Computer Science: Changing the World

Ed Lazowska

Bill & Melinda Gates Chair in
Computer Science & Engineering
University of Washington

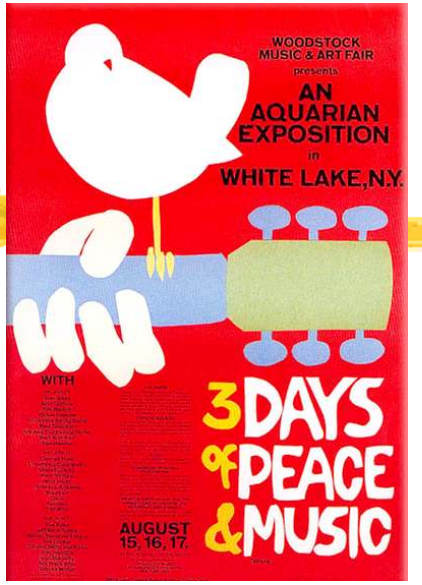
Chair
Computing Community Consortium

http://lazowska.cs.washington.edu/cs.achievements.pdf

Today …

- Forty years ago …
- The past thirty years …
- The most recent ten years …
- The coming decade …

Forty years ago …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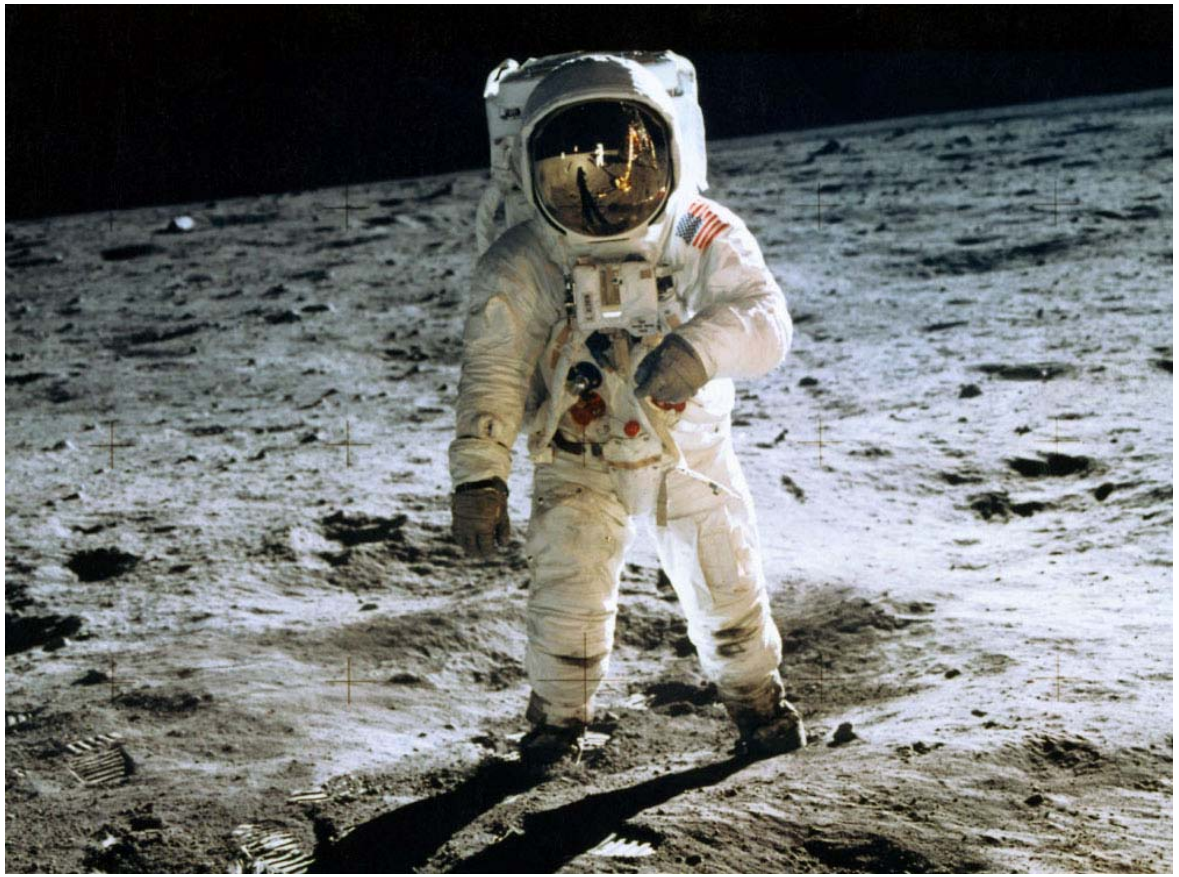
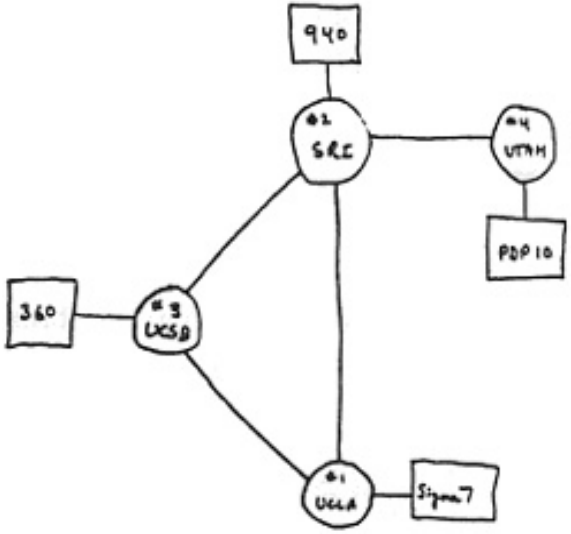
1969



[Peter Lee, DARPA, and Pat Lincoln, SRI]



THE ARPA NETWORK
DEC 1969
4 NODES

29OCT69	2100	LOADED OP. PROGRAM FOR BEN BARKER BBN	CSK
	22:30	Talked to SRI host to host	CSK
		Left IMP program running after sending a host dead message to IMP.	CSK

With forty years hindsight, which had the greatest impact?

- Unless you're big into Tang and Velcro (or sex and drugs), the answer is clear …

- And so is the reason …

EXPONENTIALS R US

The past thirty years …

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Internet, Mobile Phones Named Most Important Inventions

By PHYLLIS KORKKI
Published: March 7, 2009

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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
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15. E-commerce and auctions
16. Media file compression
17. Microfinance
18. Photovoltaic solar energy
19. Large-scale wind turbines
20. Internet social networking

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

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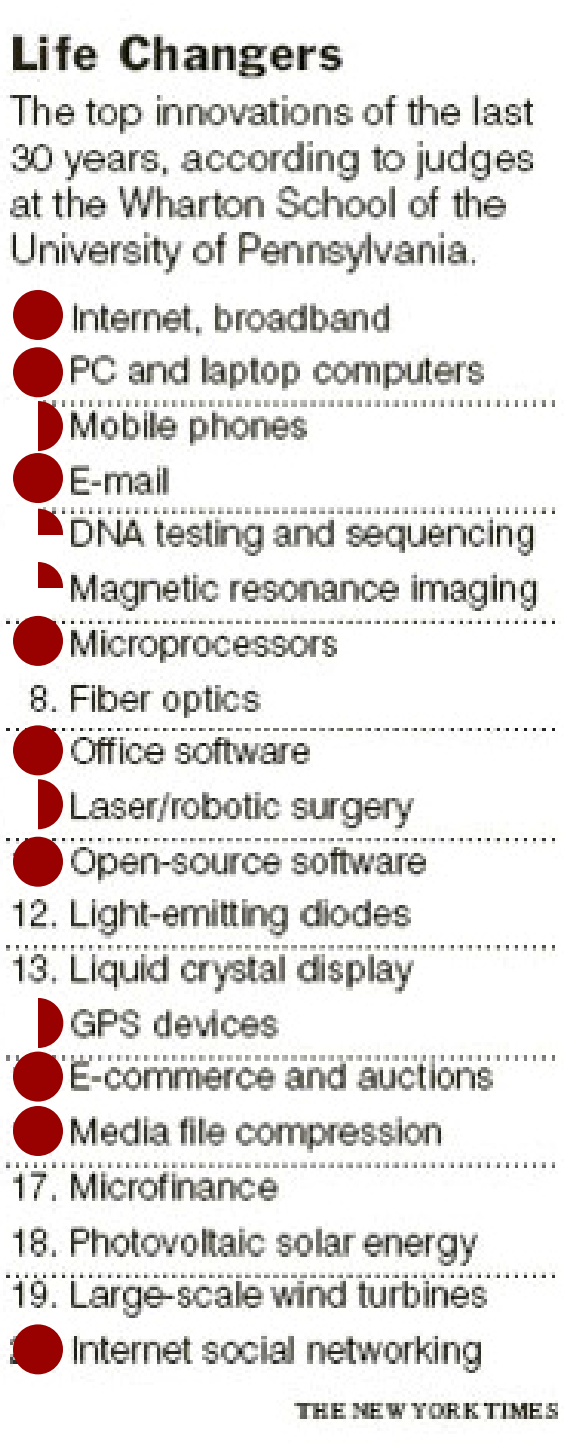

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The most recent ten years …

- Search
- Scalability
- Digital media
- Mobility
- eCommerce
- The Cloud
- Social networking and crowd-sourcing

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

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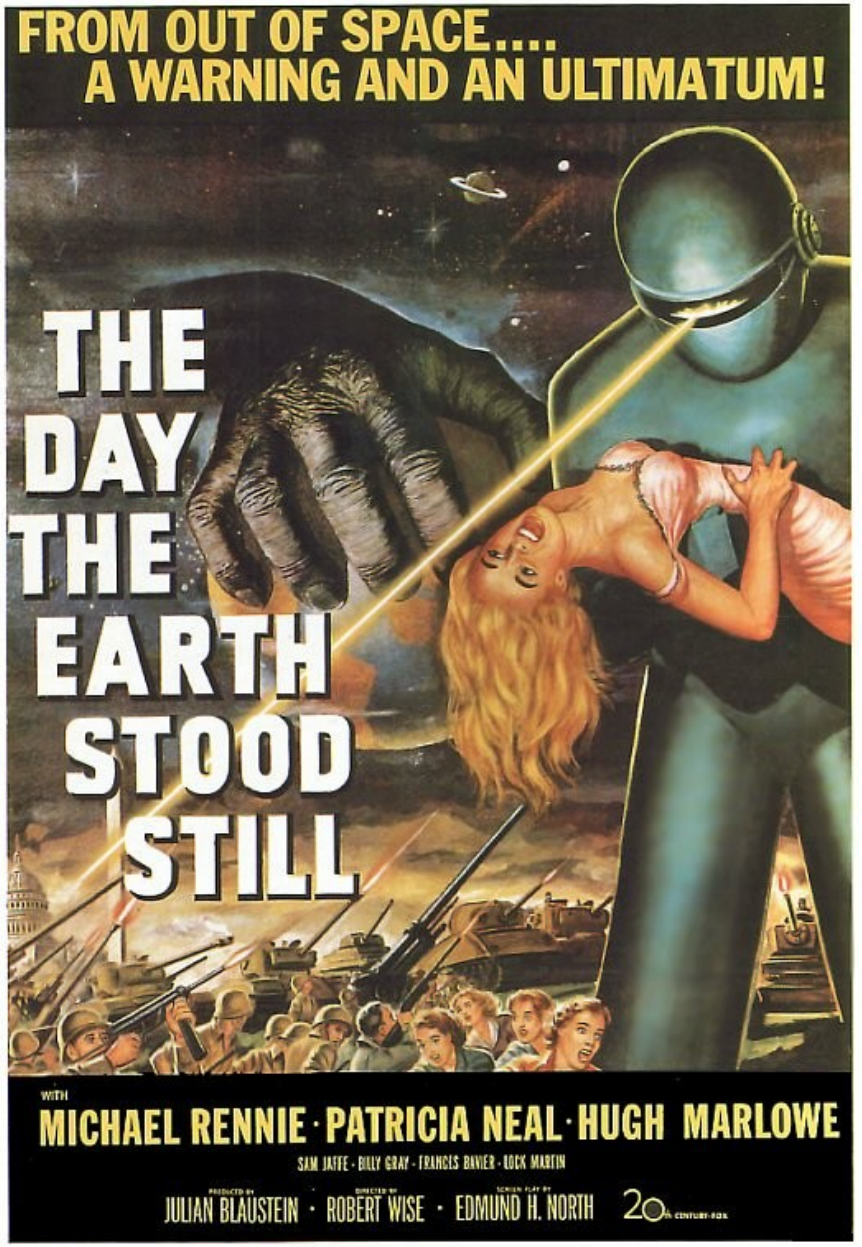

The coming decade …

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Make solar energy economical

Provide energy from fusion

Develop carbon sequestration methods

Manage the nitrogen cycle

Provide access to clean water

Restore and improve urban infrastructure

Advance health informatics

Engineer better medicines

Reverse-engineer the brain

Prevent nuclear terror

Secure cyberspace

Enhance virtual reality

Advance personalized learning

Engineer the tools of scientific discovery

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Enhance virtual reality

Advance personalized learning

Engineer the tools of scientific discovery

Predominant CS component

Significant CS component

We put the "smarts" in …

- Smart homes
- Smart cars
- Smart bodies
- Smart robots
- The data deluge (smart science)
- Virtual and augmented reality
- Smart crowds and human-computer systems

Is this a great time, or what?!?!