

The State of CRA

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What I'm Going to Say

- CRA Mission
- Computing > Computer Science
- Special Emphases
 - Human Resources
 - Government Relations & Policy
 - Speak with one voice
 - Grand Challenges Conference(s)
 - Communications
- State of Computing
 - Economy
 - Education
 - Research



Mission - Strengthen Research and Graduate Education in Computing

- Influence *policy* that impacts computing research
- Encourage development of *human resources*
- Contribute to cohesiveness of the professional *community*
- Collect and disseminate *information* about the importance and state of computing research

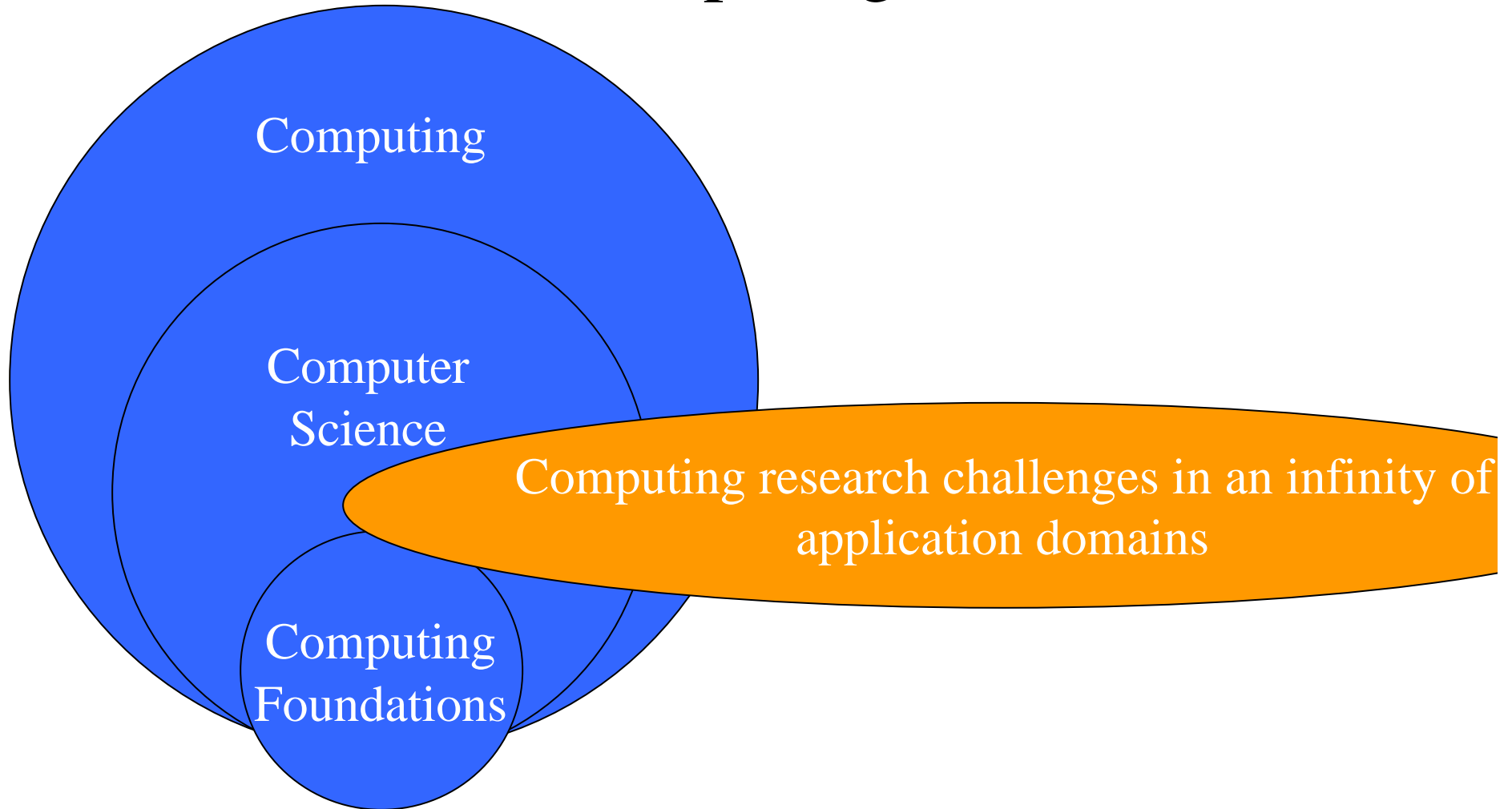


Computing > Computer Science

- Why are we called the *Computing* Research Association and not the *Computer Science* Research Association?
- Our name was Computer Science Board before 1986
- Changed in 1986 to Computing Research Board
 - Increasing concern for R&D in the computing fields, including computer engineering and computational science



A Structure for the Discipline of Computing



Interdisciplinary Research

Contribution of Discipline X

Apply known knowledge
Develop & apply new knowledge

Computing in the service of discipline X research	Interdisciplinary research
Routine application of current knowledge	Discipline X in the service of computing research

Apply known knowledge

Develop & apply new knowledge

Contribution of Computing

How to focus on Computing and not just Computer Science?

- Engagement with ECEDHA
 - But relatively few CompEngr members from ECE Depts.
- Computing topics in Snowbird program
 - Bioinformatics, Computational Biology, Genomics, Proteomics
 - Computer Science + Other Disciplines
 - When IT Becomes a Profession
- Academic Structures Task Force; IT Workers Study
- IT Deans Group
 - 36 of 45 are CRA members
- Future Grand Challenges Conferences
- “Affiliate Society” membership?
- Suggestions welcomed!!



IT Deans Group

45 known “IT Schools”– Reporting to Provost rather than to a Dean
Names such as:

- School of Information and Management Systems
- College of Physical and Mathematical Science
- Faculty of Computing and Information Science
- School of CS, Telecommunications and Information Systems
- College of Information Science and Technology
- School of Information Studies
- School of Info Technology and Engineering
- School of Information Technology
- College of Computing
- School of Computer Science and Information Systems
- Information and Computer Science
- School of Information Science & Policy
- Alliance for Technology, Learning and Society
- School of Information
- College of Information Science & Systems Engineering
- School of Library and Information Science
- School of Informatics
- School of EECS



Special Emphases within Mission

- HR
- Government Relations
- Communications



Special Emphases – Human Resources

- Faculty Recruiting and Retention – *CRA Treasurer*
- Support for Tapia Celebration of Diversity Conference
- CRA-W
 - Women Grad Students Recruiting and Retention – *CRA Vice-Chair*
 - Careers Workshop at SIGCSE for teachers from non-PhD schools
 - Distinguished Lecture Series + Grad School Recruiting Panels
 - DMP beginning to scale up with more mentors
 - Strengthened office support for CRA-W



Special Emphases – Government Relations / Policy

- *Speak with One Voice*
- Expanded committee - non-board volunteers
- Co-chair for CRAN - Computing Research Advocacy Network
 - Sign up for CRAN!!!

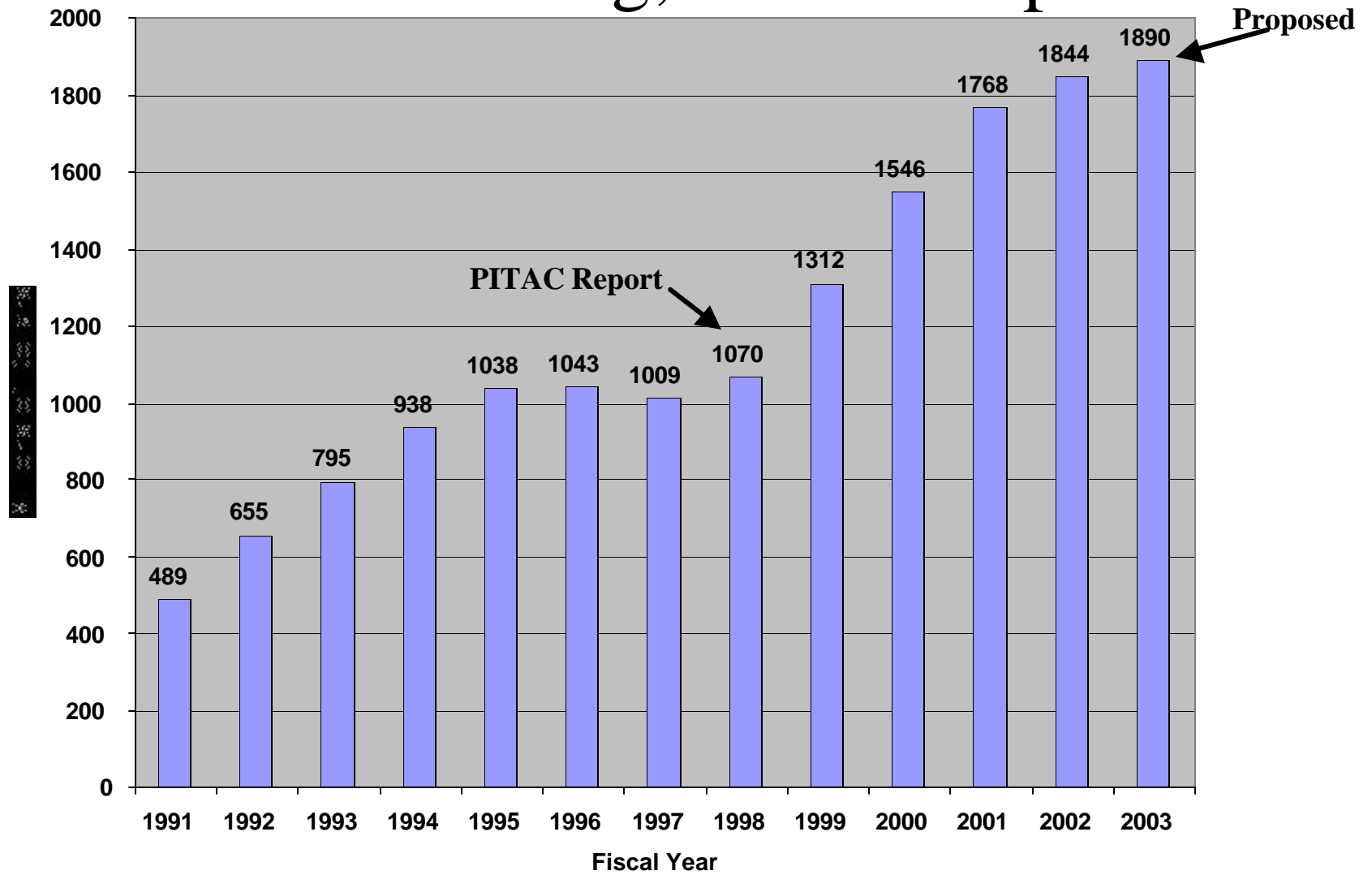


Speak with One Voice

- Astronomy
 - Popular with general public
- Medical / Health Care => doubled NIH budget over 5 years
 - Take along those who will benefit
- PITAC is our latest success story
 - High-level White House support and great committee
 - Despite unintended consequences



IT R&D Funding; PITAC Impact



Astronomy Example – Speak with One Voice

Astronomy and Astrophysics in the New Millennium

Astronomy and Astrophysics Survey Committee
Board on Physics and Astronomy–Space Studies Board
Commission on Physical Sciences, Mathematics, and Applications
National Research Council

NATIONAL ACADEMY PRESS
Washington, D.C.



Prioritized Initiatives

TABLE ES.1 Prioritized Initiatives (Combined Ground and Space) and Estimated Federal Costs for the Decade 2000 to 2010^{a,b}

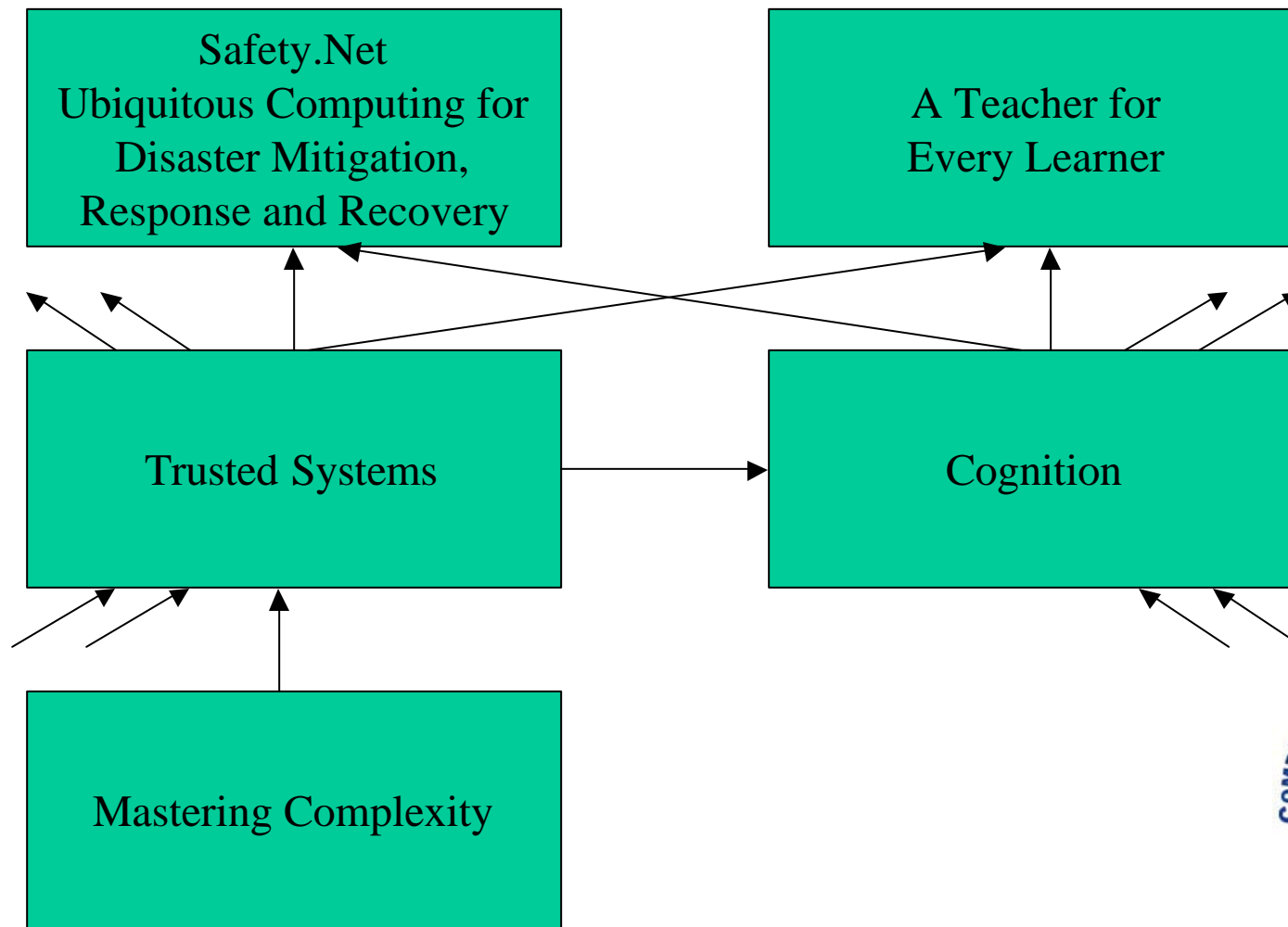
Initiative	Cost ^c (\$M)
Major Initiatives	
Next Generation Space Telescope (NGST) ^d	1,000
Giant Segmented Mirror Telescope (GSMT) ^d	350
Constellation-X Observatory (Con-X)	800
Expanded Very Large Array (EVLA) ^d	140
Large-aperture Synoptic Survey Telescope (LSST)	170
Terrestrial Planet Finder (TPF) ^e	200
Single Aperture Far Infrared (SAFIR) Observatory ^e	100
Subtotal for major initiatives	2,760

CRA's Start at "Speaking with One Voice"

- CRA Conference on "Grand Research Challenges" in Computer Science and Engineering
- Organizing Committee
 - Anita Jones, UVa (Chair)
 - William Aspray, CRA
 - Ambuj Goyal,* IBM
 - Mary Jane Irwin,* Penn State
 - Ed Lazowska,* University of Washington
 - Dave Patterson,*UC Berkeley
 - Jordan B. Pollack, Brandeis
 - Bob Sproull, Sun
 - William Wulf, NAE and UVa



Grand Challenges



CRA Board voted enthusiastically and unanimously to

- Widely disseminate report from Systems Grand Challenges
 - Distribute report to CRA members + influentials in DC
 - Briefing for funding agency officials
 - Briefing for press and congressional staffers
 - CRN
 - Web Site
 - Keynote talks at major conferences
- Establish Steering Committee for future grand challenges conferences



An Open Invitation for “Grand Challenges” Conferences

- Security and Privacy
- AI
- Database Systems
- The “Outerface” of computing – graphics, HCI, visualization, robotics, ubiquity
- Theory
- ?
- ?



Special Emphases – Communications

- “When CRA Speaks, People Listen”
- Analysis of constituencies
- New Communications Committee - *CRA Vice-Chair*
- New web pages about to roll out
- “Welcome to the Research Community packets for new faculty and for passing qualifying exams
 - Please help in distribution process
- Look for more innovations coming soon



Increasing Involvement by non-Board Volunteers

- 43 committee members beyond the 32-member board
- + Snowbird presenters
- You are invited to become involved!



The State of CRA Depends on the Broader State of Computing

- Economy
 - Purchases of computing and communications hardware and software
- Education
 - Supply of students
 - Demand for students
- Federal research enterprise



State of IT Economy

- We all know about the stock market :-)
- There is clearly a short-term dip in
 - IT and Telecomm spending
 - Hiring
 - VC investment in start-ups
- Long-term will be fine
 - Productivity effects
 - Integrated in our lives
 - Economic recovery
 - But, we are further up the S-shaped curve
 - => less dramatic growth next time 'round?



Computing is Pervasive

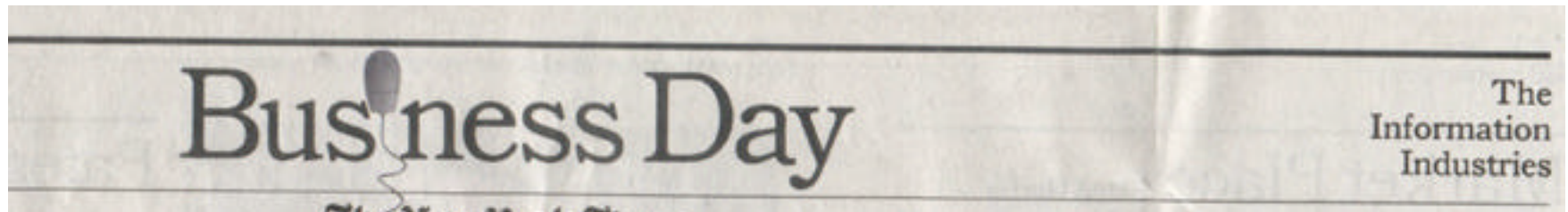
- Chip shipments

	1997	2002
PC chips	100M	200M
Embedded chips	3.5B	8.5B

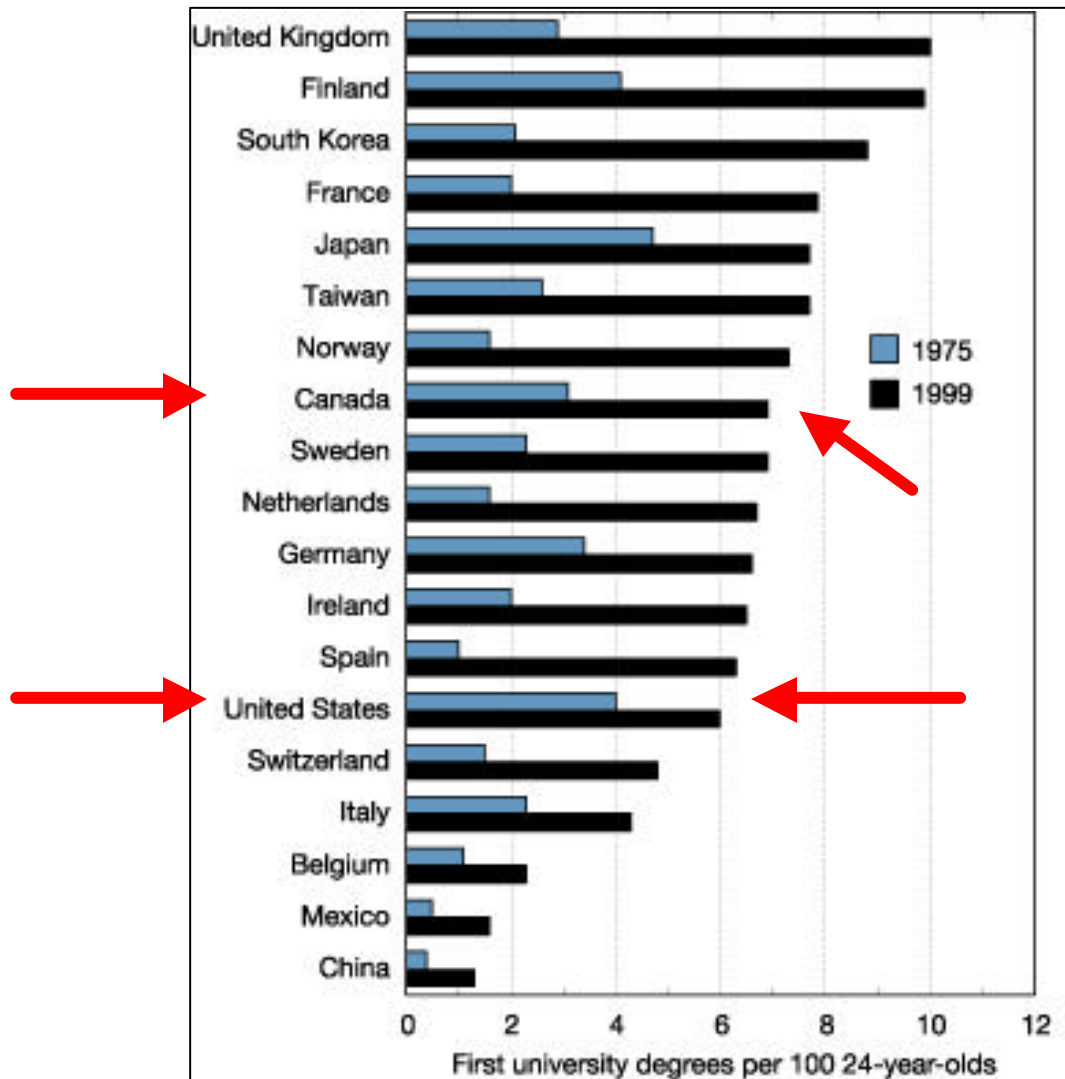
- Typical car has 12 - 24 microprocessors
 - Coming soon: fly by wire, brake by wire
- How many computers are in your home?
 - (I have 60-70)



TWO Sections in *The New York Times*



Education - Big Problems in US and Canada



Ratio of science & engineering first degrees to 24-year-old population.

US has declining enrollments

Source: NSF Science and Engineering Indicators



Instant Survey - State of Your Dept / Lab

- Assuming 3% increase means a flat budget with inflation
- Budget up more than inflationary 3%
- Budget flat with inflation
- Budget down with inflation

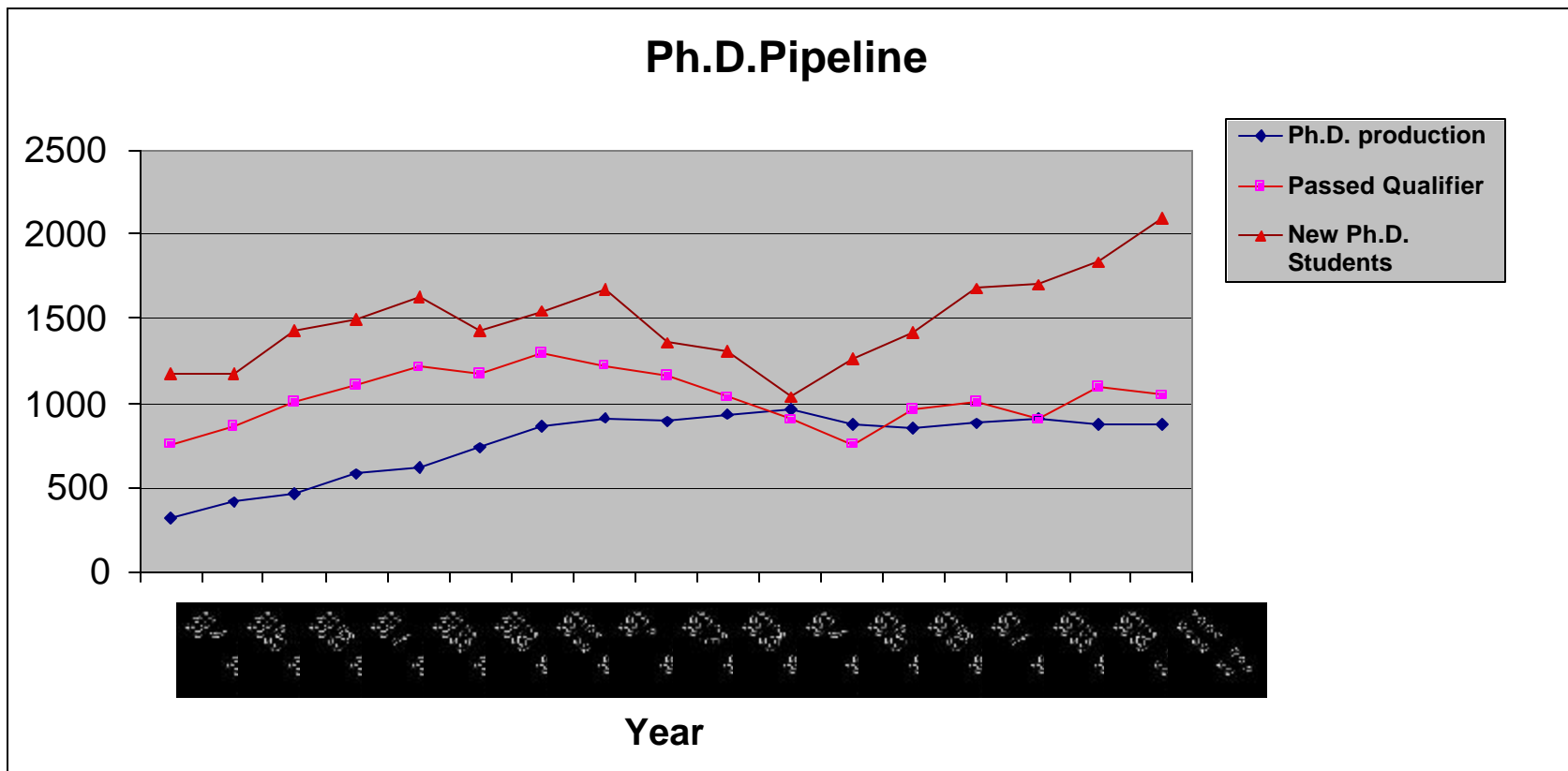


Instant Survey

- Entering freshmen class in Computing - Fall 2002
 - Hands up for increase
 - Hands up for decrease
- Entering PhD class in Computing - Fall 2002
 - Hands up for increase
 - Hands up for decrease



The State of IT Education – PhD Pipeline from Taulbee Survey



Courtesy Stu Zweben

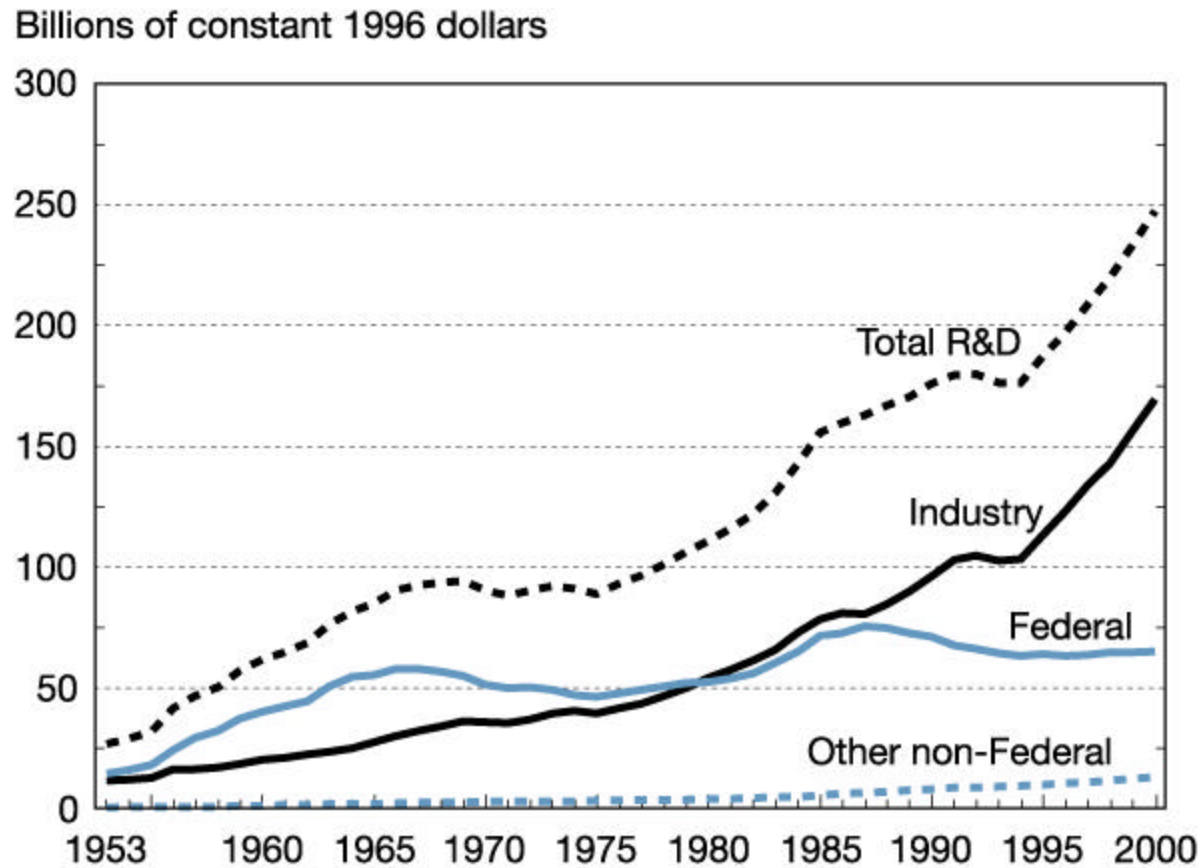
Instant Survey - Faculty Hiring Trends

Both New and Replacement

- Faculty hiring for the year that just ended
 - Higher than previous year
 - Same as previous year
 - Lower than previous year
- Expectations for next year
 - Higher than this year
 - Same as this year
 - Lower than this year



Overall State of Research Funding

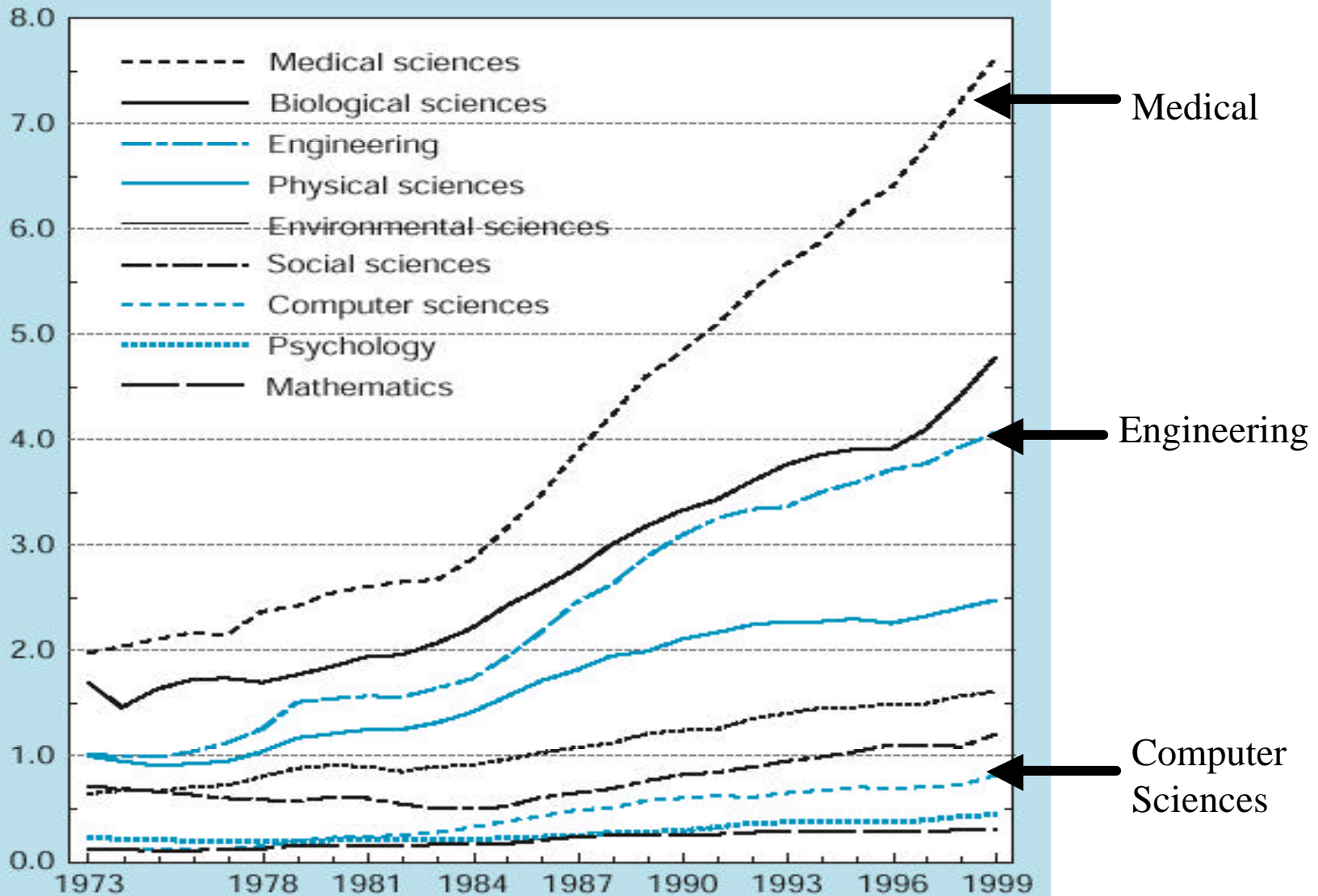


Source: NSF Science and Engineering Indicators



Academic R&D Expenditures by Field

Billions of constant 1996 U.S. dollars



Source: NSF Science and Engineering Indicators

Percentage of CS PhDs in Academics with Research Funding

- Up from '79 to '89 to '99, while Science and Engineering overall up from '79 to '89 but down in '99
- For 4 to 7 Years Post-PhD, down since 1989 – all disciplines down

		1979	1989	1999
All PhDs in academics	Science and Engineering	39.9	49.4	46.1
	Computer Science	34.8	52.4	55.6
4-7 years since PhD in academics	Science and Engineering	43	57.8	47.4
	Computer Science	na	70.8	56.6

Source: NSF Science and Engineering Indicators



And Earmarking is on the Rise!!

(Millions of dollars)

Year	Earmarked funds	Year	Earmarked funds
1980	11	1991	470
1981	0	1992	708
1982	9	1993	763
1983	77	1994	651
1984	39	1995	600
1985	104	1996	296
1986	111	1997	440
1987	163	1998	528
1988	232	1999	797
1989	299	2000	1,044
1990	248	2001	1,668

Source: NSF Science and Engineering Indicators

Given State of the Economy, CRA is Doing Remarkably Well – THANK YOU!

Success is due to:

Volunteers and Staff

Membership \$\$

NSF Programmatic support \$\$

With everyone working together to deliver value to our membership



What will *You* do to broaden and deepen
CRA's impact?





Celebrating 30 Years of Service
to the
Computing Research Community