Threads™

An Undergraduate Degree Curriculum for the
New Reality of Computing

Georgia Tech | **College of Computing**

Faculty Set Short-Term Priorities

1. Improve Undergraduate Program

2. Research Excellence

3. Diversity

4. New Areas

"Everyone ignored those wimpy 'Thank you for not smoking' signs."

1 Priority
Improve UG Program

Students

1,000 Majors

1355 Avg SAT

Representative Sample

4,500 Non-Majors

Faculty

"Well, a pop-up doctoral dissertation is certainly an original idea…"

Problem 1: Demand

Engineers 22%

Social Scientists 9%

Life scientists 4%

Physical scientists 4%

Mathematical scientists 2%

Computer specialists 59%

59%
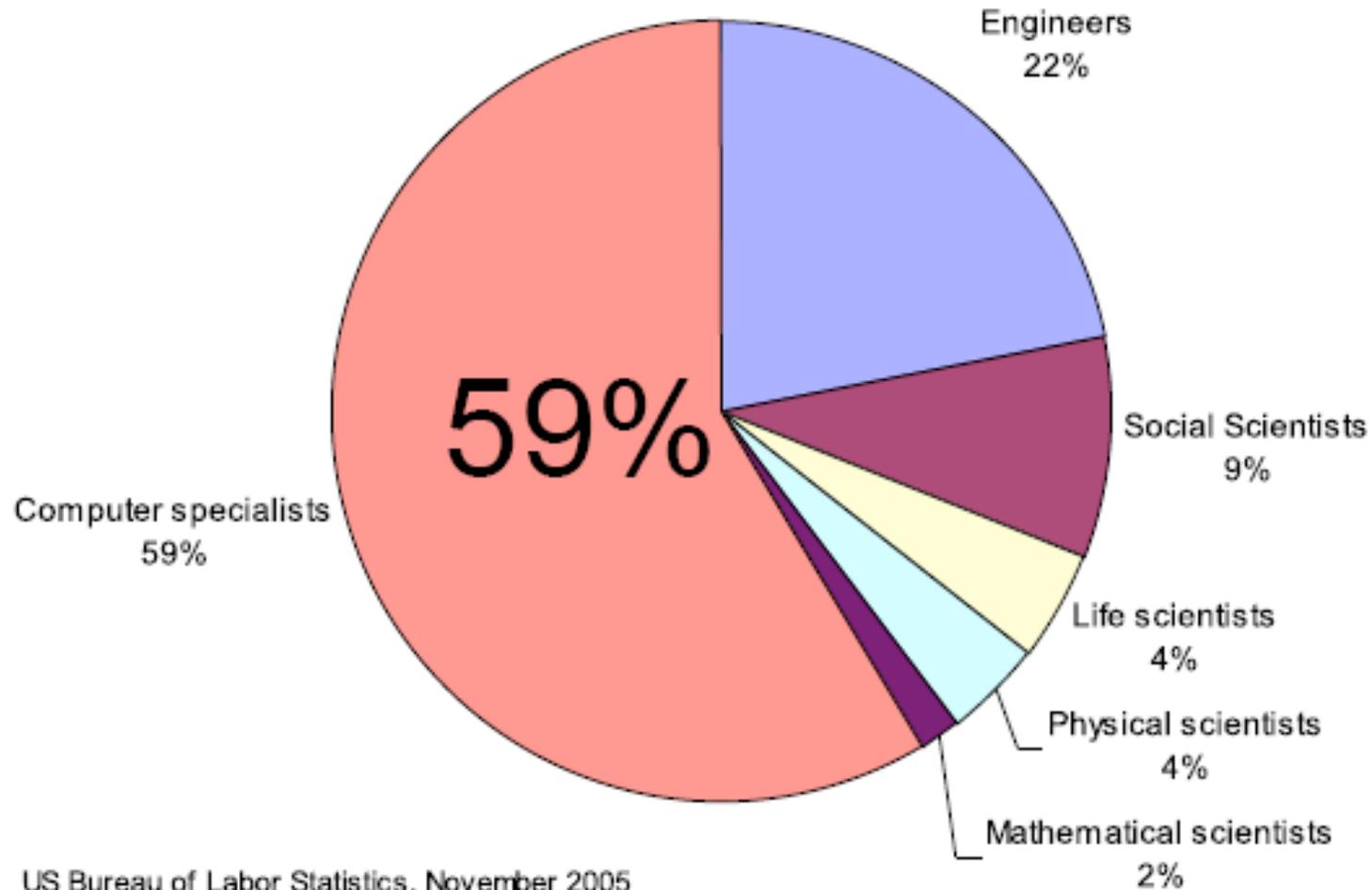
US Bureau of Labor Statistics, November 2005
http://w w w .bls.gov/opub/mlr/2005/11/art5full.pdf

Problem 1: Supply
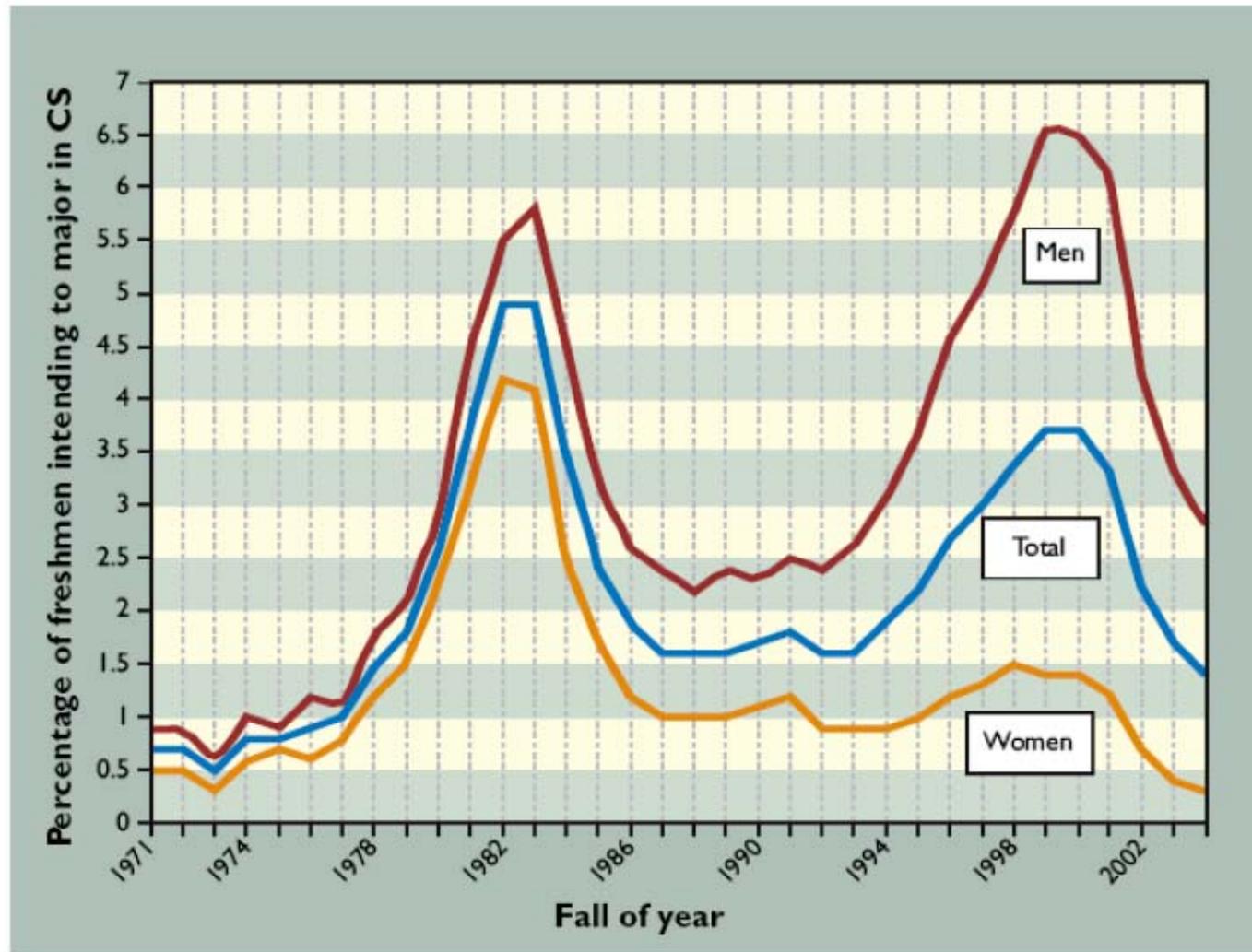
Source: HERI at UCLA

Problem 2: The World is Now Flat

"…the newest technologists have to become renaissance geeks. They have to understand computing,

… they also typically need deep knowledge of some other field, from biology to business, Wall Street to Hollywood."

UPDATED AND EXPANDED

The World Is Flat

A BRIEF HISTORY OF
THE TWENTY-FIRST CENTURY

Thomas L. Friedman
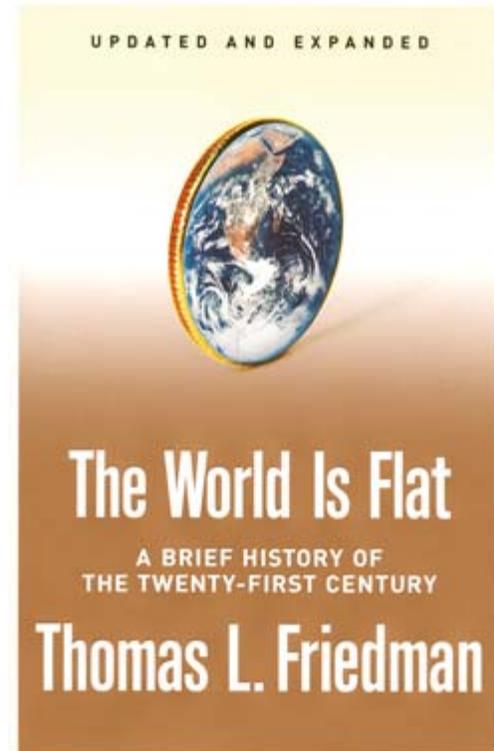
"If you have only technical knowledge, you are vulnerable,"

---Thomas W. Malone, MIT

No One had an Answer

- MIT
- CMU
- Stanford
- Berkeley
- …

Transformative Approach

- Worked Backwards…

- What Do Students Need?
- What Do Employers Need?
- What Do Professors Need?

Threads…

- Partial Paths Through The Curriculum
- Easier To Explain And Understand
- Cross Departmental Boundaries

"Embodiment"
# Where Computing Meets The Physical World
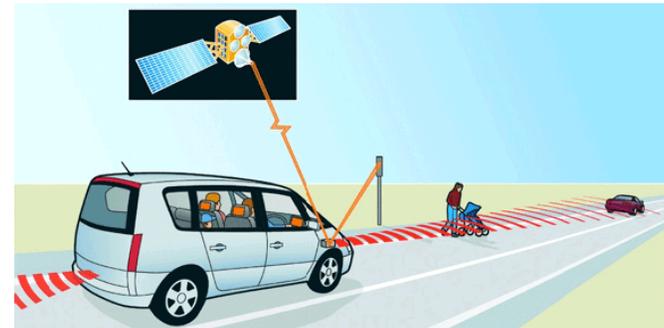
"Media"
How Computing is Used Expressively
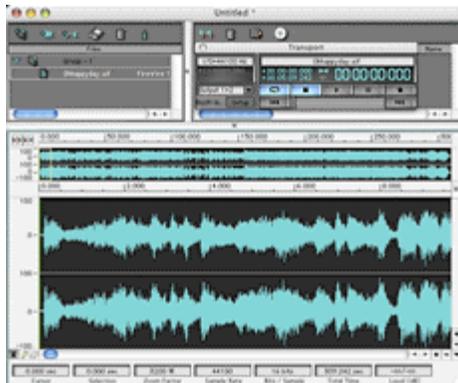
"People"
Where Computing Meets Users
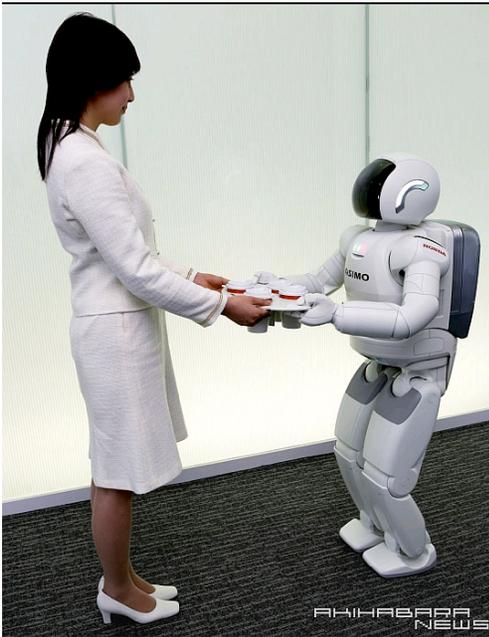
8 Threads

- Embodiment
- Intelligence
- Platforms
- People
- Internetworking
- Media
- Foundations
- Computational Modeling

Solved the "CORE" Problem

$$2/3 + 2/3 = 1$$

28 Combinations: Choice

- **Gaming**
  - **Media & People or Media & Platforms or Media & Information Internetworks …**
- **Robotics**
  - **Embodiment & Foundations or Embodiment & Intelligence or Embodiment & People…**
- **Animated Movies**
  - **Media & People or Media & Platforms or Media & Information**
- **Security**
  - **Information Internetworks & People of Information & Foundations**
- **Mobile Computing**
  - **Embodiment & Information Internetworks or People &** Embodiment
- **Bioinformatics**
  - **Computational Models & People or Computational Models**

Added Roles

- Master practitioner
- Researcher
- Entrepreneur
- Communicator
- Policy Maker

The Whole Package

- Freshman Leap
- Sophomore Leap
- Threadspace
- Advising
- Delivery

Impact?

- Applications were down 20%
- Introduced Threads

$\Rightarrow$ Fall 2006 Freshman Class was
    20% Larger Than The Year Before

$\Rightarrow$ 2008 vs 2007 up 15%

   $\Rightarrow$ Yield and broad appeal look very strong

Impact?

- Chapter 7 of "The World is Flat"

"The Right Stuff"

Impact?

The Institute for Personal Robots in Education
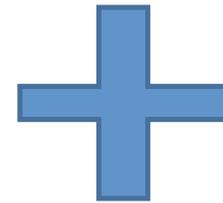
Concept
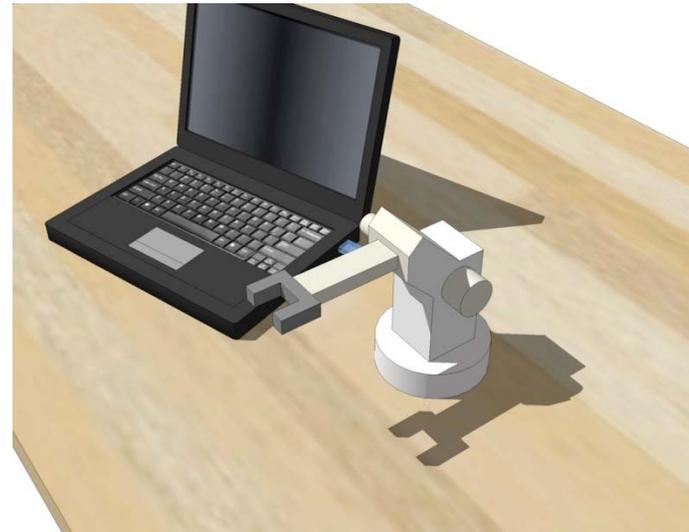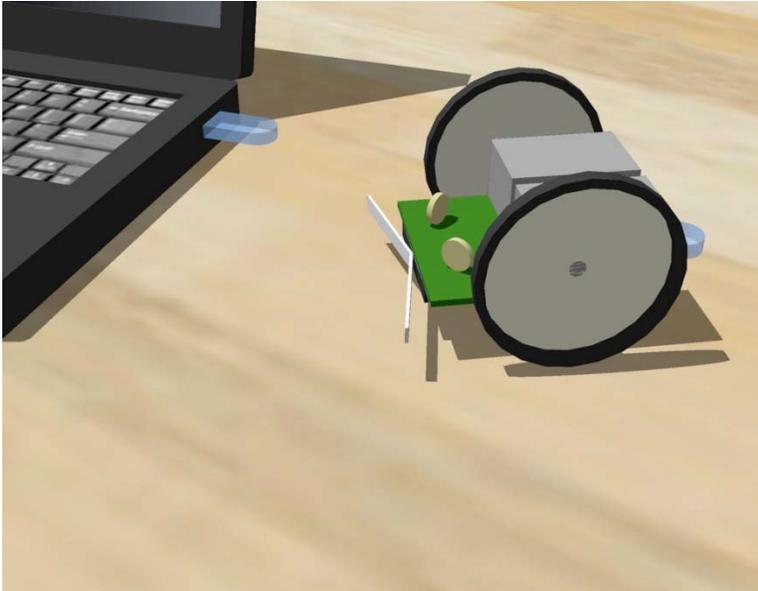
Reality

Big Change is Possible