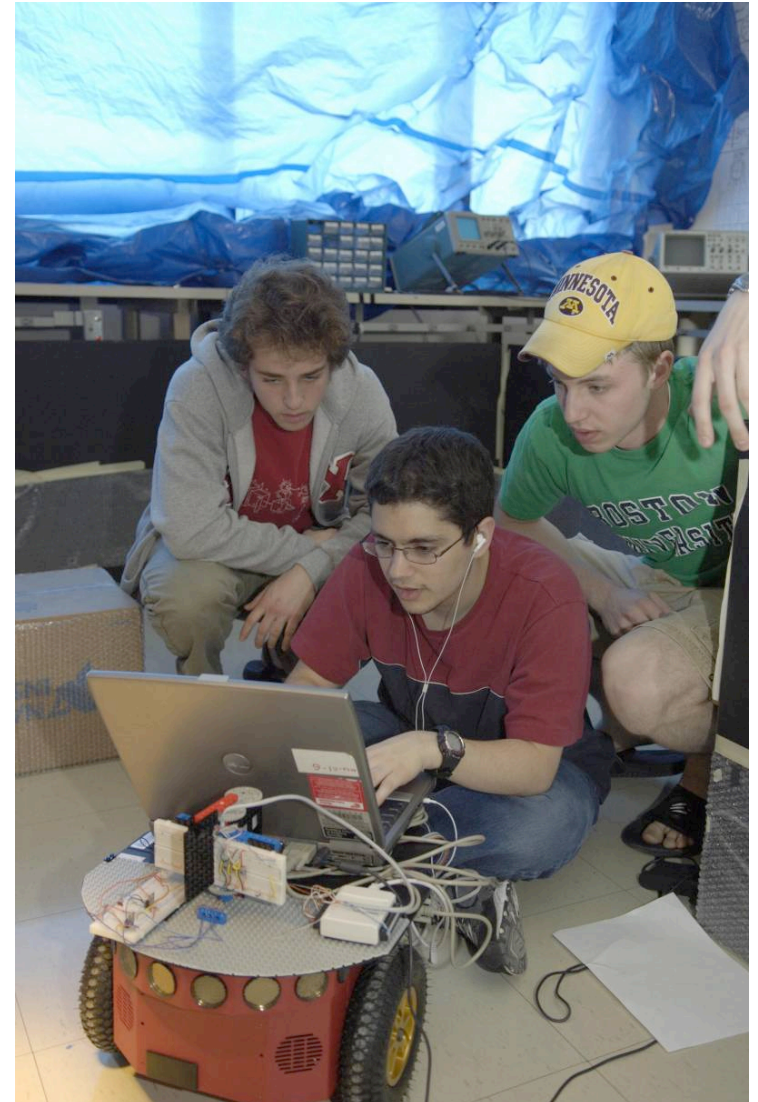


Measuring the health of the  
computing field:  
Challenges facing the CRA community

Eric Grimson  
EECS, MIT  
Chair, CRA Board

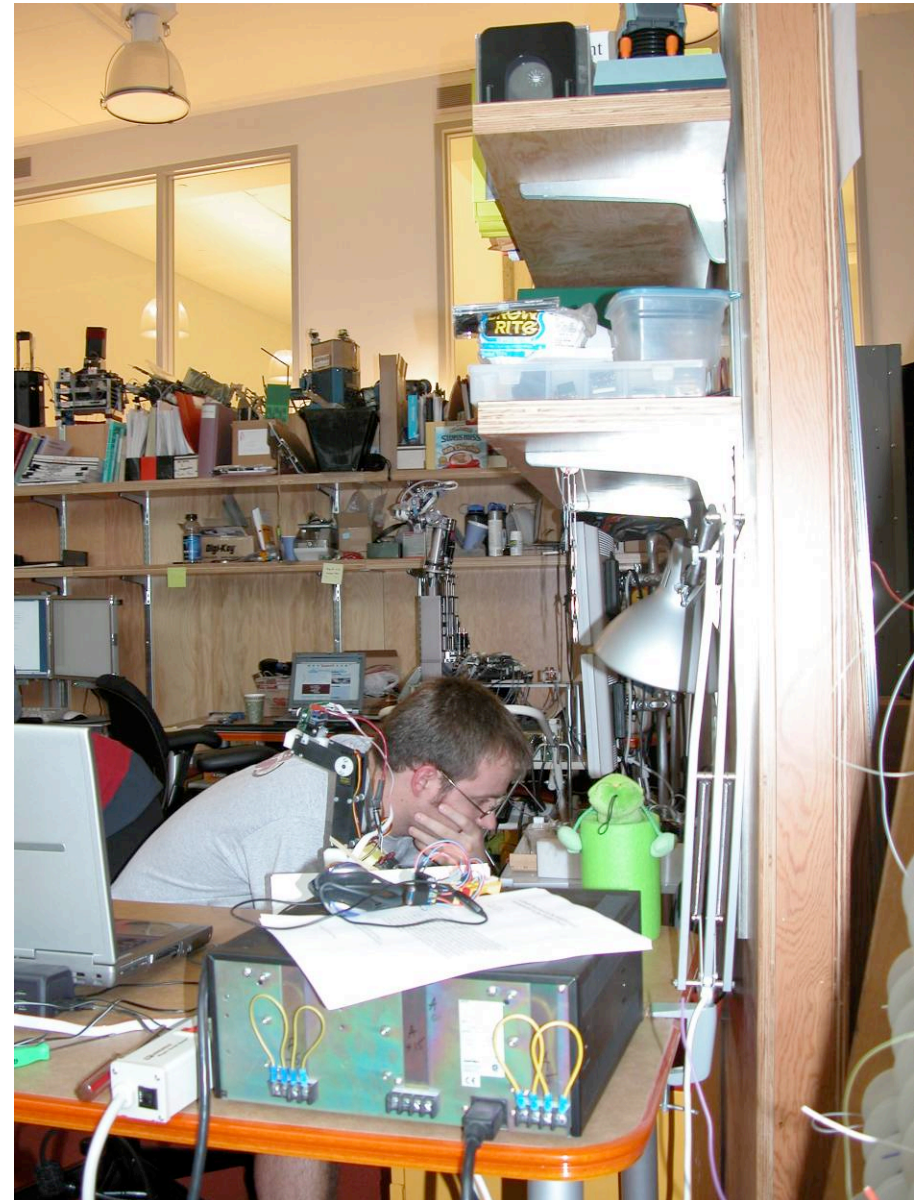
# How do we measure the health of the computing research community?

- Funding levels and trends
- Production of students
  - Numbers of students
  - Where they go and the demand level
- Perception of the field and its impact
- Influence on other disciplines

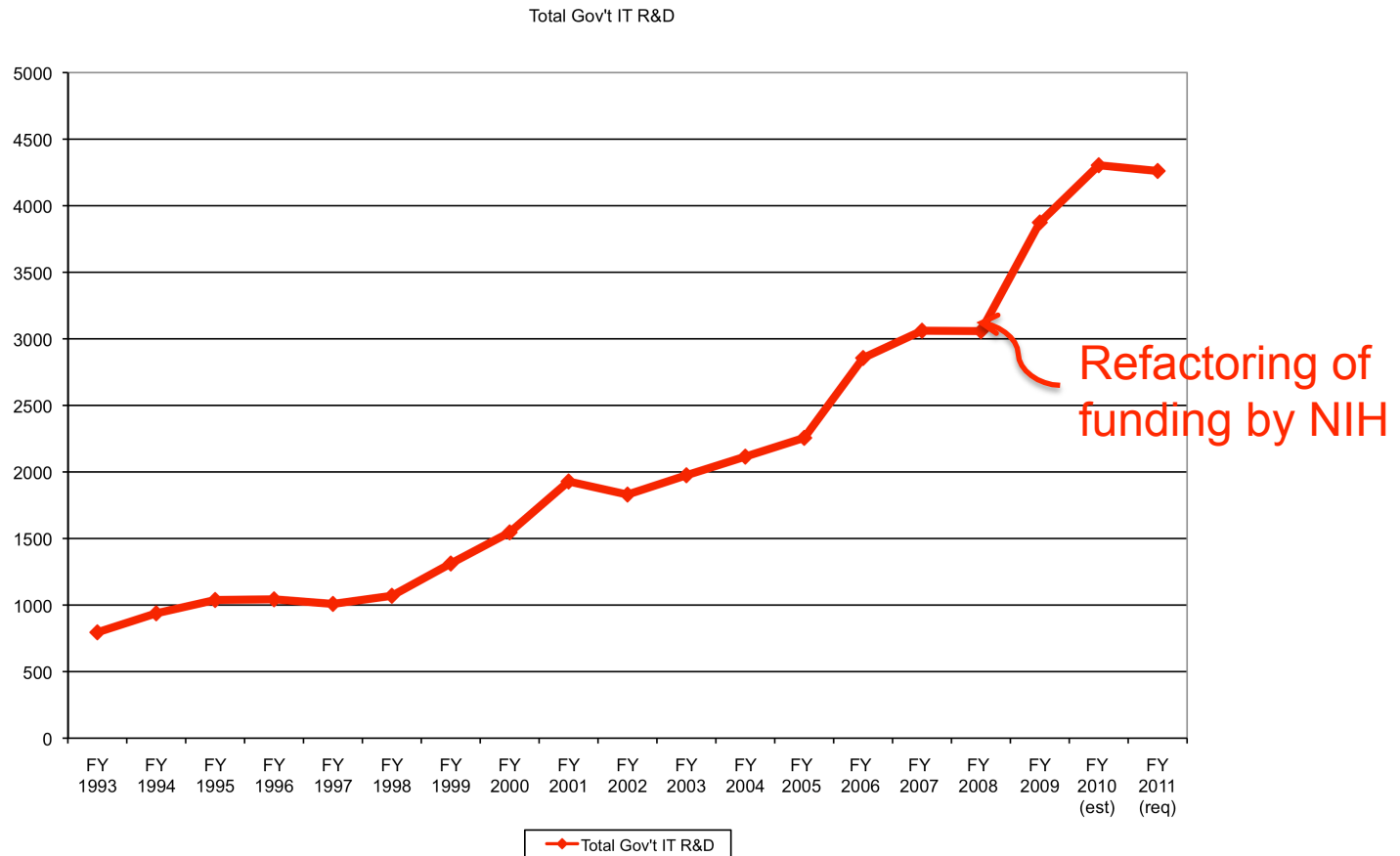


# Funding levels and trends

- FY11 budget process in Congress
  - COMPETES Act (2007) in process of renewal –double NSF budget over 7 years
  - DARPA budget expected to increase over last FY
  - DARPA moving to reinvest in university funding
  - NIH computation related funding rising
- Challenges remain – GAC promoting agenda
  - (Snowbird session on impact in DC)



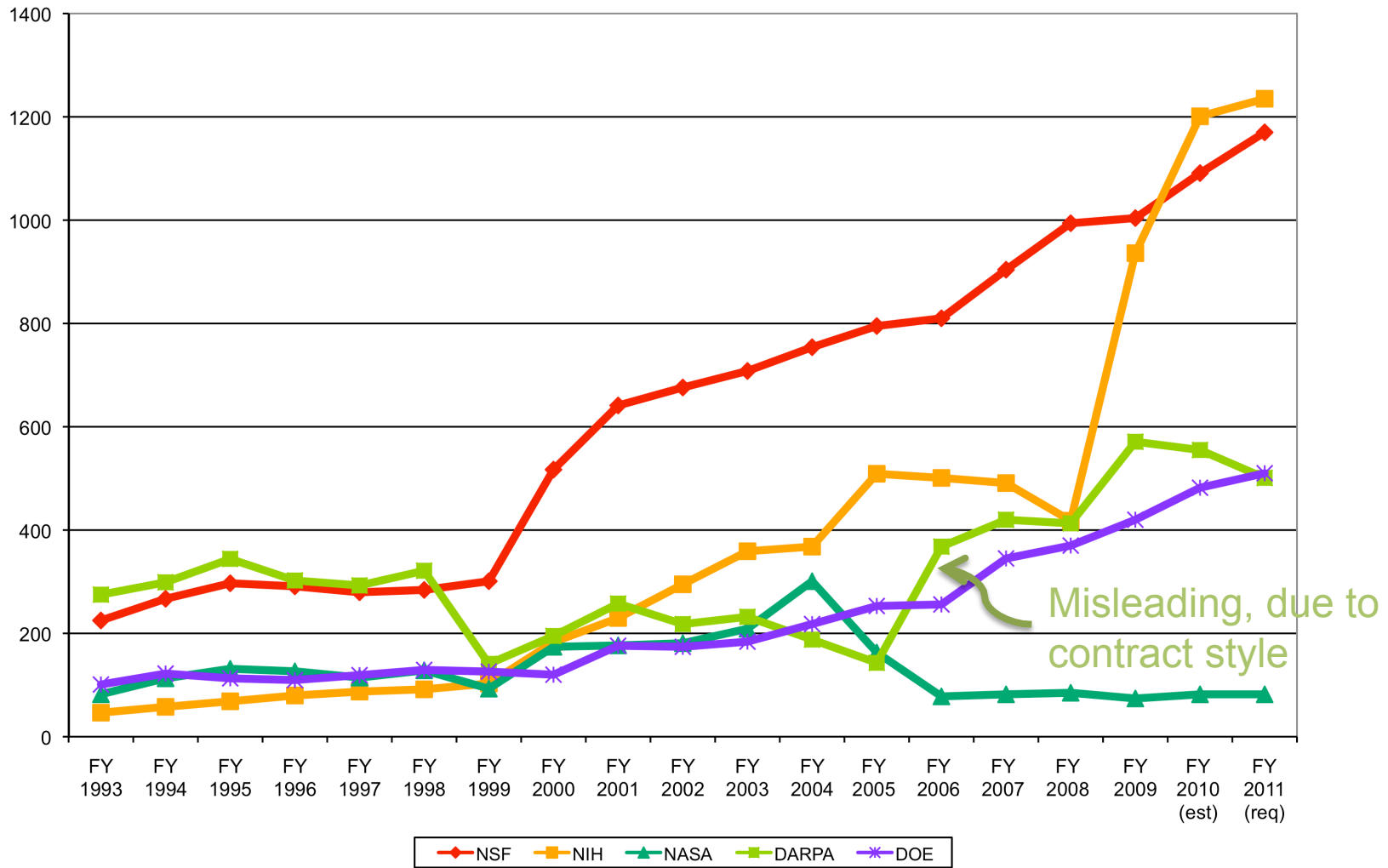
# Government IT R&D funding



Source: Peter Harsha, CRA

# Selected agencies

Selected agencies



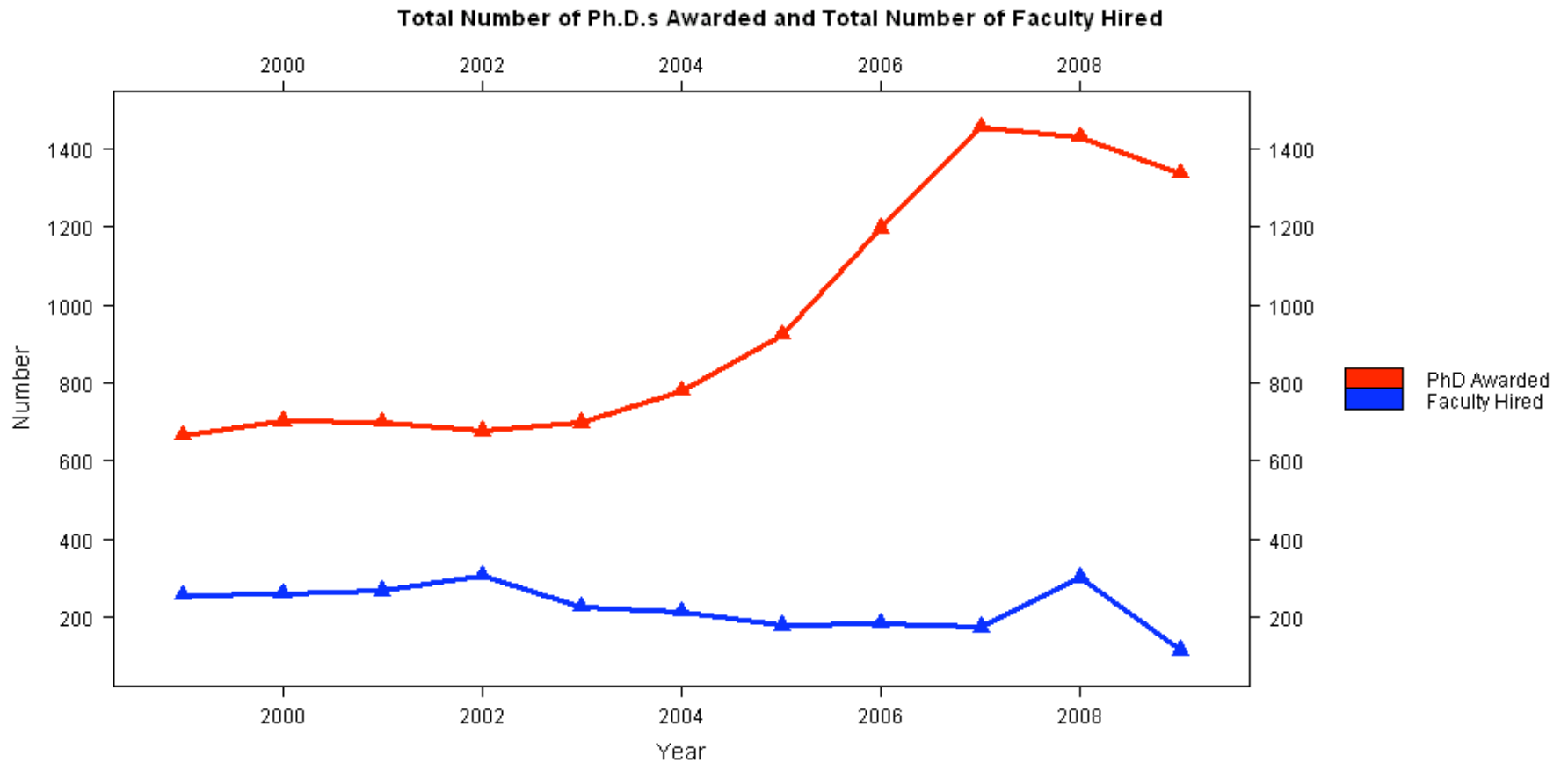
Source: Peter Harsha, CRA

# Production of students

- Doctoral production
- The earlier pipeline
  - New bachelors students
- The even earlier pipeline?

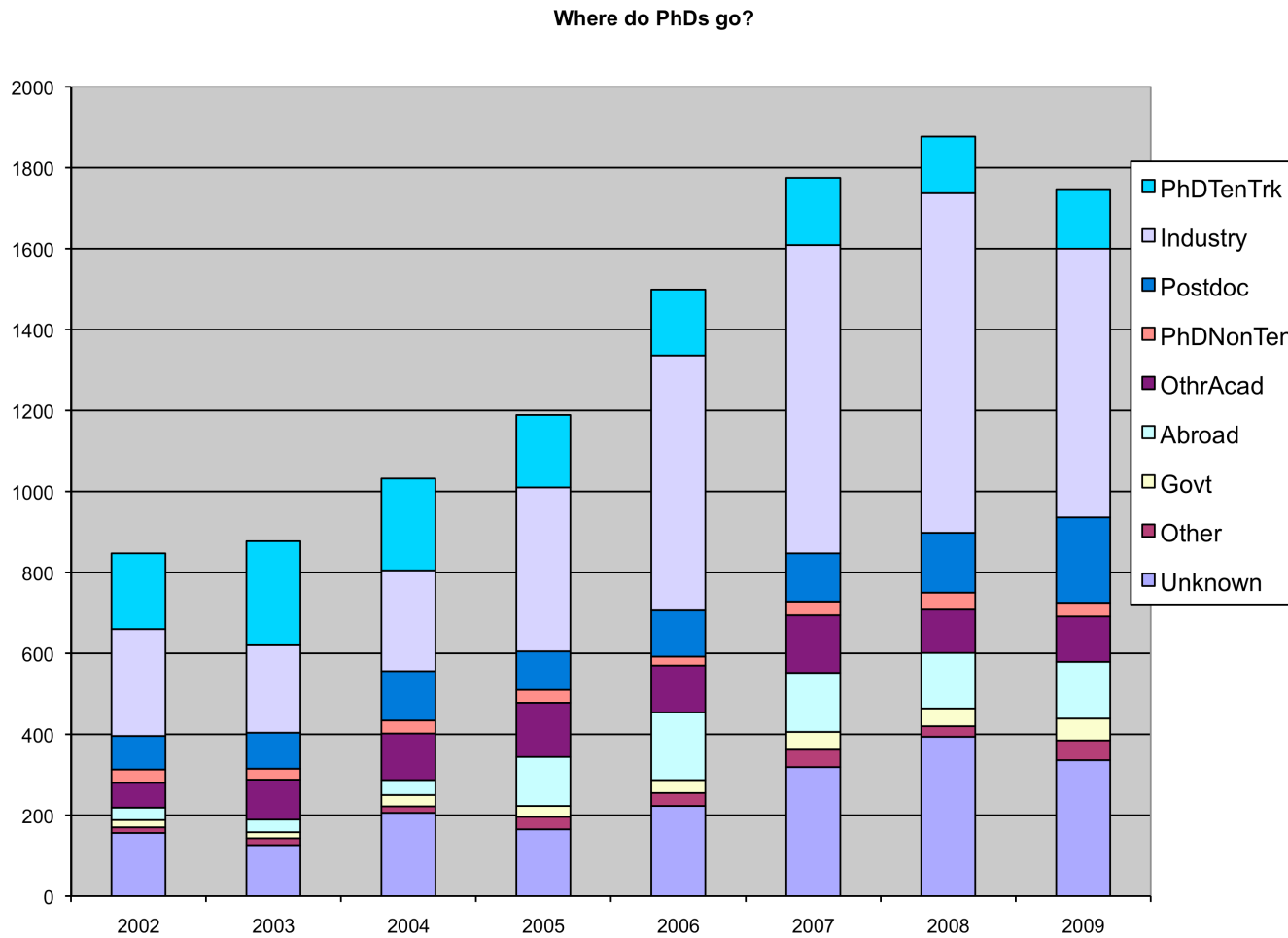


# Doctoral production



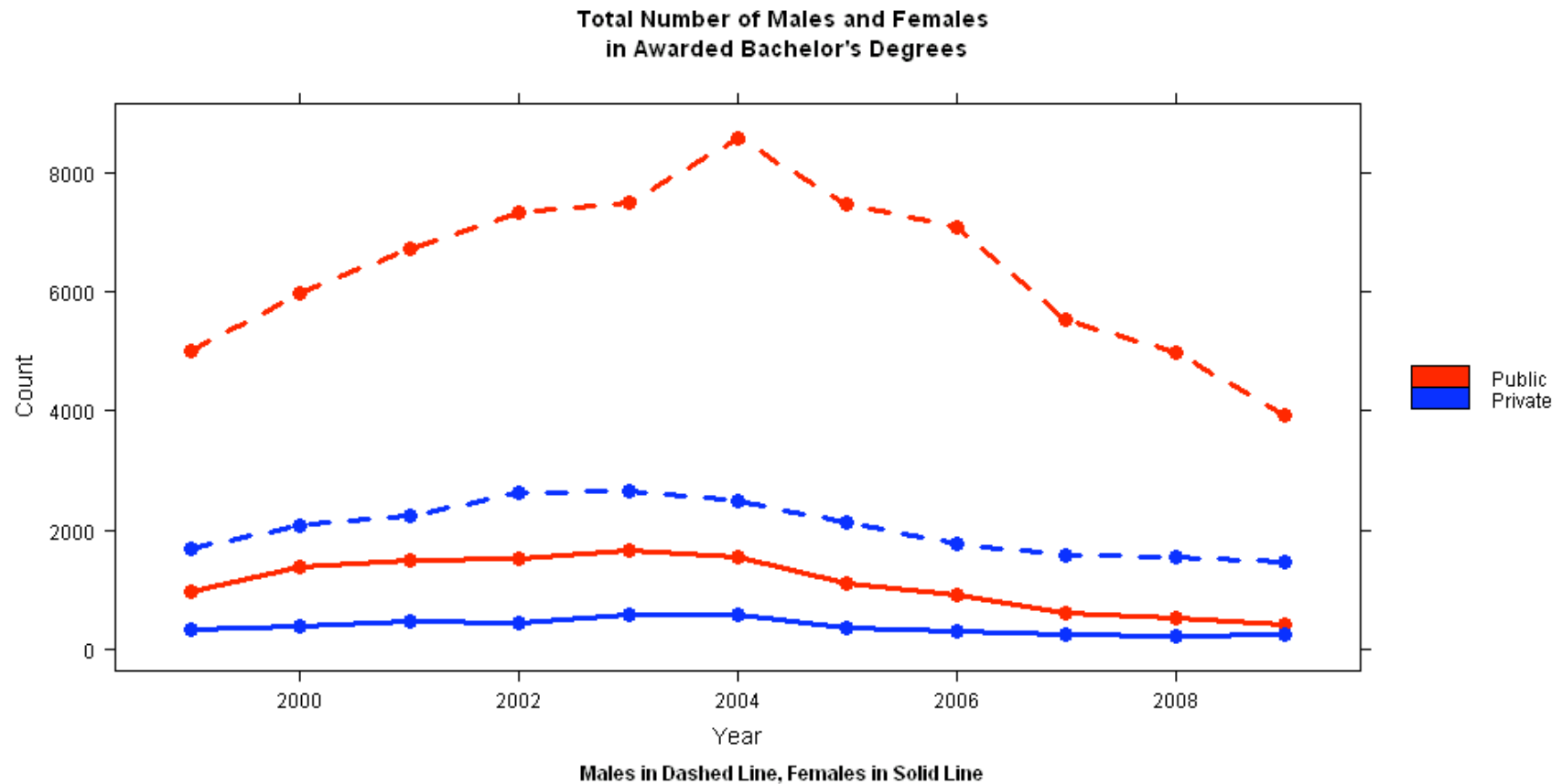
Source: Susanne Hambrusch, Purdue

# Where are our graduates going?





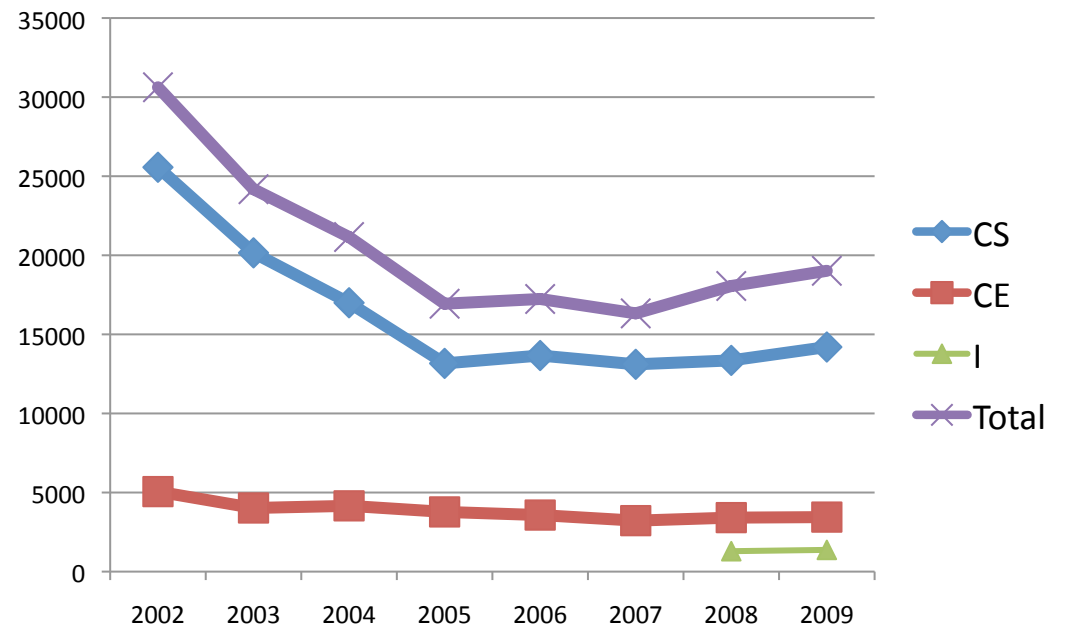
# Bachelors production



Source: Susanne Hambrusch, Purdue

# New Bachelors students

- Source – Taulbee survey
- CS has been flat since 2005, with a very slight upturn
- CE essentially flat since 2002



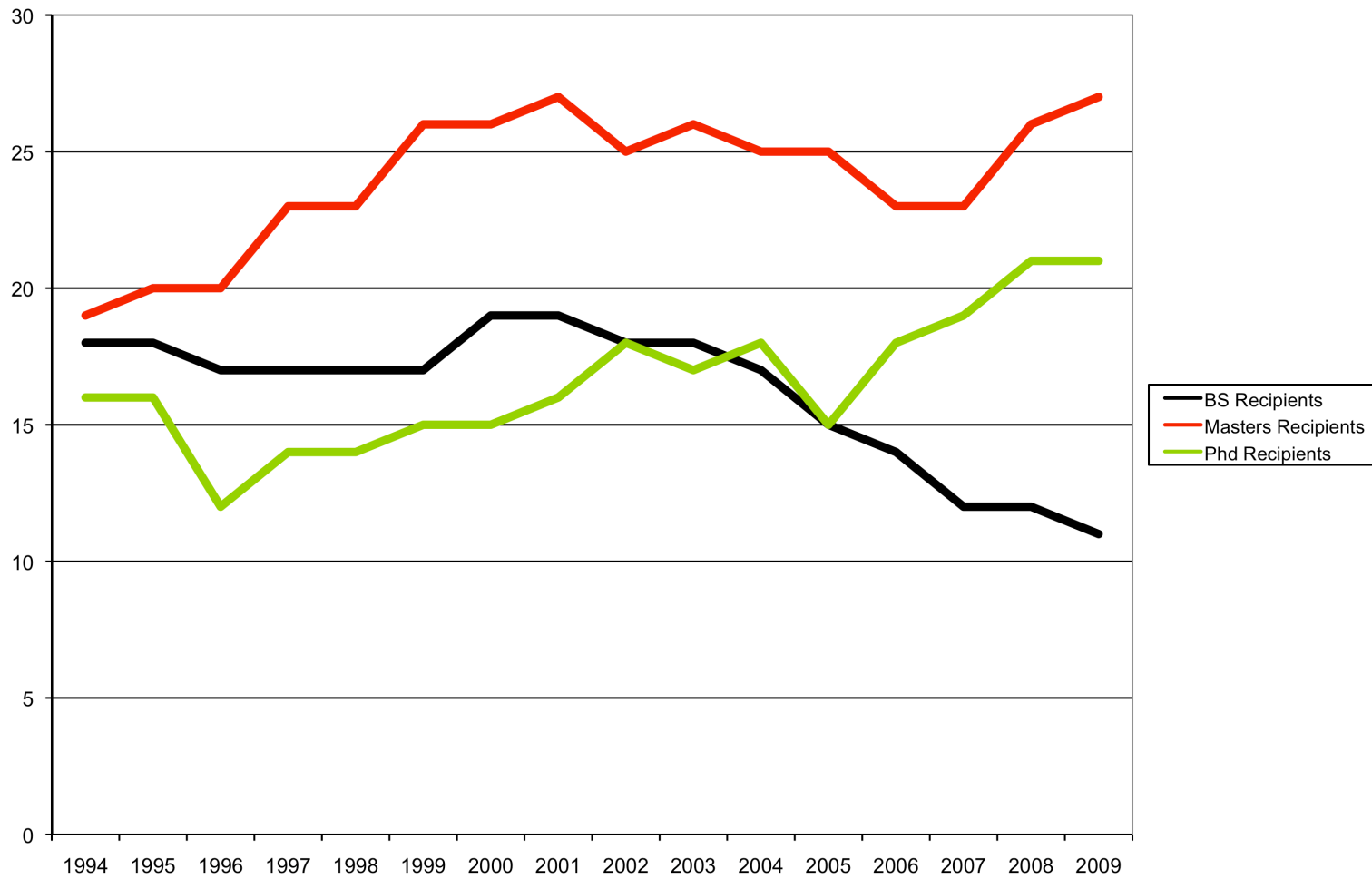
# Improving the diversity of the field

- Trends in degree recipients
- Trends in faculty positions



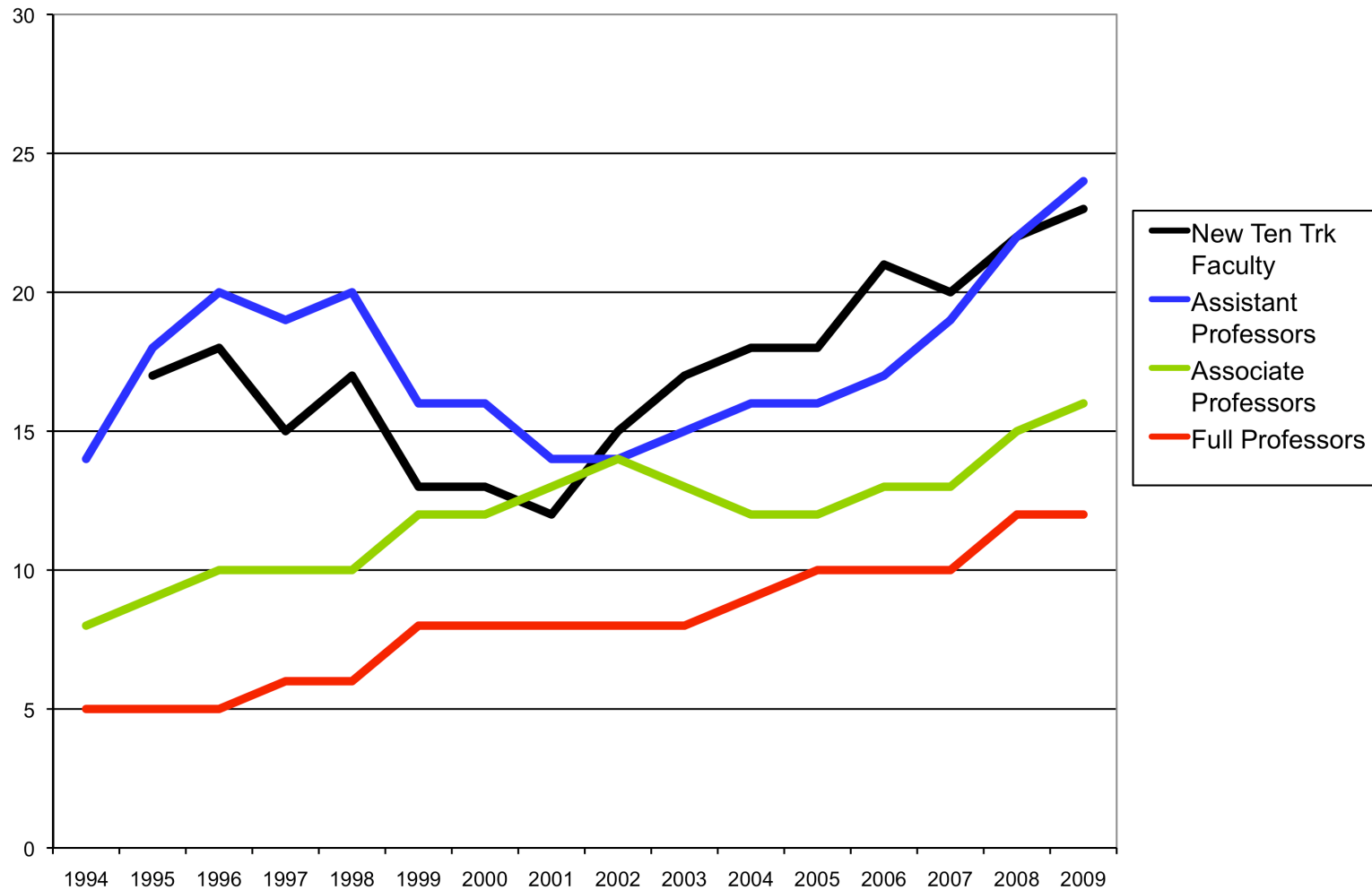
# Diversity

## Percent of Women IT Degree Recipients



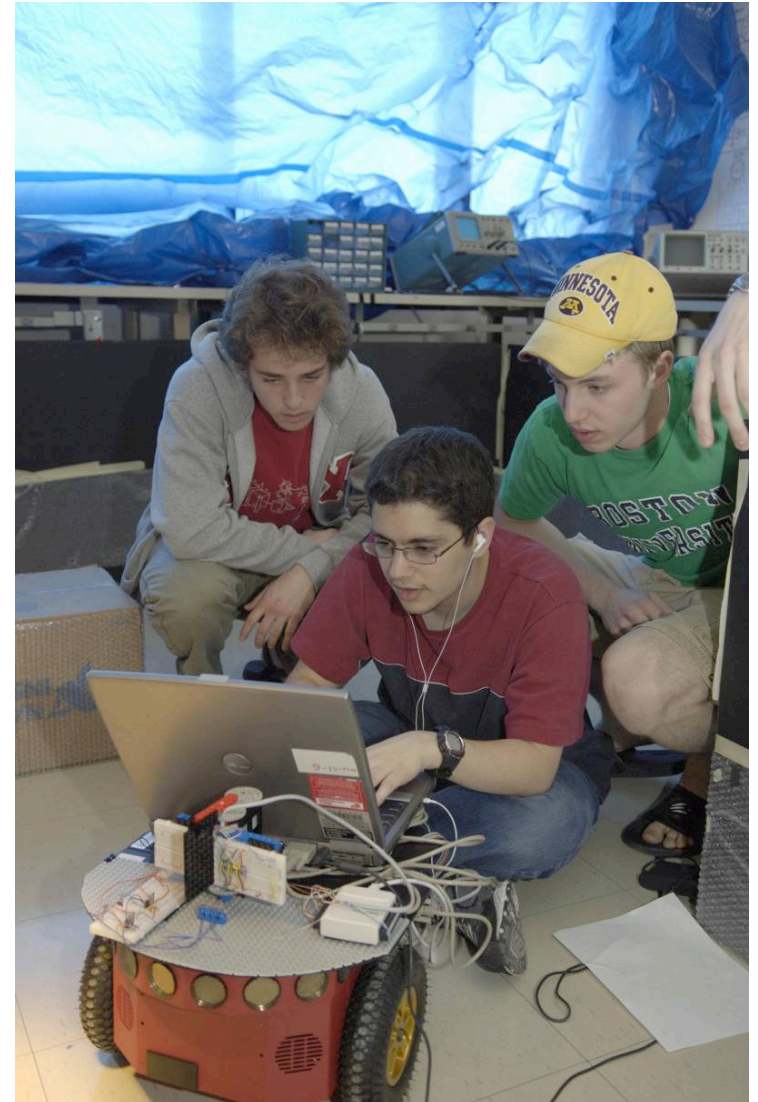
# Diversity in faculty

Percent of Women Faculty



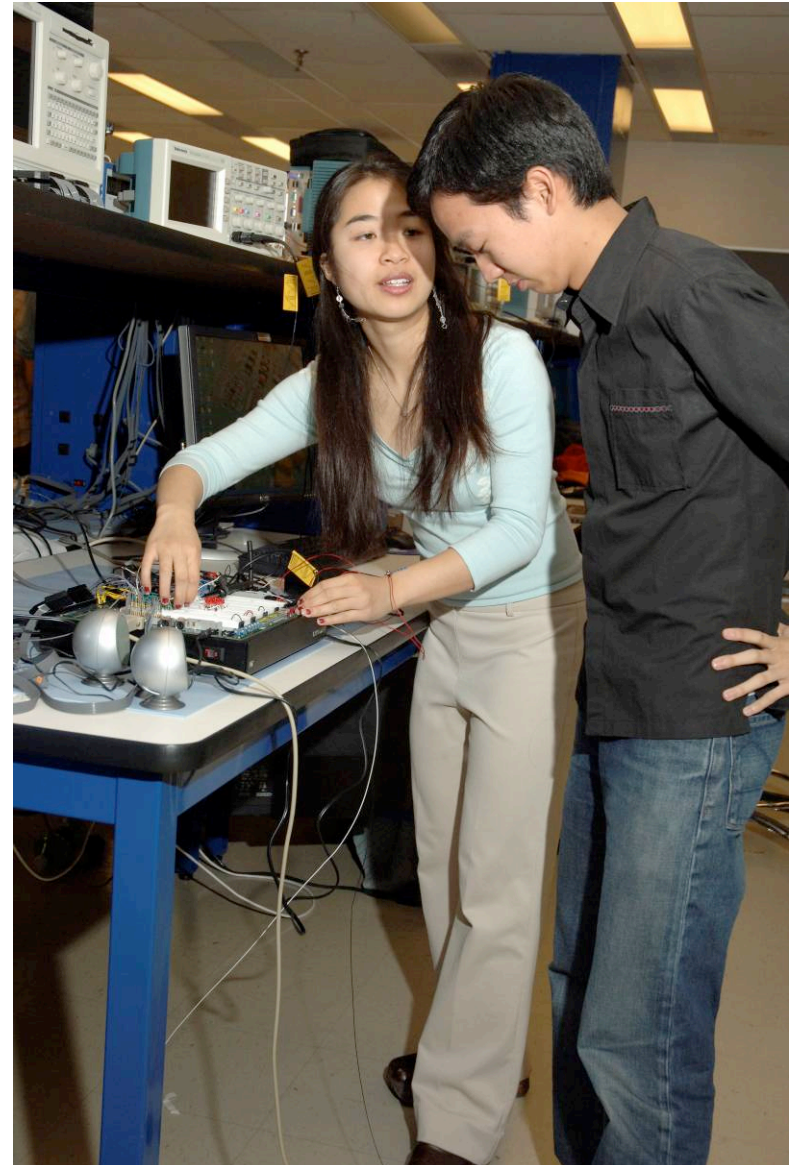
# Why are we struggling to attract students?

- US Dept. of Labor statistics show that CS/CE has large demand, high initial wages
  - 2 of top 6 occupations that require a college degree with largest projected growth in jobs are CS/CE related
- So why are we flat in terms of the pipeline?
  - We are working on getting C into CSTEM in schools, but progress is slow
    - Changing the CS AP exam, getting CS included in local curricula
    - (Snowbird session on CS/10K)
  - We need to think about how students see our curriculum
    - (Snowbird session on CRA-E)



# Perception of the field

- We are losing the “design” battle to other fields, especially Mechanical Engineering
  - Are we communicating well to students the exciting opportunities in the field?
- Current students want to make an impact
  - Is our curriculum set up to encourage students with broader interests?
  - Do we do a good job of selling CS/CE for sustainability, environmental issues, health care, energy, social well-being?



# Perception of the field

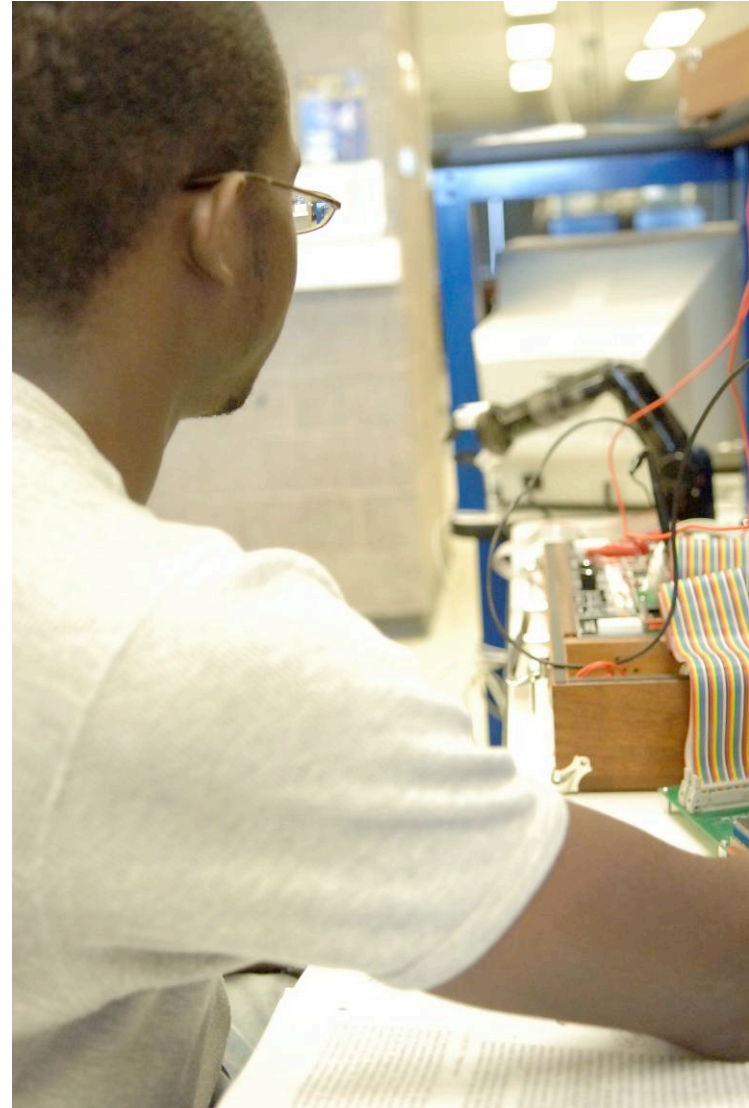
- The Obama administration is stressing four broad priorities
  - economic prosperity
  - energy, environment, climate change
  - healthcare: biomed and IT
  - national security
- We should be significant players in all of these
  - Are we?
- The NRC rankings process may not help our image?





# Are we encouraging impact?

- Are we becoming a deadline-driven field?
  - Research driven by the next conference deadline, rather than taking the time to tackle large scale issues?
- Are we hiring and promoting based on impact or volume?
  - (Snowbird discussion on publications)



# Impact: Influence on other fields

- Growing opportunities for computation in:
  - Life sciences
  - Medicine
  - Finance
  - Energy
  - Transportation
- Challenge is to articulate importance of IT role in these areas



# Influence on other fields

- Computational-X
  - We have an opportunity to relate to a wide range of other disciplines – in curricula, in research, in applications
- “Computational thinking”
  - Every well educated person should understand computational thinking

