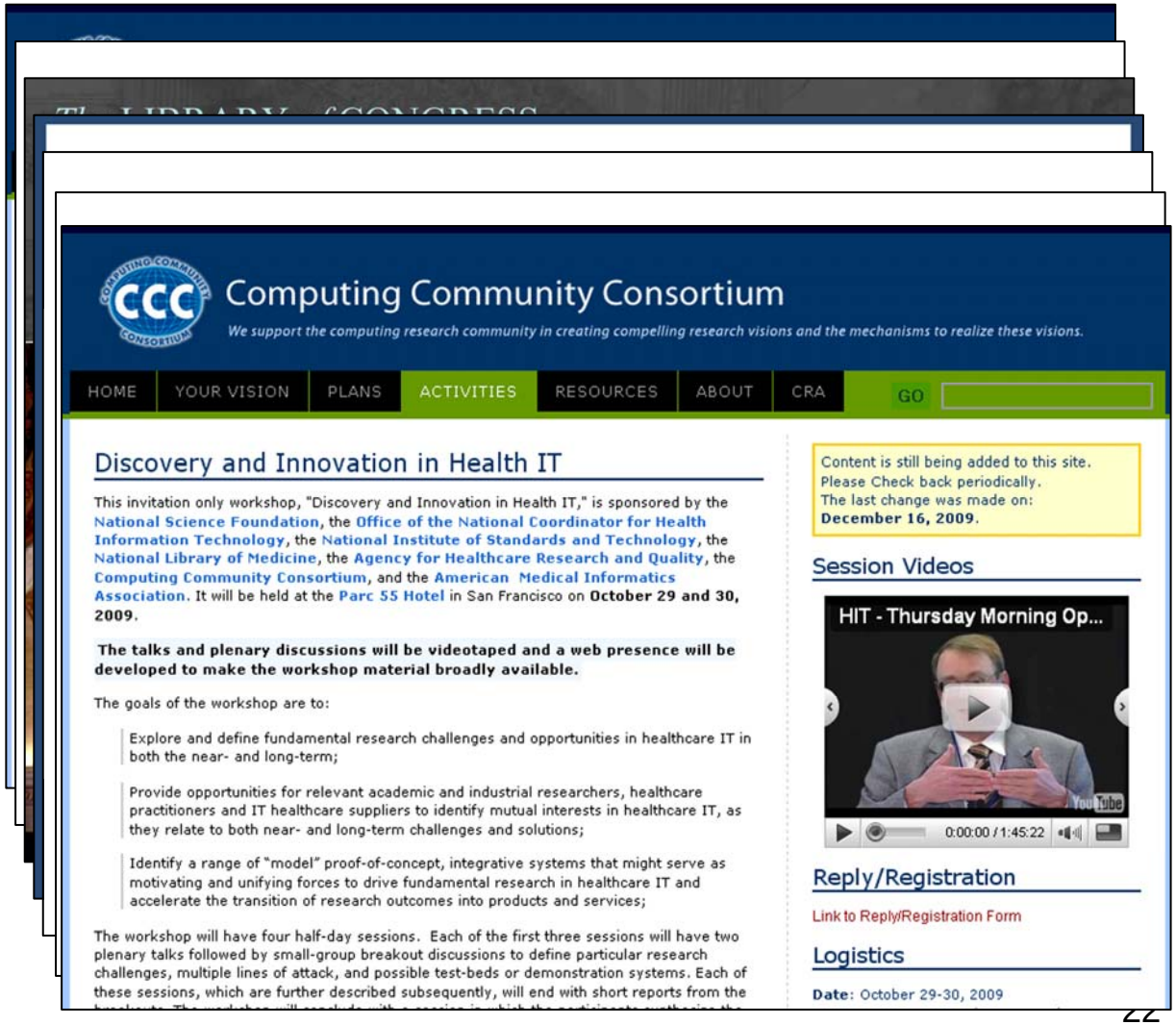
Over the past forty years, computer networks, and especially the Internet, have gone from research curiosity to fundamental infrastructure. In terms of societal impact, the Internet has changed the way we live, work and play, and altered our notions of democracy, education, healthcare, entertainment and commerce. In terms of its design, the Internet has shown a remarkable ability to adapt to, even inspire, changes in technologies and applications. In short, the Internet has been a powerful engine for technological innovation and societal evolution.

However, this is no time to rest on the successes of the past. To meet society's future requirements and expectations, networks in general, and the Internet in particular, will need to be better: more secure, more accessible, more predictable, and more reliable.

In 2008, the Computing Community Consortium (CCC) charged the Network Science and Engineering (NetSE) Council with developing a comprehensive research agenda that would support the development of better networks. The NetSE Council was to consider previous reports such as those produced by the Global Environment for Network Innovation (GENI) Science Council, as well as encourage new interdisciplinary participation. Over the summer and fall of 2008, the NetSE Council held a number of disciplinary and interdisciplinary workshops that, together with several GENI and pre-GENI workshops and documents, resulted in the network science and engineering research agenda detailed in this report. The NetSE-sponsored interdisciplinary workshops were structured to bring participants from closely related fields together with networking researchers to explore problems and opportunities in the intersection. The diversity of backgrounds of the workshop participants highlights the breadth of the intellectual space.

Major special initiatives

- Transition Team white papers
  - Unleashing Waves of Innovation
- Library of Congress Symposium
- Computing Innovation Fellows project
- Landmark Contributions by Students
- NetSE Research Agenda
- Health IT



The desired outcomes

- Broad community engagement in establishing more audacious and inspiring research visions for our field
  - Some may require significant research infrastructure (e.g., NetSE); some will be new programs (e.g., CDI, CPS)
- Better public appreciation of the potential of the field
- Attraction of a new generation of students
- More robust support for computing research
- Greater impact!