



February 22, 2024

To: Nancy Allbritton, Frank & Julie Jungers Dean of the College of Engineering, University of Washington

From: Joy Williamson-Lott, Dean of the Graduate School 
 Kima Cargill, Associate Dean for Academic Affairs, Graduate School 

RE: Review of the Department of Electrical and Computer Engineering (2023-2024)

This memorandum outlines the Graduate School's final recommendations from the Department of Electrical and Computer Engineering academic program review. Detailed comments on the review can be found in the documents that were part of the following formal review proceedings:

- Charge meeting between review committee and administrators (May 24, 2023)
- Self-Study (October 16, 2023)
- Site visit (December 4-5, 2023)
- Review committee report (December 28, 2023)
- Electrical and Computer Engineering response to the report (February 2, 2024)
- Graduate School Council consideration of review (February 15, 2024)

The review committee consisted of:

- **Anna Karlin**, Professor, Paul G. Allen School of Computer Science & Engineering, University of Washington (committee chair)
- **Sharona Gordon**, Professor, Department of Physiology and Biophysics, University of Washington
- **Mingyan Liu**, Peter and Evelyn Fuss Chair of Electrical and Computer Engineering, University of Michigan
- **Magnus Egerstedt**, Stacey Nicholas Dean of Engineering; Professor, Electrical Engineering and Computer Science; Professor (Joint Appointment), Mechanical and Aerospace Engineering, University of California, Irvine

The Department of Electrical and Computer Engineering offers the following degree programs:

- Bachelor of Science in Electrical Engineering (BSEE)
- Bachelor of Science in Electrical and Computer Engineering (BSECE)
- Master of Science Electrical Engineering (MSEE) (Daytime & Professional Masters)
- Doctor of Philosophy in Electrical Engineering

Nancy Allbritton, Dean of the College of Engineering and Eric Klavins, Professor and Chair of the Department of Electrical and Computer Engineering attended a Graduate School Council meeting to discuss outcomes from the review. The Council reviewed all documents from the review prior to the meeting. A summary of the review documents and the Graduate School Council discussion are attached to this memo.

Graduate School Council Recommendations

The Graduate School Council commends the Department of Electrical and Computer Engineering on the strength of its programs, faculty, and students. After discussion, the Council recommended the following:

- Full academic program review in 10 years (2033-2034)

We concur with the Council's recommendations.

cc: Tricia Serio, Provost and Executive Vice President for Academic Affairs
Patricia Moy, Associate Vice Provost for Academic and Student Affairs, Office of the Provost
Jackie Belanger, Director, Libraries Assessment and Planning, University of Washington Libraries
Jason Johnson, Vice Dean, Undergraduate Academic Affairs
Eric Klavins, Professor and Chair of the Department of Electrical and Computer Engineering
Review Committee Members
GPSS President

Attachment

Summary prepared by the Graduate School Director of Academic Program Review

Summary of Review Committee Report:

- ECE is providing high-quality education to an ever-increasing number of students, producing excellent research, participating in many entrepreneurial efforts, and is contributing leadership across campus and beyond. However, ECE is suffering from a shortage of resources including space, funding for faculty startups, educational infrastructure, and staff, which are impeding the department's ability to achieve its mission and to further improve its standing.

Unit Strengths:

- The leadership team is highly dedicated.
- The department is conducting world-class research in several traditional and emerging areas of ECE, including quantum, neuro-engineering and others.
- The department is providing high quality degree programs, including a high demand, high value undergraduate degree and a revenue-generating professional master's program (PMP).
- The committee observed collegiality, mutual respect, and camaraderie across different groups in the department.
- Assistant professor mentorship program appears to be successful and assistant professors indicated visibility into department decision-making and felt their opinions are taken into account.
- The department is making serious and impressive efforts to improve diversity, equity and inclusion, and their ability to recruit diverse faculty and students was reflected in the cross-section of people that we met during the visit.
- The department has acted on many of the recommendations from the 2012 review with very positive results (e.g., guaranteeing 4 years of funding to PhD students, forming an advisory board, increased transparency, etc.). Moreover, the addition of "C" into "ECE"

Concerns and risks

- A shortage of resources, including funding, space and facilities. ECE is an evolving, highly sought-after field and more faculty are needed to support the growing research mission and student population. The department also has a shortage of PhD and postdoctoral fellowships and staffing levels are at the low end relative to faculty and student size.
- Insufficient industry engagement and industry funding. Research funding from industrial sponsors and raising money through philanthropy not fully exploited, and the external advisory board appears to be under-utilized.
- Student issues: The total number of PhD students in the program was lower than expected, given the research activities and the size of the faculty. The lack of ECE-centric career fairs may have led to employment information not being disseminated as effectively as could be otherwise. Some undergraduates in site visit meetings seemed pessimistic about career prospects.

Recommendations

- The College of Engineering, the University of Washington, and the state must invest in ECE. This investment should include faculty lines, startup support, educational and research infrastructure, space, and staff. The future health of the department also depends on increasing external investment and philanthropy, as well as industry engagement.
- To convince the university, state and industry to make these investments and for its own benefit and clarity, ECE should further develop and streamline its case, including a data-driven case for why and how the CHIPS act has the potential to transform the local and state economies through strategic investments in ECE. Why ECE at UW? What is ECE's competitive advantage when it comes to research in semiconductor engineering?
- A strategic planning process for how the various educational programs ECE offers will evolve in the future. This would include target enrollment numbers for PhD, PMP and MS students.
- A long term strategy for research growth. Despite pointing to a set of strategic areas of strength and growth, concerns were expressed by some faculty about the "identity crisis" that ECE as a discipline (and this department in particular) is facing.
- A DEI strategic plan that would include concrete goals, evaluation metrics, plans for data collection, and a strategy for disseminating what has worked to the broader ECE community. The department has an explicitly stated and commendable ambition to be a national leader among ECE departments in the DEI space, but of course external visibility of these efforts will not happen without a targeted and purposeful communication strategy.
- Industrial relations: Reimagining the role and charge and possibly even the composition of the external advisory board to better utilize their expertise and help and the establishment of a real, industrial affiliates program.
- Awards: Create an official awards committee responsible for soliciting nominations of faculty for local, national and international awards.
- Staff: Conducting an anonymous survey of staff and offer staff members the opportunity to provide feedback on faculty as part of their annual review. That feedback can be included in the evaluation of faculty as part of merit reviews. In addition, increasing the number of staff in grants management is a very high priority.
- PhD student community: Work to create a stronger cohort and connections among PhD students.
- Mentoring of PhD students: Introduce individual development plans (IDPs) to facilitate career and professional development discussions. Select supervisory committees earlier and keep them active to participate in annual evaluation of PhD students, provide diverse mentoring, and improve the safety net for struggling students. Mentoring sessions on academic and other career pathways would also be useful, along with including quality of mentoring as a category in faculty reviews and to provide faculty with resources on how to become better mentors.
- Policies and procedures: Continue and complete the task of developing better documentation for new hires and onboarding. Similarly, other departmental policies and procedures (e.g., space, parental leave, teaching assignments, etc) should be written down to make sure that all

members of the department are treated fairly and so there is continuity as the leadership changes.

- **Feedback:** Conduct climate studies by subgroup (assistant professors, staff, PhD students, PMP students, masters students, undergrads, underrepresented subgroups, alumni) to better understand what's working well and what isn't working well.
- The degree program names at the UG (ECE) and Grad (EE) levels are mismatched; the committee recommended that ECE transition all grad program names from EE to ECE.

Summary of Unit Response

In its response, the Department of Electrical and Computer Engineering (ECE) expressed broad agreement with the committee's observations about the strengths of the department and commented on specific areas of concern that the review committee identified.

- **Resources:** ECE expressed agreement with the committee's assessment in three key areas, commenting on each:
 - Insufficient instructional and research space. ECE emphasized that its self-study included a space study showing opportunities to increase usable space in its building and that the department strongly supports an engineering program fee.
 - Size of the faculty and staff. ECE will explore revenue generating programs such as an expanded professional master's program (PMP) and industry partnerships and will engage in a strategic planning process to make the case for more substantial investment in ECE.
 - Shortage of PhD and Postdoctoral fellowships. ECE stated that recruiting PhD students and postdocs is one of its greatest challenges with the high cost of living in the Seattle area. ECE believes donors, industry partners and federal funding are the solutions to increase funding for PhDs and Postdocs.
- **Industry Programs:** ECE expressed agreement that its industry programs are not as substantial as at its aspirational programs across the country. The department has assessed that short staffing is part of the challenge. It plans to develop a model to sustain a new position in the department focused on student facing industry programs, continue conversations with the College of Engineering to increase staffing in Corporate and Foundation Relations. ECE will also discuss a restructure of the external advisory board at its upcoming advisory board meeting.
- **Student Related Issues:** ECE clarified that a slight decline in the size of its PhD program over the last five years may be attributed to several large labs preferring postdoctoral scholars, and in 2023 the department admitted a larger cohort of PhD students than in previous years. ECE agreed with the committee's recommendations to improve the PhD experience and is exploring ways to accomplish them. The department has been making changes to its undergraduate career fair model which does not seem to be working for students or employers.
- **Strategic planning:** ECE agreed with the review committee's recommendation to develop a strategy building on its regional strengths to catalyze investment in ECE's strengths across the region.
- **Degree programs:** ECE agreed with the committee's assessment that strategic planning for its degree programs and enrollment levels will be valuable and the department believes the best path

forward is to collaborate with the college to ensure programs are stable, sustainable, and appropriately funded.

- **Research growth:** ECE disagreed with the committee's recommendation of strategic planning for faculty hiring and research directions, asserting that the department understands quite well what its research strengths are and that it has a robust hiring strategy in place.

Summary of Graduate School Council meeting on February 15, 2024

The Graduate School Council discussion of this review included the following key topics:

- *Strengthening industry partnerships:* A Council member asked for comment on the topic of industry partnerships. The department stated that this is an area that could be strengthened and that it is exploring practices at peer institutions to identify opportunities for collaboration with the College of Engineering in the areas of advancement and industry partnership. The department also intends to improve connections with alumni.
- *Making the case with lawmakers:* A Council member asked for comment on the review committee's recommendation to work with industry to present a stronger case for investment by lawmakers. The department highlighted that the CHIPS Act presents an opportunity to advocate for funding in areas where the department provides strength and leadership in the region. There is also opportunity to work with other engineering units at UW and with the College of Engineering to develop an institution-wide and region-wide strategic vision.