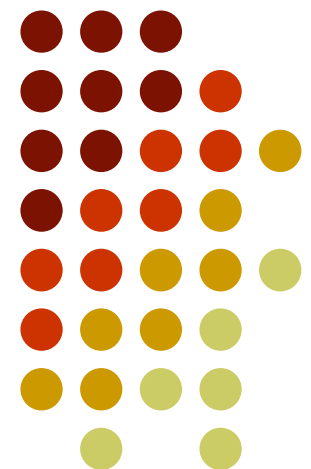




# iCUBED

**Informatics and Computation  
Ubiquitous throughout  
Baccalaureate Education**

**Fall 2008**



**Illinois Informatics Institute**  
*Invent. Imagine. Innovate.*



# informatics.illinois.edu



iCUBED Informatics and Computation Ubiquitous throughout Baccalaureate Education – 2008

# iCUBED Vision



- Transform undergraduate CS and Informatics education in order to prepare a more diverse and informatics-engaged workforce, including scientists, social scientists, artists, and educators
  - at the University of Illinois
  - throughout the United States



# Foundations of the Vision



- Discipline-centered
  - Our interest is not simply to recruit more students at the ground level, nor to change their main interests to computer science,
  - but to cultivate their computational and IT expertise *within* their chosen field



# Foundations of the Vision



- Flexible engagement in computation
  - Levels of engagement in computation can be viewed on a continuum, from novice user to "super-techie" programmer. People from any discipline should be able, wherever they are on this continuum, to find courses and programs that move them towards "super-techie" in the context of their interests.
- Computation skills are multidimensional
  - the ability to solve PDEs is very different from the ability to develop social networking software.



# Foundations of the Vision



- Cross-college administrative structures

Our view is that even a flexible program within a college of informatics is less desirable than a single administrative unit interacting with all colleges and departments



# iCUBED Goal Area 1



- Transform CS and Informatics education *at UIUC*
  - Increase engagement in informatics by creating and institutionalizing new pathways to application oriented CS/Informatics from other majors, from K-14, and from CS at UIUC.
  - Improve preparation of application area informatics specialists by expanding CS instruction and building inter- and cross-disciplinary collaborations, courses, curricula
  - Increase retention of students by creating a student-focused CS immersion program, developing application-oriented informatics instruction, and community building through extracurricular activities, service courses, and extensive internship opportunities



# iCUBED Goal Area 2



- Transform CS/Informatics education **in the US**
  - Document the UIUC transformation model, using internal observation, university data, and a thorough formal, external evaluation
  - Leverage UIUC CS and NCSA leadership status to challenge and support other programs via aggressive dissemination.





# iCUBED Objectives



- **Inside reform**  
(Computer Science Department)
- **Interdisciplinary reform**  
and infusion of informatics into disciplines
- **Institutional reform**



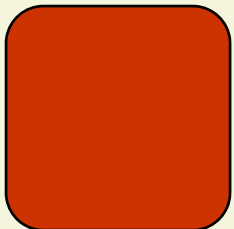


Bio

Ling

CS

Chem



Art

Psych



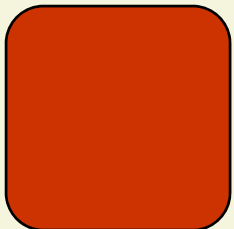


Bio

Ling

CS

Chem



Art

Psych





Bio

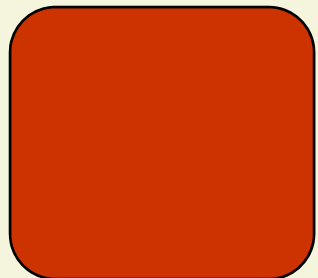
Ling

CS

Chem

Art

Psych



Institutional  
Milieu



# iCUBED Objectives – Inside Reform



- Revise introductory course sequence
- Develop Applied CS programs and “CS+X” programs within other colleges
- Cultivate K-14 relationships and programs to attract more women and minority students



# iCUBED Objectives – Interdisciplinary Reform



iCUBED will support a continuum of informatics integration within participating disciplinary departments

- Infuse informatics into existing courses
- Create new informatics-oriented courses, concentrations and certificates
- Deploy a campus-wide Informatics Minor presently under development.



# iCUBED Objectives – Institutional Reform



- Create administrative structures to enable and maintain cross-college and cross-department courses/curricula
- Develop community-building activities, internship, and job opportunities for students, especially for women and minority students
- Host workshops with national leaders, focused on integration of computation in UG curricula



# iCUBED Status – Inside Reform



- CS Tracks
  - Existing:
    - CS
    - Math
    - CSE
  - Possible new
    - Human Computer Interaction
    - Bioinformatics
    - Finance
    - Gaming?





# iCUBED Status – Inside Reform



- CS + X Majors in College of Liberal Arts and Sciences, College of Business
  - discussions underway with Biology; Finance
- K-14 pathways
  - “2+2” with Parkland Community College
  - pathways to informatics minor also
  - summer camps/outreach activities



# iCUBED Status – Interdisc. Reform – INFO Minor



- INFO minor Requirements
  - Students must be admitted to the Minor by application.
  - There is no minimum GPA or prerequisite.
  - Students need to complete three core Informatics courses plus 9-10 additional hours of coursework in approved upper-level courses.
- The three (two new) core courses
  - INFO 102 – Little Bits to Big Ideas
    - a broad introduction to computer science; understanding the nature, capabilities, and limitations of computing and information technology
  - INFO 103 – Introduction to Programming
    - for non-computer science majors, computation as the universal language of problem solving
  - INFO 202 – Social Aspects of Information Technologies
    - Understanding the social contexts of information technology



# iCUBED Status – Interdisc. Reform - INFO Minor



- Established in Spring 2008
- Currently 54 students have declared a Minor in Informatics
  - 17% underrepresented minorities (11% Black, 4% Latino)
  - 39% female
  - compare with CS 5%, 13%
- Informatics Club hosts a variety of student activities
- facebook group has more than 70 members



# iCUBED Status – Interdisc. Reform - INFO Minor



- Extremely diverse set of majors from 7 colleges:

**Advertising**

**Anthropology**

**Classics**

**Economics**

**English**

**Geography**

**Linguistics**

**Philosophy**

**Sociology**

**Statistics**

**Accountancy**

**Media Studies**

**Business Admin**

**Political Science**

**Creative Writing**

**Urban Planning**

**Graphic Design**

**Community Health**

**Computer Science**

**International Studies**

**Broadcast Journalism**

**Computer Engineering**

**Electrical Engineering**

**Mechanical Engineering**

**Management Info Sys**

**Info Systems & Info Tech**

**Environmental Econ & Policy**

**Health Planning & Advocacy**

**Math & Computer Science**

**Molecular & Cellular Bio**



# iCUBED Status – Interdisc. Reform - INFO Minor



## Spring 08 INFO courses

### INFO 102 - Little Bits to Big Ideas

- Lenny Pitt, CS  
23 students

### INFO 103 Intro to Programming

- Cinda Heeren, CS  
10 students (projected Spring 09: 60 students)

### INFO 202 Social Aspects of Information Technologies

- Lori Kendall, GSLIS  
72 students

### INFO 490GG Special topics: Game design

- Guy Garnett, Music  
31 students



# iCUBED Status – Interdisc. Reform - INFO Minor



## Fall 08 INFO courses

INFO 102 - Little Bits to Big Ideas

- Lenny Pitt, CS  
48 students

INFO 399 - Web Design

- Deanna Raineri, LAS  
3 students (independent study)

INFO 390 WAM - Writing Across Media

- Gail Hawisher, English  
32 students

INFO 490 CSU - Play & Technology

- Christian Sandvig, Communications  
22 students



# iCUBED Status – Interdisciplinary Reform



## New or revised courses under development

GEOG 05 Digital Earth	Geography
W4W Writing for the Web	English
HIST 2xx Digital History	History
STAT 212 Data Analysis and Informatics for Biologists	Statistics
Principles of Geographic Information Systems	Geography
C&I 201 Learning in a digital world	Curriculum & Instruct.
Disability + Relevant Design	Art & Design
EPS 2xx & 4xx Ubiquitous Learning	<b>Education Policy Studies GSLIS</b>



# iCUBED Status – Institutional Reform



- Illinois Informatics Institute
  - Established June 2008
  - Unit of the Provost's office
    - with autonomy to collaborate with any college, school or department
  - Houses the INFO minor
  - Biomedical Informatics PhD Program
- New tuition fee structures removing barriers for departments to offer non-major courses





# iCUBED Evaluation Questions



## Inside Reform

- How do CS application tracks change the way students & CS faculty view and participate in undergraduate CS instruction and informatics?
- How do informatics courses for non-CS majors change the way students view informatics and participate in informatics education?
- How do LAS Applied CS programs impact student participation in informatics?
- How does a LAS B.A. in CS impact student participation in informatics?
- How does the partnership between the UIUC CS Department and Parkland Community College CS program impact student preparation for, and participation in, CS and informatics education?



# iCUBED Evaluation Questions



## Interdisciplinary Reform

- How has the implementation of an informatics minor changed students' views of and participation in informatics education?
- How has each of the introductory informatics courses (INFO 102, 103, 202?) changed students' views of and participation in informatics instruction?
- How do non-CS faculty view and implement informatics into existing courses?
- How has development of informatics courses and materials for infusion into existing non-CS courses changed faculty and department views of the role of informatics in their discipline?



# iCUBED Evaluation Questions



## Institutional Reform

- How have new cross-college administrative structures changed student participation in informatics education?
- How have student extra curricular activities changed students' views of and participation in informatics education?
- How have curriculum workshops changed faculty views and participation in informatics education?

