University of Washington Department of Electrical Engineering
Departmental Response To Ten-Year Review Committee

September 21, 2012

Submitted By

Vikram Jandhyala, Professor and Chair, UW EE

Bruce Darling, Professor and Associate Chair for Education, UW EE

Jenq-Neng Hwang, Professor and Associate Chair for Research, UW EE

John Sahr, Professor and Associate Chair for Infrastructure and Advancement, UW EE, and Associate Dean for Undergraduate Academic Affairs, UW

1. Introduction

- We would like to thank the ten-year review committee for their hard work and excellent advice, and to the Graduate School for leading, organizing and shepherding this important process.
- We have shared the Review Committee's report extensively with our faculty. Additionally, a large section of the department's annual retreat on Sept 19, 2012 focused on agenda items related to the report.
- We provide here a response to the Ten-Year Review Committee report. In general we feel this is an extremely helpful report that provides the department leadership and the faculty the opportunity to further changes that will further improve the standing and quality of our department, which is one of the largest in the College of Engineering and with one of the most sought-after degrees at the University of Washington.

2. Responses to Section 2. Strengths

Leadership

- We appreciate the Committee's confidence in the department leadership. This confidence provides additional impetus and backing for positive changes to further enhance the department's standing.
- We are confident that the leadership with strong input and strong buy-in from faculty will together focus on developing areas that will move the department forward significantly, including many of the suggestions under the Committee's principal recommendations.

Undergraduate Program

- We appreciate the Committee's positive comments regarding the quality and desirability of this degree, its flexibility, the large number of capstone design courses, possibility of multiple capstones to enhance student marketability, high number of undergraduates in research, large fraction of co-ops, very good gender diversity relative to other EE departments, and satisfaction of undergraduates interviewed in terms of advising and their learning experience.
- As a department, we will continue to ensure the high quality and high desirability of this degree, and strive to make this a positive and community-enhancing experience for all.
- In addition, we expect to scale this program and to introduce new degree flexibilities including a possible integrated multi-department BS-MS and intend to synergize with the landscape of activity based budgeting.

- We also expect the new Corporate Affiliates Program to enable the development of new industry-sponsored and industrially connected inter-disciplinary capstone design courses and research projects.

Professional Master's Program

- We appreciate the Committee's positive comments regarding the department's PMP including its design, administration, fulfillment of local professional engineers' needs, and generation of a direct revenue stream.
- We appreciate the Committee's caution in terms of challenges in sustaining high enrolment numbers and maintaining quality. Recent data suggests that increasing applications, increasing enrollment and increasing GPA of the applicants can be simultaneously achieved.
- We will continue at an increasing pace to look at expansion of the PMP while maintaining quality. In particular, the PMP Committee has been working with local industry to redesign courses and introduce new streams, introduce innovative and timely certificates, consider international offerings and collaborations especially in Asia, and work closely with emerging online innovations and disruptive advances through UWEO, UWIT, and emerging massive online open course offerings.

Scholarship

- We appreciate the positive comments about the world-class research being carried out in several areas of electrical engineering.
- We also appreciate the comments about the quality of faculty, and the number of Young Investigator and Early Career awards as an indicator of quality of hiring and quality of junior faculty.
- As a department, we intend to grow both the quality and quantity of research and faculty in the department. We intend in this year and years following to engage in aggressive and strategic hiring, develop strong mentoring processes for faculty, and engage all faculty productively in scholarship, teaching, service, outreach, and community building for enhancing our department's standing.
- We also intend as a department to support and scale high-quality research through the pursuit of research centers, strategic hiring, and advancement including chaired early career positions.

Other

- We appreciate the comments on good gender diversity, and about staff feeling appreciated and respected. We intend to continue to make strides on both fronts through community building.

3. Response to Section 3. Weaknesses

Departmental Vision

We agree with the committee's suggestion of more clarity around the strategic plan. Towards this end, we have, as suggested, separated the bio-related strategic research areas into two separate thrusts, one around medical systems and devices including surgical robotics, and one around molecular engineering focusing on synthetic biology. Additionally, we are considering also demarcating two separate thrusts in the big physical data area, one related to systems that collate big data, and one around design methodologies for working with big data. This discussion is ongoing with faculty including a brainstorming session at our department's annual retreat.

Departmental decision-making and culture

We agree with the committee that enhancing all aspects of the department's collaborative culture, including decision making, is paramount. We also thank the committee for observing that the new administration has already made this a main focus. We will continue to work hard with faculty, staff, and students towards this goal. As examples of steps towards this goal:

- Faculty meetings have been made significantly more collaborative and participatory by changing to a moderated round table format from a classic presentation format. Results in terms of more effective discussions and decisions are already forthcoming.

- At the department's annual retreat, a significant time was spent on brainstorming towards improving culture. We are currently collating the brainstorming suggestions and these will be used for action and discussion this year.

- Additional events involving students, faculty, and staff have been planned for this year in both formal and informal settings.

- Entrepreneurship and commercialization related interactions with VCs, C4C, and entrepreneurs have been scaled up as another way to excite students and involve faculty.

- In the upcoming faculty search, significant faculty participation has been encouraged by (a) making the outgoing ads general in terms of attracting the best candidates rather than limiting the focus (b) creating a large search committee populated by many of the most energetic and involved faculty

members in the department, with a seasoned and effective and energetic search chair.

Building

We thank the committee for observing the challenging nature of the EE building in terms of fostering open collaboration. This is a difficult problem given we are in a relatively new building with a poor design. We are initiating collaboration with the COE to bring in an architect who will lead a design charrette on options to retrofit building areas to enable significantly improved collaboration, flow, and culture, including

- Collaborative spaces for student and faculty interactions
- Atria for social events with students, faculty, and staff
- Open areas for visitors, alumni, and donors to meet
- Front office enhancements to highlight departmental accomplishments and capabilities

We also feel that continuing to focus on interdisciplinary strategic areas and curricula, entrepreneurship and commercialization, and industrial interaction will enable additional space-related flexibilities and programs in the near future within UW and we hope we will receive support towards these goals from the college and university. We hope that we will receive support from the College and Provost's office in these critical endeavors for space enhancements within our existing building.

Job advice and placement

We thank the committee for bringing up this important issue in discussions with students. We absolutely agree that our department has been relatively weak in this area. We are making the following changes towards this goal

- More clarity in terms of point persons to work with students
- Development of a corporate affiliates program for direct interactions between potential employers, staff, students, and faculty
- Use of social media, especially Twitter on our front page to post and connect to students regarding job advice and placement

- Focused and sponsored events bringing in companies, startups, entrepreneurs, and advisors into EE to talk to students
- Organizing focused job fairs for EE students in conjunction with IEEE, HKN, and the new Corporate Affiliates Program. The first such fair is scheduled for Jan 23, 2013 in the newly updted UW Hub building.

Undergraduate program

The committee discussed four weaknesses with the undergraduate program:

(a) Excess faculty leaves and attrition leading to curriculum gaps

We agree that a legacy problem associated with faculty leaves, as well as legacy problems leading to recent attrition have impacted the curriculum. We are taking corrective action on these fronts in terms of leave policies, appropriate hiring practices, and faculty involvement this year and beyond. We thank the committee for bringing these to attention.

(b) Updating the curriculum

We agree that the undergraduate curriculum, though extremely flexible and relevant, does require updating to stay ahead of the changes in our discipline. Towards this goal, we are developing in this year a new committee headed by one of our best instructors (Prof. Jim Peckol) to begin the planning of a new curriculum, in conjunction with an integrated BS-MS plan. Several undergraduate laboratories and several senior capstone design courses are also currently undergoing revisions this year. These revisions will continue across other undergraduate courses and laboratories in the next few years following.

(c) Emerging and frontier areas

As pointed out by the committee, the department has made progress towards energy, synthetic biology, and also nanotechnology in the curriculum. This year we intend to build additional curriculum pieces around embedded systems and energy, with a view to developing these across the college and university. We will continue to encourage emerging and frontier areas in updated curricula.

(d) TA quality, preparedness, communication skills, and interest

We agree that TA quality is mixed; this is a combination of factors that include the need for better mentoring and training, preparation, screening, and cultural shifts. This is an ongoing challenge that we will strive to work on. The department has some excellent TAs but we would like this to be the norm across all courses. We are also experimenting with matching offers of RAs, fellowships and TAs for our best incoming and existing students.

Graduate program

The committee has brought to light weaknesses related to graduate student teaching, funding, culture and community, and admissions. We recognize and acknowledge that changes that enhance all of these are due, and we will be focusing on culture and community, and advancement towards increased funding in the next year. In particular, focus on better mentoring, community building, and fellowships through advancement will enable such enhancements. We are also striving to implement a more transparent and more rapidly responsive system for TA assignments to help reduce the funding uncertainty that our graduate students face.

Other

The committee points out weaknesses in tracking of undergraduates and a low number of URMs. We are building a database starting this year, and exit interviews with students, as well as connectivity with Facebook and Twitter to keep connections after graduation. On the URM front, this is a long-standing and ongoing challenging that we share with other departments, as well as other EE departments. We will continue to seek ways to enhance through working with the college and university, and also with industry through our Advisory Board and the Corporate Affiliates Program. As an early example, Microsoft has offered to connect us and coordinate with their own successful methods towards URM hiring.

4. Response to Section 4. Recommendations and Principal Recommendations

Collegiality and sense of community

We agree with the committee that enhancing all aspects of the department's collaborative culture, including decision making, is paramount. We also thank the committee for observing that the new administration has already made this a main focus. We will continue to work hard with faculty, staff, and students towards this goal. As examples of steps towards this goal:

- Faculty meetings have been made significantly more collaborative and participatory by changing to a moderated round table format from a classic presentation format. Results in terms of more effective discussions and decisions are already forthcoming.

- At the department's annual retreat, a significant time was spent on brainstorming towards improving culture. We are currently collating the brainstorming suggestions and these will be used for action and discussion this year.

- Additional events involving students, faculty, and staff have been planned for this year in both formal and informal settings.

- Entrepreneurship and commercialization related interactions with VCs, C4C, and entrepreneurs have been scaled up as another way to excite students and involve faculty.

- In the upcoming faculty search, significant faculty participation has been encouraged by (a) making the outgoing ad general in terms of attracting the best candidates rather than limiting the focus (b) creating a large search committee populated by many of the most energetic and involved faculty members in the department, with a seasoned and effective and energetic search chair.

We thank the committee for observing the challenging nature of the EE building in terms of fostering open collaboration. This is a difficult problem given we are in a relatively new building with a poor design. We are initiating collaboration with the COE to bring in an architect who will lead a design charrette on options to retrofit building areas to enable significantly improved collaboration, flow, and culture, including

- Collaborative spaces for student and faculty interactions
- Atria for social events with students, faculty, and staff
- Open areas for visitors, alumni, and donors to meet
- Front office enhancements to highlight departmental accomplishments and capabilities

We also feel that continuing to focus on interdisciplinary strategic areas and curricula, entrepreneurship and commercialization, and industrial interaction will enable additional space-related flexibilities and programs in the near future within UW and we hope we will receive support towards these goals from the college and university. We hope that we will receive support from the College and Provost's office in these critical endeavors for space enhancements within our existing building.

Strategic thrusts

We agree with the committee's suggestion of more clarity around the strategic plan. Towards this end, we have, as suggested, separated the bio-related strategic research areas into two separate thrusts, one around devices including surgical robotics, and one around molecular engineering focusing on synthetic biology. Additionally, we are considering also demarcating two separate thrusts in the big physical data area, one related to systems that collate big data, and one around

design methodologies for working with big data. This discussion is ongoing with faculty including a brainstorming session at our department's annual retreat.

Advisory board

We thank the committee for this excellent suggestion of a functioning and active advisory board. We have acted on this advice and setup a strong advisory board which will meet at UWEE on November 2nd and provide updates to the COE about progress and challenges in UWEE besides providing domain-specific advice.

Graduate student recruiting

We are initiating follow-ups on the suggestions, including controlling the number of students enrolled, pursuing advancement opportunities towards fellowships, and creating collaborative graduate student recruiting sessions.

Faculty leave policy

We thank the committee for pointing this out, and we will create a systematic process for faculty leaves in order to enable strong curriculum offerings and sufficient faculty strength.

Development

We agree with the committee that focus on advancement is critical. Towards this goal, we have recently built a new Advisory Board, focused on endowed fellowships, created new alumni events, and are creating an alumni database. This is the first administration to have an Associate Chair position focused on Advancement and Infrastructure, and we are working together with the College of Engineering to create a second Advancement staff member to interact with our substantial alumni base.

Diversity

On the URM front, this is a long-standing and ongoing challenging that we share with other departments, as well as other EE departments. We will continue to seek ways to enhance through working with the college and university. We will seek to jointly develop events targeting URMs within our admissions processes, corporate affiliates, and job fairs.

Interactions with CSE

We agree that enhancing relationship with CSE is in the best interests of both departments, the college, and the university. We see examples of this through joint proposals, student interactions, courses and EXCEL hiring. We hope that with equal

enthusiasm from CSE, that we can progress further in at least three ways (a) Continuing to build momentum in the critical interface area of Computer Engineering, through hardware, software, and algorithm courses addressed to both departments, through joint research, and through exploring possibilities to build college and university wide freshman courses in embedded systems and related areas (b) Enthusiasm from the leadership of both departments to enable students of both departments to hold joint socials and career building opportunities. (c) possibility of joint strategic hiring with CSE to enhance collaboration, which have already been initiated in several areas, such as NSF ERC and Molecular Systems and Devices, in a manner driven by both departments and beneficial to both departments.

Website

We will enhance information on our website for all constituents, especially for students, prospective students, and alumni. These enhancements will also include event information, and social media updates on Facebook, Twitter, and LinkedIn. Large enhancements on our website are resource limited, and we hope the college may have a larger scale plan for resource sharing for web and social media content management.

Informal review by the College of Engineering within five years

We have discussed this in detail with Dean of Engineering Matt O'Donnell and Ten-Year Committee Chair Francois Baneyx. We agree with and propose the following suggestion : The UWEE Advisory Board, which will meet yearly in the Fall at UW, will meet annually with the Dean to discuss progress in the department, and will provide a report of EE activities, challenges, and accomplishments to the Dean.

We would be glad to provide any other information as required, and once again wish to thank the Ten Year Review Committee and the Graduate School.

Comment

The review committee report did not contain an explicit recommendation for when the next formal review by the Graduate School should occur. Electrical Engineering is a fast moving field, and we ourselves feel that it is important for our programs to stay on track. We believe that the proposed *annual* review with the Dean of Engineering, as a follow up to our annual Advisory Board review, will serve this function. We hope that the Graduate School will concur that our degree programs should be more broadly reviewed formally again in ten years.