



College of Engineering
and Applied Science

WORKING FOR WYOMING & THE WORLD

Cameron H. G. Wright, Ph.D., P.E. | Dean

Dept. 3295 | 1000 E. University Ave. | Laramie, WY 82071-2000
Tel. 307.766.6104 | Fax 307.766.4444 | www.uwyo.edu/ceas

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TO: Anne Alexander, Interim Provost
SUBJ: Proposed COSC-ECE Merger

This report describes an investigation into the potential advantages and disadvantages of a proposed merger between the Computer Science Department and the Electrical and Computer Engineering Department in the College of Engineering and Applied Science. A summary follows below, with additional detail in the subsequent pages listing specific feedback from faculty members of the two departments.

After reviewing feedback from the faculty members and department heads of the two departments, reviewing models used at various other universities, and conferring with the college Director of Business Operations to identify any potential monetary savings, my conclusion is that ***a merger between the two departments is not recommended at this time.***

Both departments suffer from too few faculty members to reach “critical mass” in a variety of research and teaching areas. However, merging the two departments would not appear to alleviate this problem. The two departments have maintained regular communication over years and have done well at finding efficiencies with course offerings and administrative support. Research collaborations have occurred as mutual opportunities arose, and a merger likely would not increase such collaborations. Monetary savings appear to be essentially nonexistent, as the departments already share the single staff support person. Indeed, if the model used at a few universities, such as the University of Michigan, where an EECS Department has two divisions (a division of Electrical and Computer Engineering and a division of Computer Science) with two division chairs *and* a department head, a merger would end up costing more money than is currently expended for the two departments.

Therefore, I recommend that the proposed merger not be pursued at this time.

Respectfully submitted,

Cameron H. G. Wright, Ph.D., P.E.
Interim Dean and Professor

xc: Steven Barrett, AVP for Undergraduate Education
James Ahern, AVP for Graduate Education
Ruben Gamboa, COSC Dept Head
John McInroy, ECE Dept Head

Perspectives of the Computer Science Department (COSC)

The COSC faculty discussed a possible merger at the faculty meeting on October 26, 2020, and subsequently via email among the faculty. The faculty was overwhelmingly opposed to the idea, though with varying degrees of opposition.

A senior faculty member reminisced about the time when he was interviewing for a job. He was offered a position at another institution that had recently undergone a similar merger, and he found the atmosphere to be so depressing that he turned the job down.

Other faculty members spoke of personal experience with similar issues at prior institutions, and all tales were cautionary ones. A recurring theme was problems with hiring and promotion decisions. This was especially delicate, since many faculty members perceive that Computer Science would be easy to overlook next to an Electrical and Computer Engineering department. The fear is that having “Engineering” in their program names would give EE and ECE the majority culture in a merged department.

More directly, the faculty was skeptical of any proposed savings. The two departments are already sharing the only staff member, so the savings are probably minimal.

From an emotional, as opposed to a rational perspective, a few faculty members expressed sadness that this coincides with the department’s 50th anniversary. Some raised the issue as to whether this would affect fundraising.

Many made the point that the disciplines are sufficiently distinct that a merged department would feel artificial. Worse, it could sow the seeds for protracted infighting between different factions. In fact, some recounted memories of working on a divided departments and contrasted that with the more collegial atmosphere our department has today.

The merger was also discussed at the Advisory Board Meeting on November 30, 2020. The Board was unanimous in its opposition to the idea, mainly because it did not see any major positives from the merger, and only a small cost savings. The board did encourage the departments to pursue closer cooperation, in order to foster cross-disciplinary projects.

On a more positive note, some faculty did point out that research collaborations may be easier to establish if the faculty in the two departments were to spend more time together, so that is a plus for a merger. More generally, cooperation between the departments was seen as a definite plus. One area where that cooperation should begin is in the degree programs. It should be easier for students to switch between Computer Science and Computer Engineering, for example. Also, students in one discipline should be able to take technical electives from the other discipline for their degree. We plan to pursue such a collaboration in the future, regardless of the merger status.

Perspectives of the Electrical and Computer Engineering Department (ECE)

The ECE faculty and staff met the same week that the merger was first proposed. At that time, many points were made, and some items were identified which needed further study. Some further study has been done since then. A summary of the findings is given below.

Cost Savings:

- ECE and COSC already share the one and only office associate, so no savings there.
- There may be a slight savings because only one department head could handle both departments. But that head's research will plummet, so the savings are limited. Furthermore, the extremely broad range of fields across the two departments means that an Associate Department Head from the opposite department is needed, reducing the savings to nil.
- There are no courses that are redundantly taught by both departments. The two departments have a good relationship and have split the courses carefully, so no savings are expected in course offerings.
- ECE has lost several faculty over the past few years and the faculty are now spread extremely thin. Faculty cannot be reduced further without major impact.
- No cost savings are anticipated in the facilities, equipment, or laboratory space.

Potential Disadvantages of Merging:

- Most other universities have separate departments for ECE and COSC. Remaining separate departments allows us to more easily fit other University models and work more easily with those other Universities. A brief study of surrounding University models is in the Appendix.
- It makes our university seem very small to outside entities, as if we don't have enough students to justify separate ECE and COSC departments. For MIT and Berkeley this isn't a problem, but does pose a perception and public relations issue for UW.
- Degrees originating from just one department across this broad area are not the standard, and may put our graduates at a disadvantage when seeking employment or graduate school admittance.
- The hearts of the programs are completely different. The trainings between ECE Engineers and Computer Science degrees are very different.
- Mergers can have unintended consequences and be problematic.
 - At UW, plant science, animal science, and entomology were merged into one dept. They had infighting, tough situations with RTP, and tough situations with hiring.
 - At UW, Petroleum Engineering was combined with Chemical Engineering only to again split a few years later at great cost.
 - Montana State University merged COSC and ECE: it was the largest department at MSU, and then later split after finding the merger was a bad idea.
- Both departments have Computer in the name, but the disciplines are incredibly diverse. In fact, electrical engineering alone is incredibly broad. There are 36 sub-societies in the IEEE, of which only two have "Computer" in the title.

- Research collaboration w/ COSC has happened in the past, and has yield successful outcomes. However, if we start having issues within the merged department this could have a negative impact on these relationships we have built. One example is provided by Dr. Diksha Shukla. She interviewed for a position in ECE but ended up in COSC thanks to the existing good relationship between the departments.
- Much of UW's COSC research is closer to the Math department than ECE
- RTP voting would be difficult. Is there a way to have the separate department personnel vote on only their half of the cases within the UW system?
- Significant time would be spent reinventing every department policy, etc.
- Combination of the department financial accounts would be problematic. For instance, thanks to a strong donor base and careful spending, ECE has substantial discretionary funds donated privately. These funds would need to be very carefully managed to make sure they were used to maximize the benefit to UW, Wyoming and as specified by the donors.

Potential Advantages of Merging:

After considerable discussion, none of the ECE faculty and staff had mentioned any advantages of merging, so John McInroy (ECE Head) encouraged them to name advantages. None were offered, so he offered the following potential advantages of merging:

- The department names are so similar that it is confusing for many people, so sometimes opportunities that should be jointly explored or even belong in the other department are missed.
- Sometimes we see new first year students who have an interest in computers so they sign up with ECE or sign up for COSC, and then halfway through their studies they realize they should be in the other department. Merging may help improve communication and ease degree changes for these students. ECE students have an easier time switching to a COSC degree, but COSC students have an issue going into ECE because the prerequisites don't match unless carefully chosen.
- Just having the personnel from both departments in both rooms, having joint seminars, and rubbing elbows may keep us more aware of our COSC colleagues. This may lead to improved research and curricula.

John McInroy then again encouraged the faculty and staff to think of advantages. None were offered.

Alternatives to Merging:

- Could we benefit from having more adjunct faculty b/w the departments? Perhaps have Dr. Diksha Shukla become an adjunct faculty member in ECE in addition to her COSC appointment?
- Host joint seminars and one joint meeting each semester across both departments aimed at increasing collaboration.
- Create some other administrative structure to facilitate collaboration. For example, create a "computing group" consisting of the faculty and staff working at the interface between ECE and COSC. Alternatively, both departments could be housed under the school of computing or another similar organization.

Recommendation from the ECE Head:

Several years ago I toured both Berkley and MIT's combined Electrical Engineering and Computer Science (EECS) departments. The departments are gigantic (at MIT, EECS comprises 40% of the total undergraduate enrollment!). These departments are stunning, and since that time I have been very intrigued with the possibilities of forming an EECS department at UW. I still think this is something that merits more serious consideration. However, I don't think it is something that should be rushed into, as there don't appear to be huge advantages that can't be gained other ways, and there are certainly disadvantages.

APPENDIX

A Brief Study of Surrounding University Models

As a supplement to the feedback on the proposed merger of the Electrical & Computer Engineering Department and the Computer Science Department. A survey was completed of Mountain West Conference Schools, and engineering schools in neighboring states.

- The survey of schools in the Mountain West Conference shows the following.
 - Not a single school in the conference has a combined Electrical Engineering and Computer Science Department.
 - 8 schools (Wyoming, Colorado State, Boise State, University of New Mexico, Fresno State, UNLV, San Diego State and Utah State) all have two departments: an Electrical & Computer Engineering Department and a separate Computer Science Department.
 - The Air Force Academy has two separate departments: Electrical & Computer Engineering Department and a separate Computer and Cyber Science Department.
 - University of Hawaii has two separate departments: Electrical Engineering Department and a separate Computer Science Department.
 - San Jose State has 3 separate departments: Electrical Engineering Department, Computer Engineering Department, and Computer Science Department.
 - University of Nevada Reno has 2 separate departments: Electrical & Bioengineering Department and a separate Computer Science Department.
- A survey of engineering universities in neighboring states shows the following:
 - Only one university (South Dakota State University) has a combined Department of Electrical Engineering and Computer Science.
 - University of Nebraska and the University of Idaho both have 2 separate departments: Department of Electrical & Computer Engineering and a separate Computer Science Department.
 - Montana State University and the University of Utah both have 2 separate departments: Department of Electrical & Computer Engineering and a separate School of Computing.
 - The University of Colorado has two separate Departments: Department of Electrical, Computer, and Energy Engineering and a separate Computer Science Department.

In total, of 18 universities surveyed, only one did not have separate departments. It was probably the smallest and least distinguished.