



SMITH COLLEGE

Computer Science Department

June 10, 2008

Memo

Recipients: Provost Susan Bourque
Assoc. Provost/Dean John Davis
Assoc. Dean Danielle Ramdath
Joseph O'Rourke, Judith Cardell, Nicolas Howe,
Eitan Mendelowitz, Ileana Streinu, Dominique Thiébaud
Sender: Judy Franklin, Chair Computer Science 07/08
Subject:

Computer Science Department Summary Report on Retreat Curricular Mapping Within the Major Held May 5, 2008

The Computer Science department retreat was focused on three main topics: achieving our recent curriculum goals, continuing to pursue our mid-term review goals, and following the guidelines for the retreat suggested by the Provost. The retreat was held before we knew that our FTE of 6.25 will decrease to 5.25 in the future, although we knew this was a possibility. We expect to follow-up with changes that may need to occur because of that at a later date, certainly during our decennial review.

Our own goals

The overarching goal necessitated by our survival, is to increase our enrollments. Our introductory courses, at the 100-level that do not currently count toward the major, and also including csc111, our first course for most majors, enjoy solid enrollments each semester. (e.g. **csc102**: 32 in fall07 and 29 in spring08; **csc111** 37 in fall07 and 36 in spring08). Higher-level courses are undergoing lower enrollments, and the decrease is also expressed in our major. An enrollment of 14-20 is a very successful enrollment for a 200-level course. One is to make advising clearer, and to show that CS can accommodate diverse entering students. We are developing visual year by year maps, showing possibilities like JYA, tracks for students entering with programming experience, and late major declaration.

We plan to adjust course content to increase enrollments. Some ideas are to use 100-levels as first courses, if students start undeclared, to remove 112 from the core courses, to add an optional 'certificate' for students taking a number of extra high-level courses, and to add information about careers and community building to the course content.

We considered ways we can fit into the new Centers: While much of the effort in the Center for the Environment may have an intellectual focus on sustainability, we imagine aiding students, especially students with interdisciplinary double majors, in using interactive physical demonstrations or experiments or artworks that make use of sensors and computers or embedded processors. One contribution we can make via the Center for Community Collaboration is generation of web sites for the community, possibly in our course **csc105**, Dynamic Web Documents. The Center for International Studies may be a venue for Dominique Thiébaud, a past JYA director, to offer his "reverse culture shock workshop."

Make/continue plans to achieve goals of mid-term review

The goals that were the outcome of our mid-term review are also three-fold. First, we planned and continue to plan to expand our activities in several directions. The directions are the arts; engineering; and molecular biology, or more generally speaking, computational science. Most of our faculty members have been active in arts and technology, being active in the interdisciplinary campus working group, working to develop the program and minor, and participating as fellows in the Kahn Institute open labs/open studios project in Fall06. We have also hired Eitan Mendelowitz (Spring08) who has already developed two new courses in computing and the arts, and was instrumental in making the first computer science art show in the Nolan Art Lounge in the campus center a success. We continue to have three or four digital arts minors per year.

The computer science department continues to offer **csc111** both semesters, and it is a requirement for the engineering major. We have had students double major in CS/Engineering, and minor in Engineering. These students often participate in the engineering design clinic, complementing the engineering teams with their knowledge of programming and computer-based problem-solving. Our inter-departmental cooperation has been greatly enhanced by Judy Cardell's joint appointment, especially at the levels of student advising and student research. Finally, we have found that the cultures of the two departments differ enough that some engineering students have become computer science majors after one or two semesters at Smith.

The third direction we are advancing in is molecular biology/computational science. We are offering a computational biology seminar in Fall08 with five-college student interest. There has been some initial collaboration with computational physics faculty on campus, faculty members have been on thesis committees in the five colleges for various computational science fields, and we find Div III students enrolled frequently in **csc111**.

The second goal established at our mid-term review was for Smith to be leader in

educating women in Computer Science. We have continued to participate in a yearly programming contest, enabling our students to compete, and to remind our peer undergraduate institutions that women are interested in and able to do computer science. One of our faculty members has maintained information about scholarships for women in Computer Science and overall we are making this information more visible. Most scholarships are for juniors or seniors and women entering graduate school in Computer Science. The department would benefit greatly from a scholarship program at Smith for incoming students in Computer Science.

We have revamped and updated our web site, adding faculty-editable blogs for announcements that are then emailed to students, especially for scholarships and blogs. We designed a tri-fold pamphlet that we can hand out during prospective student events and further distribute as needed. Another unimplemented idea is to add a course or workshop on the history of women in computer science. We have also established an alumnae email list to keep alumnae collected as well as to email non-entry level position announcements. We are just beginning to plan our twentieth anniversary celebration, which we will hold in Ford Hall, with guest lecturers and workshops as possibilities, when Ford Hall is ready to contain us.

The final goal of our mid-term review is to increase and maintain our number of teaching course units from a historical low of 18 in F05/S06. We were granted a tenure-track position that enabled Eitan Mendelowitz, after a 2.5 year delay, to start teaching in Spring08. The course unit count in F07/S08 is 19, and for F08/S09 it is 19.5.

Unfortunately, computer science has been targeted as one of eight departments who will lose FTE as a part of the faculty reduction. Our understanding of this situation is, from Judy Franklin's meeting with Carol Christ and Susan Bourque on May 11, 2008 that the department has 6.5 FTE currently. The department will lose .25 FTE with Judith Cardell's move to $\frac{3}{4}$ Engineering and $\frac{1}{4}$ computer science (from $\frac{1}{2}$ -- $\frac{1}{2}$). The other .75 will come from Ileana Streinu's grant buyout and five-college position, should she be awarded her currently proposed grant. It is our hope that enrollments will come back, following the national trends that are starting to show an upsurge, and that this issue can be revisited. Meanwhile, we plan to increase activities meant to increase enrollments.

Guidelines from the Provost's Letter

We addressed five topics from the Provost's guidelines letter. First, we examined what our curriculum contributes in terms students' intellectual capacities. The ability to think critically and analytically is nearly synonymous with the kind of problem-solving that is naturally developed in computer science. The ability to convey ideas clearly in oral, written and visual form is emphasized in various ways. Students must write clear documentation in their programs, students make oral presentations and write papers in our seminars, and several courses require user interfaces that are clear, and useful.

The ability to know and apply quantitative skills is developed rigorously in programming and computer theory courses. We also note that computer science majors are required to take three math courses. The ability to understand and apply scientific reasoning is one of

the capacities. Debugging – the logical process of finding errors in a program - is not done by the scientific method per se, but is quite close in nature to the testing and reasoning required.

The interdisciplinary nature of computer science enables us to help students engage with artistic creation and expression. As already discussed, we are expanding in the arts and technology are, and for example, have four courses that are being actively taught that spark artistic creation. These are:

csc106 – Introduction to Computing and the Arts

csc240 – Computer Graphics

csc260 – Advanced Computing and the Arts

csc354 – Seminar on Digital Sound and Music Processing

We also propose that the idea of being creative in problem solving, and even writing elegant code fall under this capacity.

Students should be able to work both independently and collaboratively. Traditionally our students have worked quite independently. We have introduced pair programming in **csc111**, group projects in courses like computer architecture, and group art critiques in Introduction to Computing and the Arts.

The second topic in the Provost's letter is the development of student research abilities in the structure of the major. Many of our students have done summer research projects with us. The special studies credits may be used for studies that are not honors thesis research. And our seminars involve reading research papers in a particular field. Spurred by this college-wide effort, we have a brand new course before CAP, **csc300**, research practices in Computer Science, that is similar to the 2-credit courses offered by Math and Physics. Another unimplemented idea from the retreat is the require the library literacy course for students taking 300-level seminars.

In topic three, the provost asks: Are the pathways through the major clear for prospective majors? Our answer to this is probably that they are not. We list our requirements for our major on our web site, and have a dependency graph for our courses, that is a visualization of the prerequisite structure. Our plan is to create visual examples of different scenarios such as students studying JYA, students declaring the major in the second year, etc.

The fourth topic asks if the department is satisfied with the level of advanced work accomplished by its majors? Our answer is yes we are satisfied. We have especially had some astounding honors theses produced by our students. However, we have not deeply reviewed the transcripts, looking for trends, and that is now on our agenda.

Finally, the provost asks, what are the culminating or capstone experiences for students in your major? All CS majors must take a 300-level seminar and it must be taken at Smith in our department. This ensures that the number of students is small, and that they will have the oral and written facets of the seminar, as well as the research discussions.