A Word on Off-Shoring: Causes

1. Technology – successes of computer science and computer engineering!
   - The "Death of Distance"
   - If it can be bits, it's up for grabs
   - No Neo-Luddites out there

2. Economics – business realities

Off-Shoring Economics - 5Cs

- Closer to market

- Closer to suppliers

- Closer to talent

- Closer to politicians - to do business

- Cost reduction - just one of many considerations
  - Labor
  - Infrastructure
  - Taxes and regulations
  - Government subsidies

Triple Whammy has Driven Down UG Enrollments

- Undergraduate – perceived low demand
  - Newly-declared CS/CE undergrads in 2003
    - Down 22% to 18,000 (2003 Taulbee)
    - A strong trend
- *Which in turn can affect our financial viability*

Good News – PhD Production *Finally* Trending Back Up
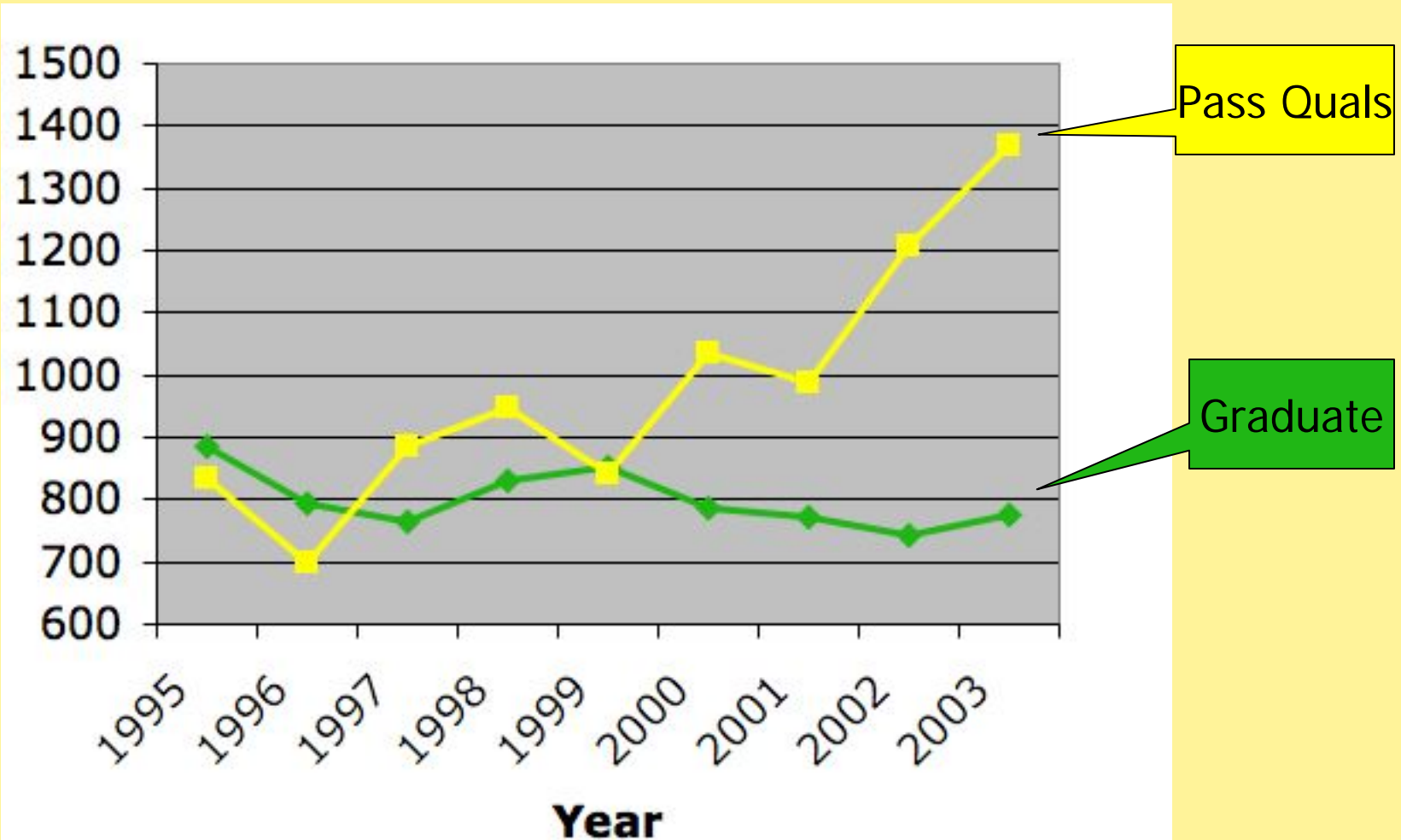
CRA Role

- Data - Taulbee Survey
- Pipeline
  - CRA-W
  - Support Coalition to Diversify Computing
- Support changes to Visa process
- Much needed beyond what CRA can do - High School and earlier

Triple Whammy + Other Factors => Positive Impacts on Universities

- Re-examine what we teach in CS/IT
  - Connect computing with X
  - X = people, biology, science, business, etc.
  - Two of the PITAC topics do this
    - Health and IT, Computational Science
  - Computing and IT ⊃ Computer Science
  - "Customer Facing" knowledge and skills

Warren Washington - Chair, NSB

"Academic institutions need to change to educate students in a much broader context than they do now. You'll be hearing enlightened university presidents talking about this. But down at the department level, there's this focusing only on the narrow sort of discipline objectives. That's where it's going to be hard to make changes."

Quoted in the Chronicle of Higher Education

An Inflection Point for Computing?

- Opportunity to really examine Computing Education and Research

- "TripleWhammy" gave us breathing space and motivation

- Potential Crises in Funding and Pipeline

- Self-examination of what is computing

So What Can CRA Do About This New World?

CRA Role – New Activity

- Pipeline
  - The case for grad school
  - Why strong BS students don't go to grad school
- Improving graduate education
  - Best practices
  - Courses beyond computing - broadening
- If we stand still, we will fall behind
- Interested? Talk to Jack Stankovic

CRA – New Activity

- PhD opportunities beyond professoriate and research labs

- Interested? Talk to Marc Snir

CRA – New Activity

- Computing Research is increasingly interdisciplinary

- Faculty are increasingly interdisciplinary

- Need best practices in evaluating interdisciplinary faculty?

- Interested? Talk to Dan Reed

CRA as Catalyst

- Leadership Summit Tomorrow
  - AAAI, ACM, CACS/AIC, CRA, CSTB
  - IEEE-CS, NSF, PITAC, SIAM, USENIX
- Strategies / cooperation on
  - Defining Computing & Computing Education
  - Sharpening and Delivering the Computing Message
  - The Case for Computing as an Undergrad Major/Minor
  - The Case for Graduate School
  - The Case for Computing Research Funding

More Generally

- Time for broader community involvement in CRA
    - CRA-W and Snowbird already there
- Participate in existing committees
- Participate in new activities
- Chairs – please identify
    - Promising Associate Professor
    - Seasoned Full Professor

CRA Finances are Strong

- Growing membership

- Stable revenue

- Sufficient reserves

CRA Does

Policy

Information

Human Resources

Community

CS Degrees Granted

CRA Mission Areas

Policy	Information Gathering and Dissemination
IT Research Funding and Research Environment Tracking Budgets Educating Members on Advocacy CRAN (advocacy network) Testimony Submissions to Congressional Committees Policy Reports Workforce Policy Issues Related to Women and Minorities News Conferences Congressional Visits Publications Policy blog Website	Computing Research News (CRN) Computing Research Bulletin Surveys—Taulbee, Profiles, Lab Salaries CRA Best Practices Reports Forsythe List\Address Labels CRA-W Careers Booklet CRA-W Graduate School Information Guide Publications Brochures Annual Reports Websites—CRA, CRA-W, CDC Conferences, Workshops

Human Resources	Community Building
Job Service Workforce Issues Academic Careers Workshop CRA-W Support CRA-W/Lucent Distinguished Lecture Series CRA-W Distributed Mentor Project CRA-W Career Mentoring Workshops CRA-W Collaborative Research Experiences for Undergraduates (CREU) CRA-W Grad Cohort Program CRA-W Cohort for Associate Professors Project CRA-W Recruitment and Retention Report Recruitment and Retention of Women in CS&E Graduate Programs Study CRA-W "Expanding the Pipeline" Column in CRN CDC Support CDC Recruitment and Retention Report Sessions at Snowbird CDC Tapia Conference Outstanding Undergraduate Awards A. Nico Habermann Award CRA-W Anita Borg Early Career Award	CRA Conference at Snowbird (biennial) Computing Leadership Summit Lab Directors Regional Meetings IT Deans Meetings CRA Membership Activities Distinguished Service Award External Awards Industry-University Relations Industry-University Model Agreements Grand Challenges Conference CRA-W/Lucent Technologies Distinguished Lectures Conferences, Workshops

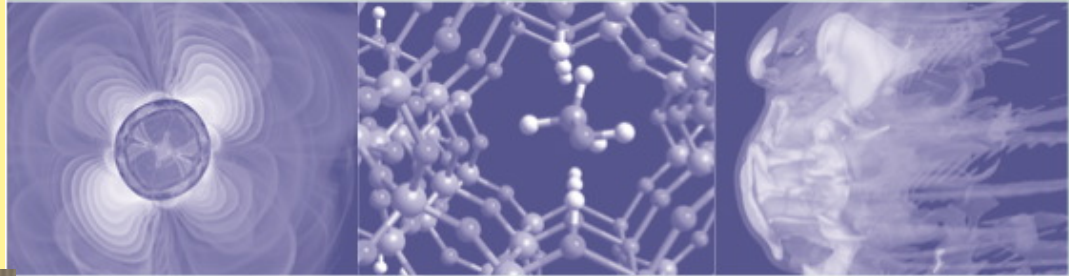# CRA Does Computing Research Policy

The blog

When CRA Talks, People Listen

CRA
Organizes

Workshops

that

Drive Policy

Workshop on

The Roadmap for the Revitalization
of High-End Computing

COMPUTING RESEARCH ASSOCIATION

JUNE 16-18, 2003

Edited by Daniel A. Reed

Everyon
e
gets advice
from

CRA Does
Computing Research Information

Table 1. Base Salaries in Industrial Research Labs by Years of Post-Ph.D. Experience (thousands of dollars)

| | 2001 | | 2002 | |
	Median	Mean	Median	Mean
New PhD	97.5	98.8	99.7	99.5
1-5 Years	105.2	107.1	110.4	112.9
6-10 Years	124.3	126.3	129.9	132.2
11-15 Years	134.2	134.3	140.8	141.7
16+ Years	138.0	139.3	147.1	147.5

Table 2. Total Cash Compensation* by Years of Post-Ph.D. Experience (thousands of dollars)

| | 2001 | | 2002 | |
	Median	Mean	Median	Mean
New PhD	105.7	107.1	105.7	103.2
1-5 Years	113.1	114.9	117.1	120.6
6-10 Years	133.6	136.5	139.8	143.6
11-15 Years	143.7	145.0	151.1	152.8
16+ Years	147.2	150.2	157.3	159.0

* Total Cash Compensation is base salary plus additional cash (e.g., bonus) items.
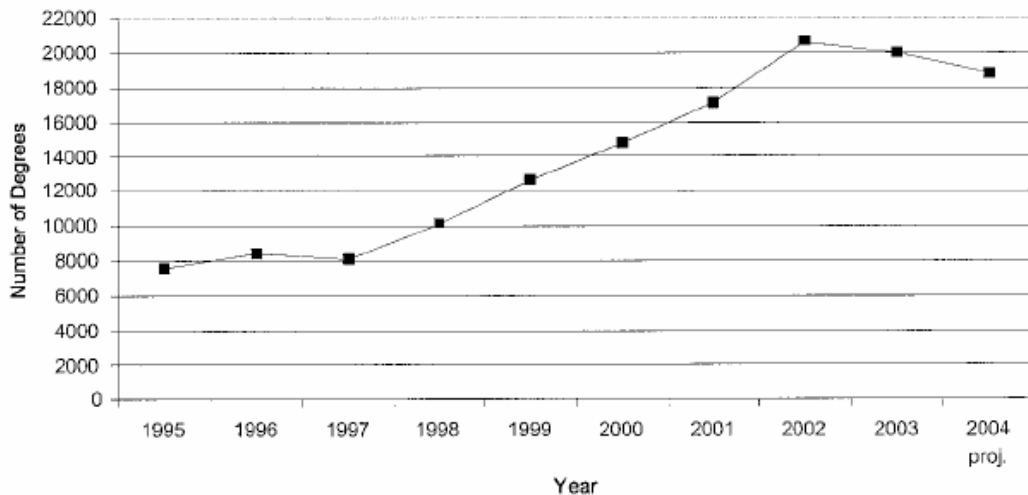

Figure 6. BS Production

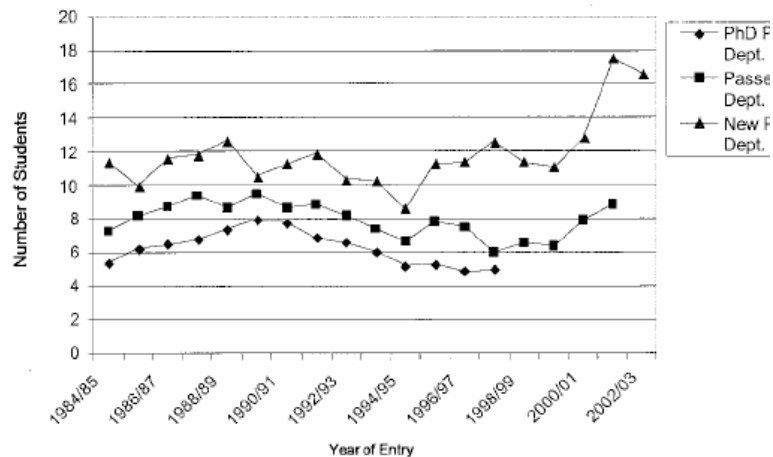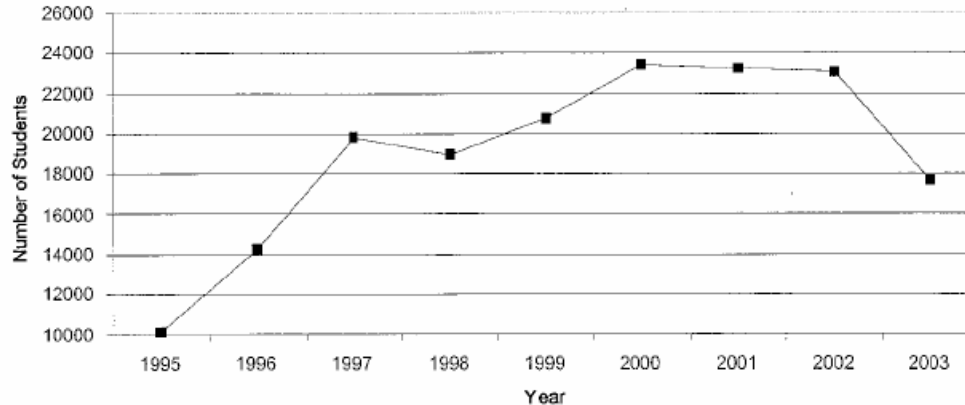Figure 3. PhD Pipeline Corrected for Year of Entry

Figure 7. Newly Declared CS/CE Undergraduate Majors

An Overview of Past and Projected Employment Changes in the Professional IT Occupations

By John Sargent

U.S. Department of Commerce

Professional information technology (IT) occupations have experienced both rapid growth and, most recently, higher-than-average job losses.

Professional IT occupations provided the lion's share of science and engineering job growth during the period 1991-2001. Computer system analysts and scientists and computer programmers together accounted for 79.4 percent of job growth in the science and engineering occupations during this period; if one also adds electrical/electronic engineers (many of whom are IT professionals), the total rises to 93.1

and indirectly—and their importance to U.S. competitiveness, economic growth, and innovation, policymakers have focused attention on understanding this key labor market and the challenges associated with both rapid job growth and recent job losses in these occupations.

Accordingly, since the mid-1990s the U.S. Department of Commerce's Office of Technology Policy (OTP) has conducted extensive analysis of the characteristics of the IT workforce, the dynamics of the IT labor market, the IT education and training landscape, and potential policy implications.[2] This article presents an overview of OTP's analysis of IT occupational employment changes between 1990 and 2002, as well as OTP's analysis of the Department of Labor's Bureau of Labor Statistics' (BLS) projections for IT occupational growth through 2012. IT

Population Survey (CPS), a product of the U.S. Department of Commerce's Census Bureau and BLS, and 2) the Occupational Employment Statistics (OES) survey, a BLS product.

These surveys used separate and distinct occupational classifications. In addition, the survey methodologies differ significantly; for example, CPS data are acquired through a survey of households, while OES data are derived from a survey of companies. As a result, the CPS and OES surveys arrive at different aggregate numbers for the IT workforce and thus are not directly comparable. Still, both surveys provide insight into the dynamics of the labor market for professional IT workers.

A Decade of Strong Employment Growth

Rapid advances in digital technologies and their widespread deployment throughout the economy fueled explosive growth in the demand for workers skilled in the development and use of information technology. Between 1990 and 2000, CPS data show that the number of jobs in professional-level IT occupations doubled, expanding from 1.2 million to 2.5 million. This translates into an annual growth rate[3] of 7.2 percent for these IT occupations, compared with 1.3 percent for all occupations during the same period.

Recent Losses in IT Occupational Employment

The IT occupational employment picture has been quite different since 2000. Between 2000 and 2002, OES

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CRA Bulletin, June 3, 2004

CRA Bulletin

June 3, 2004

- NSF Funding Outlook Grim But Cyberinfrastructure is a Priority
- Highlights from the House Science Committee HPC Hearing
- President Awards CRA-W for Mentoring Efforts
- Industrial R&D Expenditures Declined in 2002
- Academic R&D Grows in 2002
- Academies' Presidents Comment on U.S. Visa Policies
- CREU Program Accepting Applications
- Fulbright Scholar Awards 2004-05

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NSF Funding Outlook Grim But Cyberinfrastructure is a Priority, says NSF Director

National Science Foundation Director Arden Bement met recently with the Coalition for National Science Funding (of which CRA is a member) and warned the science community CNSF represents to lower expectations of increased funding for the agency in the near-term, saying the expectation of budget-doubling, as authorized by Congress and the President in 2002, "isn't reasonable."

For more information: http://www.cra.org/govaffairs/blog/archives/000084.html.

Highlights from the House Science Committee HPC Hearing

In what could fairly be described as a "love in," the recent House Science Committee hearing on HR 4218, the High Performance Computing Revitalization Act of 2004 (HPCRA), featured witnesses from the Administration, industry, university and federal labs all singing the praises of the committee's bill to amend the 1991 High Performance Computing and Communications Act. The Committee's bill attempts to address concerns within the computing community about interagency coordination in the government-wide Networking and Information Technology Research and Development (NITRD) program generally, and specifically within the high-performance computing community. See http://www.cra.org/govaffairs/blog/archives/000080.html.

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