My Y3K Problem

Cornell matriculates 3000+ students per year.

How can CS help with the recruitment of these bright high schoolers?
I would like to start by describing the biggest problem that I face as CS Chair: the Y3K problem. It is quite simply how can CS help the University attract the brightest possible high schoolers to fill our 3000+ freshman positions. The snap answer, the easy answer, the myopic answer is this:

- Run Your Major Well.
- Sit Down, and
- Shut Up!

But things are not that simple.
Graduating Seniors in CS

Academic Year
In 10 years the CS major and many of our core courses have tripled in size. A trend like this makes it hard for my faculty to realize their teaching and research ambitions. But the truly shocking thing about this graph is its similarity to another one...
Graduating Seniors Across Cornell Who Are Poorly Served By Current CIS Curriculum
Graduating Seniors who are Ill-Served by Current CIS Curriculum (Speaker Notes)

This is not the time or place for me to label the y-axis or point fingers. However, it is the time and place for me to say that while the delivery of a quality undergraduate CS major is my problem, the delivery of an effective campus-wide CIS curriculum is our problem.

Let me give an example that explains the latter. We teach a database course. But it takes a 4-course sequence to get there and so one can safely say that our database course is “for experts.” A bioscience major interested in genomics needs to understand databases and how to use them. We could try to craft a narrow database skills course reachable after (say) just a single prerequisite course. But such a course would inevitably treat databases as black boxes and would be little more than a reading of some manual. A far richer course would result if some bioscience unit offered a low-prerequisite, “grey box” database course where the use of databases was presented against a rich backdrop of applications. That would have the kind of intellectual content we expect from a course at Cornell. The contributions of computer science and genomics would be seen side-by-side and that has tremendous value, especially at the undergraduate level.
Give and Take

We envision an FCI that lends faculty lines to the departments.

We envision departments that use these lines to create new undergraduate courses and new research initiatives in FCI areas.
The Faculty of Computing and Information Science (FCI) that we envision can help solve this problem. The cynical view is that the FCI giveth, the FCI taketh away, and the FCI controlleth my future. I prefer to see this as a way for Cornell to gracefully track undergraduate needs in CIS areas. It could help a bioscience unit attract a faculty member in the bioinformatics area with the understanding that the new hire develop and offer the database course alluded to above. Or, it could create a space for a current bioscience faculty member to develop and offer such a course. The key point is that the control of the course rests with the home unit—not the CS department. Our role would simply be to stand in close proximity to the bioscience faculty member as a fellow believer in the Cornell ideal of liberal education. It takes two departments with mutual respect to crack hard, interdisciplinary, curriculum nuts.
The Research Triangle

Computational Science

Theoretical Science

Experimental Science
Let me clarify further how I see the role of the department in the FCI. Computational science is just one of three components to the enterprise of science. The unfortunate view of this research triangle equates computational science with computer science. It is far more accurate to realize that the computational vertex is populated by engineers, mathematicians, physical scientists, biological scientists, social scientists, and (by the way) computer scientists. We should focus on how to make the research triangle on campus vibrant and not engage in some petty king-of-the-mountain contest that identifies one group as the prime mover in computational research. When high schoolers have the research triangle explained, I want them to think first about Cornell and maybe later about Duke!
Hidden Agenda

To lengthen the list of CS + X research collaborations on campus:

- Cognitive Studies
- Biology
- Digital Libraries
- Crack Propagation (CEE)
- Power Systems (EE)
Hidden Agenda (Speaker Notes)

Does the Department have a hidden agenda? You bet. It is to lengthen the list of our serious on-campus research collaborations. The longer that list the easier it will be for the University to attract top faculty both in CS and in the complimentary units.
The Information Superhighway

- Research Ideas
  - Grad Courses
    - Ugrad Courses
      - Concentrations
        - Majors
The great thing about being in a research university is to watch ideas flow from the blackboard into the undergraduate classroom. A chit-chat point with a graduate student may grow into a seminar talk. If the ideas coalesce, then that becomes a graduate course. If the topics in that grad course become fundamental, then they are shaped into a ugrad course. If that happens again and again in neighboring areas, then we start talking about a new concentration. If the fabric of that concentration is sufficiently rich and broad, then we begin to think along the lines of offering a new undergraduate major. And whether or not that warrants a new academic unit becomes the ultimate question.

No one in this room knows how these progressions will play out in the computing and information science area. However, we believe that a properly structured FCI will ensure that Cornell can track these developments with intelligence.