EECS Action Plan for Graduate Programs

The School of EECS thanks the graduate review team -- Stephen Phillips, Bruce Porter, James Coakley and Walt Loveland -- for their thorough analysis and review of our graduate programs and their thoughtful recommendations for improvement.

The review team has applauded the current leadership of the College and the School and commended the remarkable collegiality of the faculty members. They wrote, “the EECS faculty collaborate extensively with researchers across campus, and are nationally and internationally recognized for their outstanding research contributions. As such, the School enhances the reputation of the College of Engineering and OSU.”

The review team has made a number of good recommendations which we have carefully considered. We summarize the recommendations below with our analysis and implementation plan.

Ph.D. Recruiting

Recommendation 1: To recruit from a larger pool of candidates, and perhaps to bring in some star students, consider recruiting students who have non-traditional backgrounds. This might include students who majored in another area of math, science or engineering; also, it might include computing professionals who have been out of school for a while. This will require creating an alternate path through the graduate programs -- one that enables students to gain a solid foundation before progressing to graduate work.

Action Plan: We agree that the current setup is not conducive to non-traditional students without appropriate undergraduate background. There is some interest in relaxing the requirements to attract non-traditional students from disciplines such as Mathematics and Psychology, and some evidence here and elsewhere that this improves diversity without lowering the standards. The research group structure of the graduate admissions process allows us to do this selectively on an experimental basis. We will let the research groups gradually relax the requirements in some areas, e.g., Theoretical Computer Science, Signal Processing, and Human Computer Interaction, measure their success, and expand to other areas.

Strength of Curriculum

Recommendation 2: The CS curriculum is considerably weakened by the lack of faculty in some core areas. Examples include operating systems, compilers and cybersecurity. This is likely to hurt student recruitment into the graduate program, as well as their job prospects afterwards. The long term solution is to recruit faculty in these core areas of CS. In the short term, consider re-assigning a few professors to develop and teach courses in these core areas, even if it is outside of their research areas. Also, consider hiring adjunct faculty for these core classes. For example, you might offer a compiler class taught by a visitor from Intel. To solve the logistical problem, the class might be taught using tele-presence equipment, or it might be offered in a 1-week compressed form.

Action Plan: The current faculty searches include areas such as Systems,
Programming Languages, and Security and would mitigate these weaknesses. A joint undergraduate/graduate Operating Systems course has been proposed as a stop gap measure until we hire a systems person. We will do our best to cover all areas as much as possible, but we really need more faculty members in many critical areas.

Recommendation 3: Consider reducing the number of courses required of Ph.D. students. In CS, students are required to take two core courses, then three courses in each of three areas. Perhaps it would be better to require the two core courses, one course in each of three areas (for breadth), and three courses in the student’s research area (for depth). This reduces the course load from eleven to eight, which might help students, faculty and administrators.

Action Plan: We are considering changing the requirements to three courses in the students’ research area and two courses each in two other areas, plus two core courses. This would make the requirements to 9 courses, which is the minimum required by the graduate school.

Recommendation 4: In addition to meeting the coursework requirement, Ph.D. students are required to pass a qualifying exam as well. Commonly, a degree program requires either courses or a qualifying exam, but not both. Consider dropping one.

Action Plan: We find the qualifier to play a crucial role in filtering the unprepared students as soon as possible. Course requirements are also important to prepare the students for research. We have recently revised our qualifier exam processes so that they are more uniformly applied and fair to the students. We will review the results of the exams and fine-tune our processes in light of this suggestion.

Recommendation 5: Students generally agreed that the “slash courses” (which enroll both undergraduates and graduate students) are ineffective. Some faculty assign different exercises and projects (and possibly exams) to the two groups of students, and this seems to improve the experience. Consider requiring this practice in slash classes.

Action Plan: There are only three slash courses in CS. We will try to reduce the number of slash courses in ECE as much as possible and will use different projects and exams as suggested for the remaining.

Recommendation 6: There is some concern among the graduate students and faculty that not enough “pure” 500 and 600 level courses are offered on a regular basis. The students report some unpredictability in the schedule of how often, and in which quarters, specific graduate courses are offered. (This appears to be, at least in part, due to the need to cover teaching of the courses in the fast-growing undergraduate program.) Consider publishing course schedules, at least tentative ones, two years in advance so that graduate students can make plans.

Action Plan: We will publish a two year rolling plan to allow students to plan better. We plan to hire at least 12 new faculty in the next 2-3 years, which will help us introduce more advanced graduate classes.

Recommendation 7: Students receive little feedback form the Departments on their progress through the Ph.D. program. It seems that all students are reviewed annually – in
CS by the faculty, and in ECE by the Director. Based on these reviews, consider providing regular feedback and guidance to the students.

Action Plan: We will work on improving the review process and provide useful feedback to students. We are moving towards a web-based evaluation of the students where students can upload their resumes and their CVs to “Portfolio Central” website (see below for details) which could ease the burden on the students and make it more useful for them.

Enrichment Opportunities for Students

Recommendation 8: About one-third of the Ph.D. students expressed interest in teaching an undergraduate class, serving as the instructor, not just as a TA. Consider offering this opportunity to selected students, not only for their benefit, but also to help meet the School’s teaching mission.

Action Plan: The E-campus program is already providing a number of opportunities for CS students to teach. The ECE students are also teaching some sections for the INTO students. In addition, the summer classes are mostly taught by the graduate students. We will consider having more of the lower level courses taught by the graduate students based on the interest of the students. We will also consider the long-term goals of the students in doing the teaching assignments.

Recommendation 9: While some students felt they had enough contact with companies, others wanted more contact in order to explore internships and careers. These students expressed frustration with the School’s career fairs because they are focused on undergraduate students. Consider holding a separate career fair event for graduate students.

Action Plan: We will highlight our Masters students during the Undergraduate career fairs so that they will benefit more from them. We are also planning to build a “Portfolio Central” website where all of our students (undergrad + grad) can upload their resumes/CVs, plus screenshots and information about the projects that they worked on and the kinds of internships or jobs they seek. This would make it easier for students to get internships and for companies to find interns. It would provide EECS some documentation of what our students are accomplishing and would curate a mass of information that EECS could draw upon for marketing.

Recommendation 10: Some graduate students requested more opportunities for professional development, such as grant writing workshops. Consider providing these opportunities within the School, College or University.

Action Plan: There are some grant writing workshops offered by the graduate school. Some faculty members are interested in offering courses on research methods in the school, which we will pursue. We will also try to offer courses in technical writing and presentations which will benefit everyone.

Recommendation 11: It seems that the ECE and CS departments are largely distinct. Building strength at the intersection of ECE and CS could leverage the successful integration of the two programs in one academic unit. Consider, for example, hiring joint
faculty and conducting EECS-wide seminars of broad interest to graduate students and faculty.

**Action Plan:** We currently have close to 20% members who work across disciplinary boundaries, e.g., in Communications, Systems, and Signal Processing. We are planning to make more hires in these bridge areas such as Computer Engineering, Systems, Security and Theory. We have a weekly EECS-Colloquium that covers both areas. Currently the attendance is only required for first year students. We are considering changes to make it more attractive to all students and especially useful for advanced research students. We will start a distinguished colloquium series where leading scholars and academics will be invited to speak to our students and faculty.

**Rankings and Ratings**

Recommendation 12: *Consider a faculty recruiting strategy that leverages local strengths (e.g. natural resources, Intel), focuses on a few targeted interdisciplinary areas and pursues recruits in groups so that start-up equipment and facilities can be shared. Begin to raise funds now for future endowed faculty positions.*

**Action Plan:** We are trying to recruit in areas, e.g., Security, Embedded Systems, and Communications, that are important for local industry. We have one endowed chair so far and are raising funds for more.

**Organizational Support**

Recommendation 13: *Currently it seems that all available funds – both current funds and anticipated funds – are earmarked for faculty growth. While this is clearly important, consider using a portion of the funds for administrative, instructional and other supporting activities.*

**Action Plan:** We hired a number of instructional faculty and advisors to help with increased teaching loads. We are also using our discretionary funds for scholarships and teaching assistantships that go to graduate students. Currently, we are evaluating the staffing of our computer support and seeing if additional resources are needed in this area.

Recommendation 14: *The EECS advisory board is large and engaged in the Program. Consider leveraging the Board for specific support of the program, in the form of cash, internships, funded research, scholarships, endowments and faculty support.*

**Action Plan:** The board helps us with different kinds of internships, and scholarships. Some of the funding for the ECE program comes from the industries on the advisory board. We will plan to engage them more in the future by giving them better access to our students and their work through our Portfolio Central Website.