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
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

- Computer specialists: 59%
- Engineers: 22%
- Social Scientists: 9%
- Life scientists: 4%
- Physical scientists: 4%
- Mathematical scientists: 2%

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.”
“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

\[
\frac{2}{3} + \frac{2}{3} = 1
\]
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

⇒ Fall 2006 Freshman Class was 20% Larger Than The Year Before
⇒ 2008 vs 2007 up 15%
  ⇒ 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

Robotics@GT + Microsoft Research
Concept
Reality
Big Change is Possible