NSF WORKSHOP on SCIENCE EDUCATION IN COMPUTATIONAL THINKING (SECANT)

Purdue University
November 15 &16, 2007
Motivation (1)

- Computing requirement for all science majors starting fall 07
  - Existing introductory programming courses do not match what science students should learn

- Overall re-evaluation on the introductory course sequence
  - Declining enrollment and poor retention of majors
Motivation (2)

Science 2020: Report on importance and impact of computing on science.
  ◦ Nature (March 23, 2006) and Microsoft Research website

NSF CPATH – Revitalized Undergraduate Computing Education
Purdue’s Science Enrollment

- Biological Sciences
- Computer Science
- Actuary Science
- Chemistry
- Mathematics
- Physics
- Statistics
- Other
Questions

- What should science majors know about computing?
- How can we effectively use computation to teach science?
- Can computing be integrated into non-CS majors?
- Would the outcome impact CS and engineering majors?
Course Development: Introduction to Computational Thinking

- Offered as a pilot in spring 2008
- Introduce programming methods and computational principles in a problem- and application-driven way
- Use Python and Python libraries including VPython, NumPy, and NetworkX
Workshop Objectives

- Get a broader perspective on the computing for science students
- Learn from the experiences of other institutions
  - Interaction between large research institutions and smaller liberal arts colleges
- Work towards creating a dialog and building a community for sharing resources
A look at the agenda (1)

- Creating a dialog between science and computer science – four perspectives, followed by discussion.

- Computing courses – three perspectives, followed by a panel, and discussion.

- Panels on
  - on visualization and data analysis
  - the next generation of scientists in the workforce
A look at the agenda (2)

- Round table discussion on community building

- Workshop follow-ups
  - Collect presentation material and 1–2 page position papers
  - Prepare a final report
  - Organize material on workshop website