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March 25, 2009

Changing the World!



Ed Lazowska

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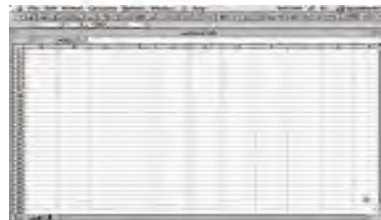
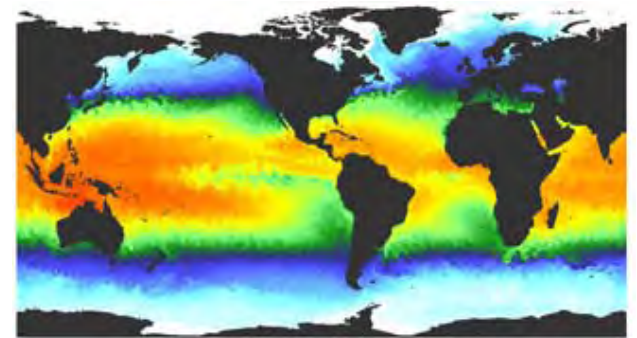
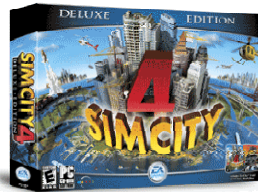


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We support the computing research community in creating compelling research visions and the mechanisms to realize these visions.

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





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THE COUNT

Internet, Mobile Phones Named Most Important Inventions

By PHYLLIS KORRKO Published: March 7, 2009

In response to the shouted-out question, "What are some of the greatest inventions of all time?," nearby office workers in a recent informal survey gave the following answers: the wheel, the engine, the ballpoint pen, diapers and the cheese Danish.

Life Changers

The top innovations of the last 30 years, according to judges at the Wharton School of the University of Pennsylvania.

1. Internet, broadband
2. PC and laptop computers
3. Mobile phones
4. E-mail
5. DNA testing and sequencing
6. Magnetic resonance imaging
7. Microprocessors
8. Fiber optics
9. Office software
10. Laser/robotic surgery
11. Open-source software
12. Light-emitting diodes
13. Liquid crystal display
14. GPS devices
15. E-commerce and auctions
16. Media file compression
17. Microfinance
18. Photovoltaic solar energy
19. Large-scale wind turbines
20. Internet social networking

THE NEW YORK TIMES

A panel of eight judges from the Wharton School of the University of Pennsylvania was required to go back only 30 years — not to the dawn of history — when asked a similar question. So its answers, of course, were very different.

In the survey, the Internet was voted the biggest innovation of the last three decades, followed by computers, mobile phones and e-mail. The survey was sponsored by Knowledge@Wharton, the school's business publication, and PBS's "Nightly Business Report."

Good, important choices all, but for classic, long-lasting appeal, they still can't beat the wheel. PHYLLIS KORRKO

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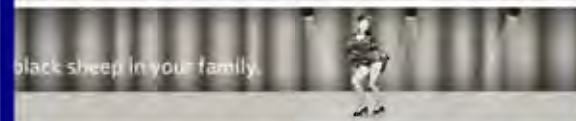
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Named Most Important Inventions

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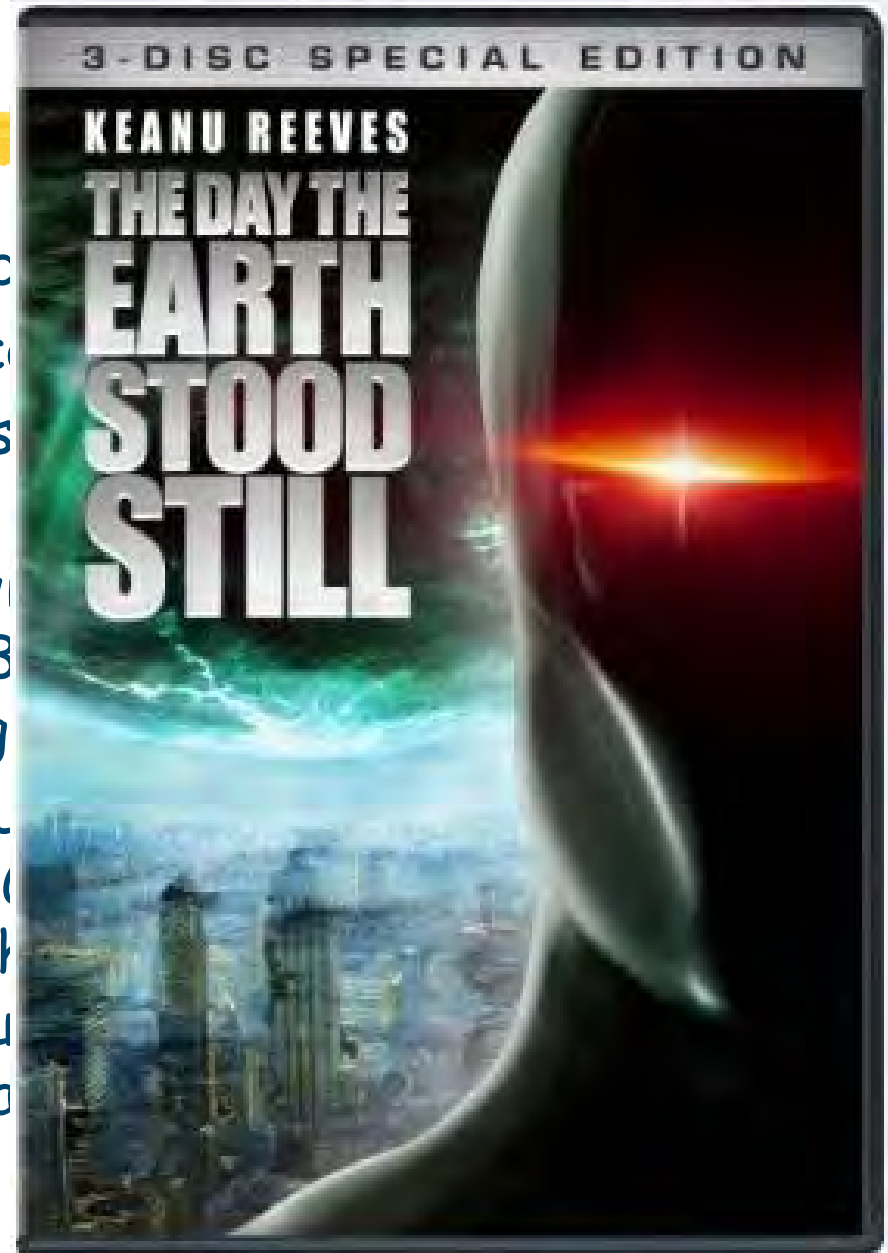
Imagine spending a day without information technology



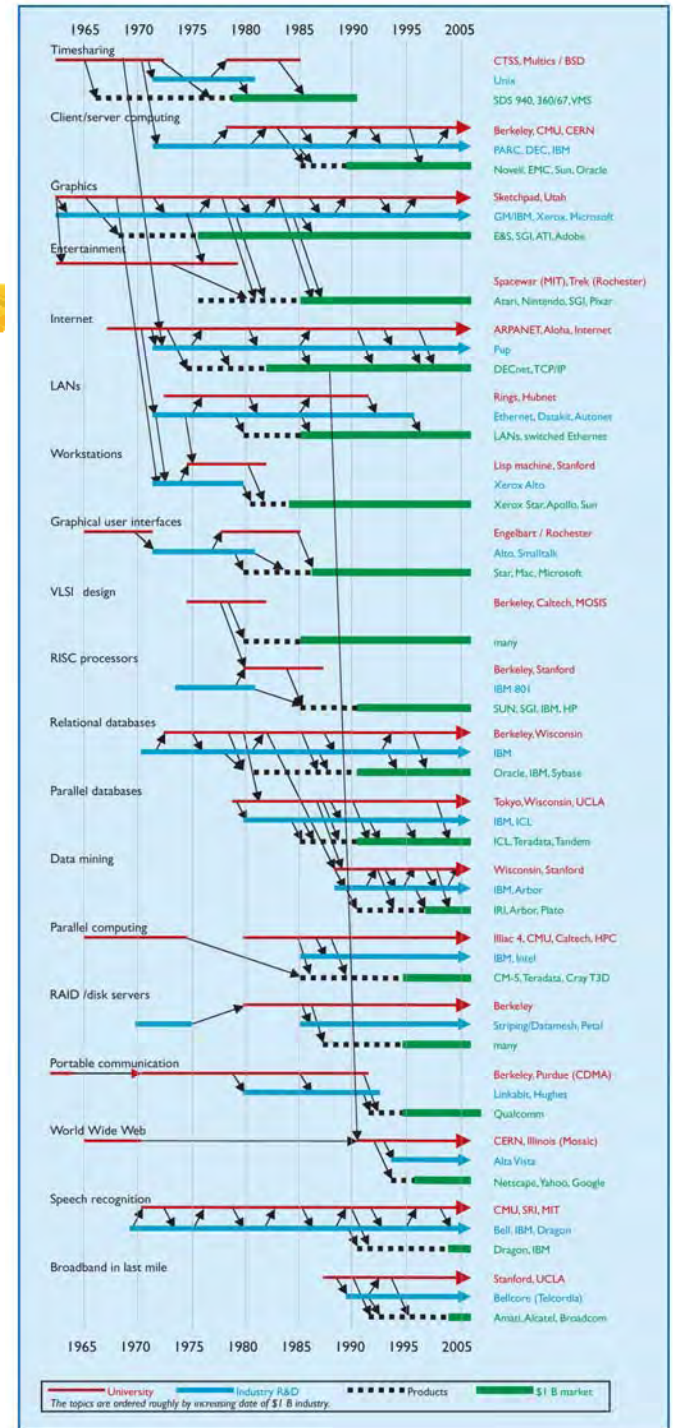
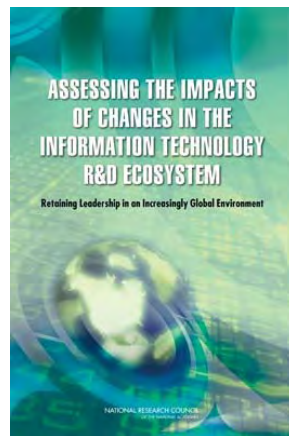
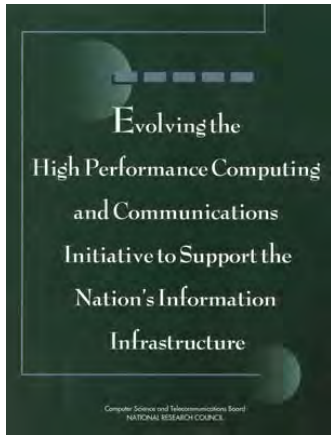
- A day without the Internet and all that it enables
- A day without diagnostic medical imaging
- A day during which automobiles lacked electronic ignition, antilock brakes, and electronic stability control
- A day without digital media - without wireless telephones, high-definition televisions, MP3 audio, DVD video, computer animation, and videogames
- A day during which aircraft could not fly, travelers had to navigate without benefit of GPS, weather forecasters had no models, banks and merchants could not transfer funds electronically, factory automation ceased to function, and the US military lacked technological supremacy

Imagine spending a day without information technology

- A day without the Internet and
- A day without diagnostic medicine
- A day during which automobiles have no antilock brakes, and electronic
- A day without digital media - with no high-definition televisions, MP3s, computer animation, and videogames
- A day during which aircraft could not navigate without benefit of GPS, and we had no models, banks and merchandise that are funded electronically, factory automation, and the US military leadership and supremacy

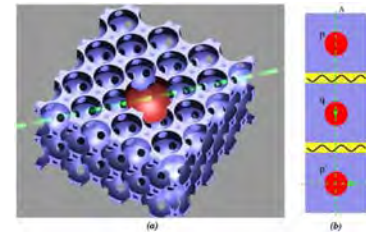
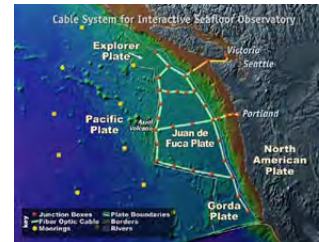
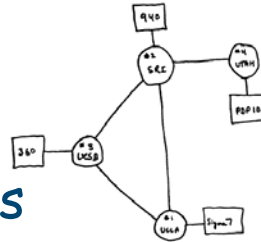


Research has built the foundation



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 of the developing world
- Personalized health monitoring => quality of life
- Neurobotics
- Synthetic biology



Today



- Game-changing advances of the recent past
- Advances that are on the horizon, and what will be needed to achieve them
- Lessons that can further increase the already remarkable effectiveness of the IT R&D ecosystem
- Synthesis (and some demonstrations)

Session 1: The Internet and the World Wide Web

9:00 - 10:20

Why We're Able to Google

Alfred Spector (Google)

The Magic of the "Cloud": Supercomputers for Everybody, Everywhere

Eric Brewer (University of California, Berkeley)

Human Computation

Luis von Ahn (Carnegie Mellon University)

Discussion by the speakers of future challenges and synergies



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Why We're Able to Google™

Converging Progress from Government-
& Industry-sponsored Research

The
Modern
Web

Human Interface Technologies
(broadly construed)

Information sharing
and retrieval

Web technologies

Distributed computing

Security Technologies

Networking
Operating
Systems

Open systems
approaches

Programming
Languages &
methodologies

Algorithms and Theoretical Results

Long Term Geometric Growth in Processing, Network, Storage

Dr. Alfred Z. Spector
VP, Research and Special Initiatives
Google, Inc.

Internet and the World Web Panel, March 25, 2009

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The Magic of the Cloud:

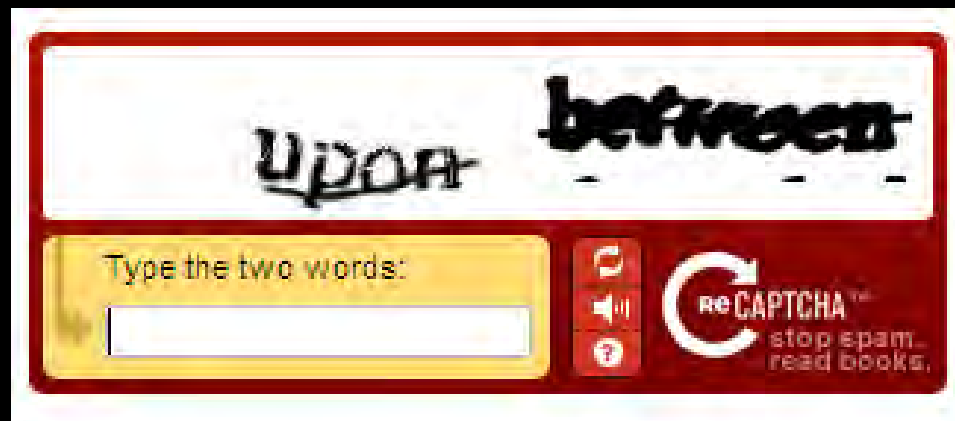
Supercomputers for Everyone, Everywhere

Prof. Eric A. Brewer
UC Berkeley

Human Computation

Luis von Ahn

Carnegie Mellon University





Session 2: Evolving Foundations

10:40 - 12:00

Security of Online Information

Barbara Liskov (Massachusetts Institute of Technology)

Learning to Improve Our Lives

Daphne Koller (Stanford University)

Global Information Networks

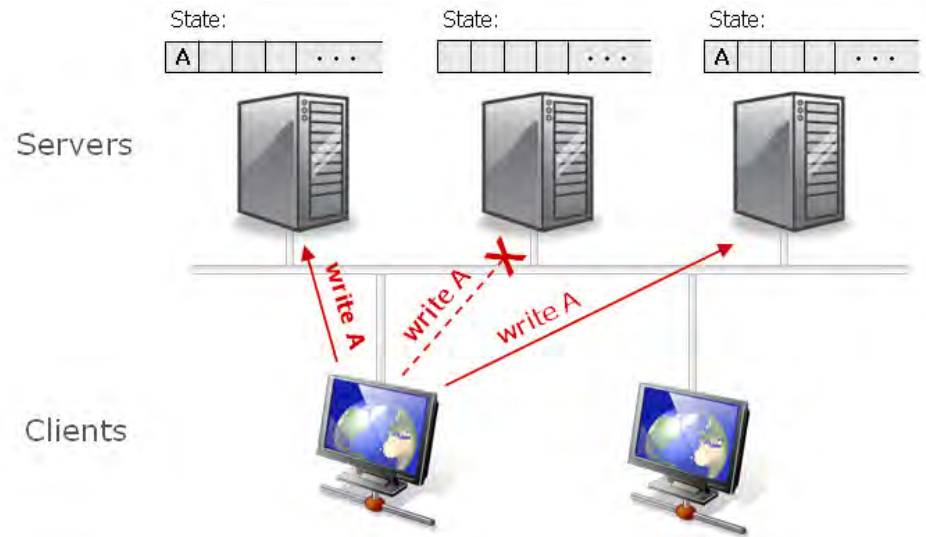
Jon Kleinberg (Cornell University)

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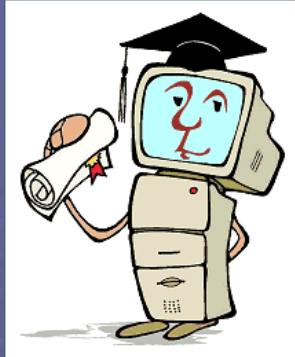


Security of Online Information

Barbara Liskov

MIT CSAIL

March 2009



Learning

to improve our lives

Daphne Koller
Stanford University





Session 3: The Transformation of the Sciences via Computation 1:00 - 2:20

Supercomputers and Supernetworks are Transforming Research

Larry Smarr (University of California, San Diego)

Computing and Visualizing the Future of Medicine

Chris Johnson (University of Utah)

Zooming In On Life

Gene Myers (Howard Hughes Medical Institute)

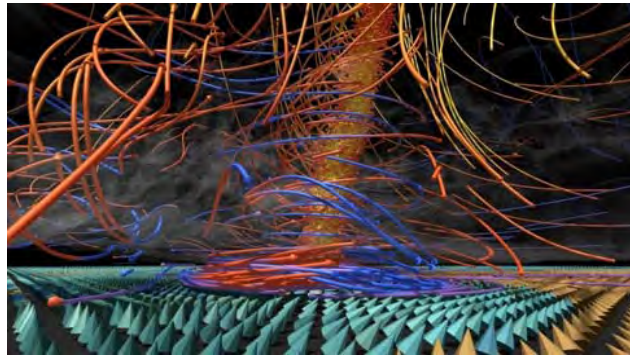
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Supercomputers and Supernetworks are Transforming Research



Dr. Larry Smarr

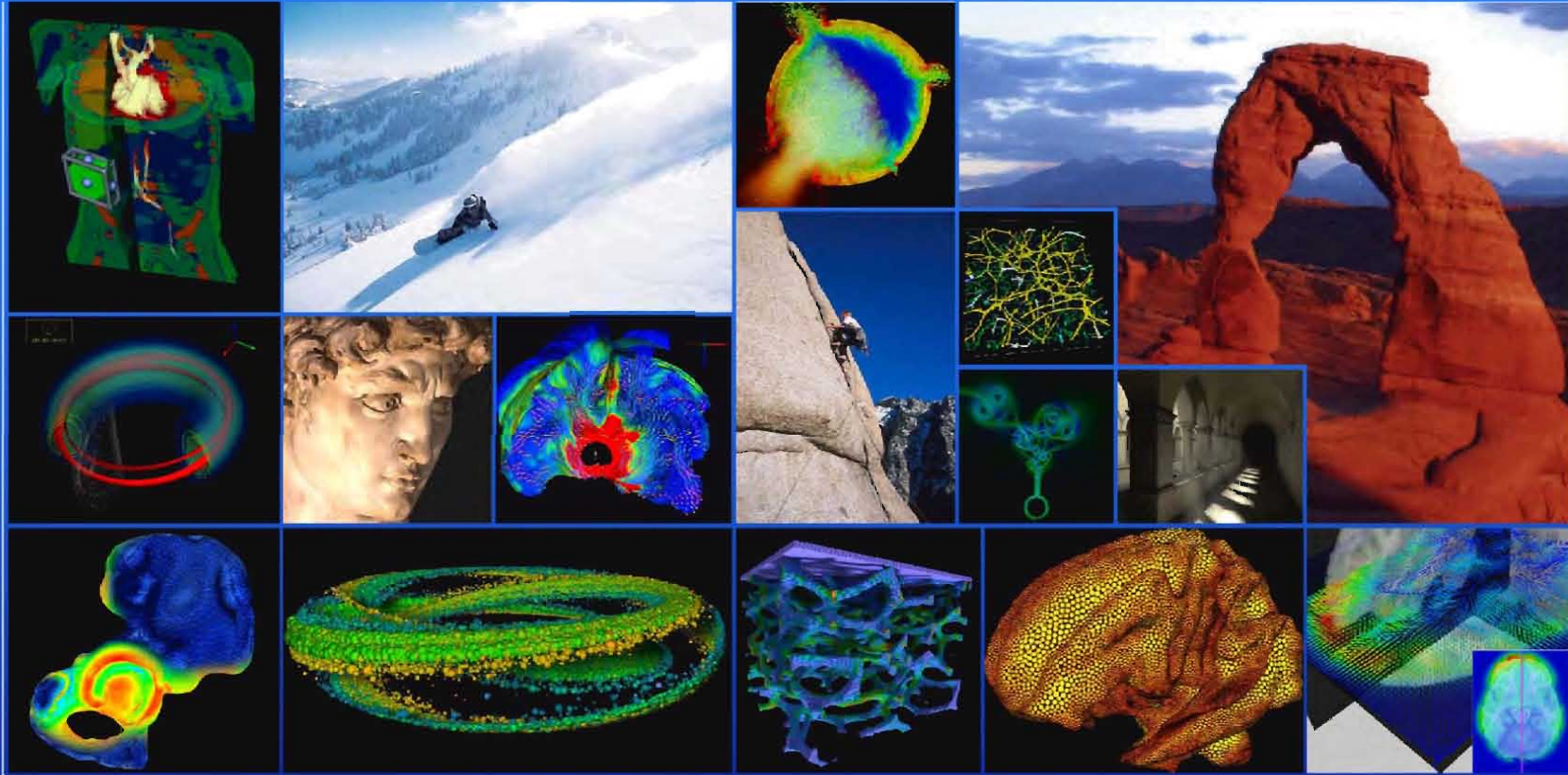
**Director, California Institute for Telecommunications and
Information Technology**

Harry E. Gruber Professor,

**Dept. of Computer Science and Engineering
Jacobs School of Engineering, UCSD**



Computing and Visualizing the Future of Biomedicine



Chris Johnson

**Scientific Computing and Imaging Institute
University of Utah**

Zooming in On Life

Gene Myers

Group Leader

HHMI Janelia Farm Research Campus



Session 4: Computing Everywhere!

2:30 - 3:50

Sensing Everywhere!

Deborah Estrin (University of California, Los Angeles)

Pixels Everywhere!

Pat Hanrahan (Stanford University)

Robotics Everywhere!

Rodney Brooks (Massachusetts Institute of Technology and Heartland Robotics)

Discussion by the speakers of future challenges and synergies



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Sensing Everywhere! from ecosystems to human systems

Professor Deborah Estrin

NSF Science and Technology Center for Embedded Networked Sensing (CENS)

UCLA Computer Science Department

destrin@cens.ucla.edu

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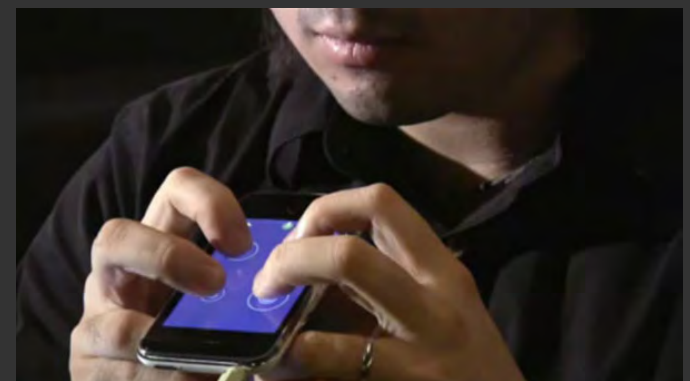
Pixels Everywhere

Media Tech and How it Changed the World

Pat Hanrahan

Department of Computer Science

Stanford University





Robots Everywhere!

Rodney Brooks

Massachusetts Institute of Technology

iRobot Corporation

Heartland Robotics





Evaluation Session: Moving Forward

4:00 - 5:00

Discussion by the speakers and the audience of what factors made these achievements possible and what factors will accelerate future advances.

Moderators: Susan Graham (University of California, Berkeley) and Peter Lee (Carnegie Mellon University)



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Walk to Madison Hall, James Madison Building, Library of Congress 5:00 - 5:30

Closing Session 5:30



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The origins of this symposium

- Built upon a history of attempting to better understand the IT innovation ecosystem
- Discussions with NSF
- Broad input from the computing research community
- Program committee chaired by Dan Reed synthesized this input into a set of recommendations
- Members of the CCC Council assembled the final program



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- The session chairs and discussion moderators
 - Susan L. Graham (UC Berkeley)
 - Peter Lee (Carnegie Mellon University)
- The Computing Research Association
 - Andrew Bernat
 - Peter Harsha
- The program committee, speakers, and demonstrators

