

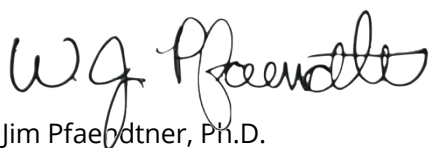
11/1/2019

Dear Review Council,

Enclosed please find our Chemical Engineering Unit Response to the 10 year review visiting committee. We thoroughly enjoyed the 10 year review process, and we were gratified to see many of our strengths and unique elements recognized as such in the committee report.

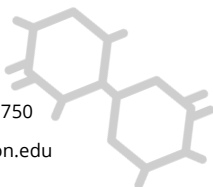
On the following pages you will find a detailed response to the committee report, which I trust you will find useful in finalizing the Chemical Engineering 10 year review process.

Thank you for all of your diligent work in performing the 10 year review. Please do not hesitate to contact me should you need any further information to complete your review.



Jim Pfaendtner, Ph.D.

Jagjeet and Janice Bindra Endowed Career Development Professor  
Professor and Department Chair, Chemical Engineering  
Adjunct Professor, Chemistry  
University of Washington



## **General response to the committee report**

We are very grateful for the substantial investment of time and effort spent by the Chemical Engineering 10 year review committee. The analysis of our self-study, site visit and subsequent compiling of the report were clearly done thoroughly and with a focus on helping ChemE continue its long tradition of excellence.

In preparing our response to the committee report to assist the Academic Affairs and Planning office, we have chosen to offer a point-by-point response to the *challenges* and *threats* noted by the committee. In general, we are in strong agreement with the number and extent of the strengths and recommendations. Many of the recommendations are already being implemented in the unit and several of them are not feasible due to UW-specific constraints that the external reviewers may not appreciate.

## **Response to threats identified by the 10 year review visiting committee**

- 1. Upgrading and maintaining the building hurts department budget. The department needs stronger support from the College and the University for maintenance to allow it to innovate on educational and research programs.*

We are in complete agreement with this. We request support from the review committee within the Academic Affairs and Planning office to emphasize with the College of Engineering and the Provost the need to develop a comprehensive space plan for the next decade.

ChemE makes substantial investments each year in maintaining Benson Hall and this limits our competitiveness and effectiveness in executing the department mission.

The arrival of a new dean within COE on November 1, 2019 presents an unparalleled opportunity to rethink the space future of ChemE, collaborate with the college on meeting other pressing space needs and projects, and prepare for the next decade.

2. *Current building appears to be at capacity. Limits growth in educational programs, faculty offices and research capacity. Although space in other state of the art buildings has been secured, this separates faculty and graduate students into different locations which can detract from the cohesiveness of the department.*

We are in complete agreement with this. Our response to item #1 above is echoed here. Chemical Engineering is eager to collaborate with the college and university to address our long term space needs.

3. *Dependence on international students for MS (and undergraduate) program.*

The advent of terminal fee-based masters programs in chemical engineering is occurring nationwide and, to our knowledge, these programs universally enroll a near totality of international students. Provided the value proposition for a research-focused ChemE MS exists in other countries around the world, we do not see any issue in running a program that meets this demand.

We see the emergence of the "Data Science Track" ChemE MS degree as a viable option to grow the participation of domestic students – especially those from non ChemE undergrad backgrounds (e.g., BS Chemistry degree holders)

We do not agree our department demonstrates a 'dependence on international students for our undergraduate program'

4. *Current research is dominated by molecular and nano-science and engineering. This is a focused and highly competitive area. Consider broadening research portfolio in chemical engineering.*

The ChemE department underwent a nearly 10 year strategic research and teaching initiative in molecular and nano engineering, which also ran concurrently with a COE wide molecular engineering initiative. Many of our faculty were leaders in the shaping of these programs, have been leaders nationwide in the emergence of molecular and nanoscience as key ChemE research areas, and were hired through the availability of growth lines aligned with the COE MoLES initiative. In summary, it is not a surprise that our research and teaching are so strongly aligned with molecular and nano- science and engineering principles.

ChemE faculty searches are rarely focused in one specific area with a preference to seek the best candidates for our unit. We have passed the recommendation to

broaden the research portfolio to the search committee and discussed it at our faculty retreat.

## **Response to challenges identified by the 10 year review visiting committee**

### 1. Reduced numbers of PhD students incoming each year

We agree this has been a challenge presented by the department *over the last two recruiting cycles*. Prior years have seen rather healthy PhD classes, but the total number of PhD students enrolled in the ChemE PhD program has been dropping. This was identified by the current chair during his interview cycle in December 2018, it came up again during the external advisory board meeting in May 2019, and the chair discussed it at length during the ChemE faculty retreat in September 2019.

The ChemE PhD program has a new graduate program chair and director, Cole DeForest. Cole is soon to be tenured and emerging leader in our ranks of mid career faculty. He is eagerly tackling the challenge and this issue is his number one priority. While it is too soon to tell, there is a strong feeling in the department that the recruiting issue is being addressed and that we will see improved numbers in the coming year(s).

In addition, the chair is working on a strategic plan to incentivize faculty to staff their research programs from the ChemE PhD program. We face competition from faculty staffing their groups from other programs – especially the interdisciplinary Molecular Engineering PhD program which has led to an effective transfer of around 10% ChemE-funded RA positions from the ChemE PhD program to the MoleE PhD. Faculty are additionally choosing to hire postdocs or hire new PhD students from Chemistry and MSE instead of replacing graduating PhD students from ChemE program. The chair will enact a program that more clearly defines ChemE financial support of PhD student (fellowships and TAs) while also aligning other ChemE strategic resources (e.g., investment of seed funds and new faculty startup funds) with growth of the ChemE PhD program size.

### 2. Graduate Job Placement

We agree that more data is needed, and we are working with the advising staff to improve data collection and systematize the process. The data presented in the committee report do not reflect the high level of “no response” (e.g., 37% of MS

students report jobs, but there is a significant fraction of non-responders). Moreover, calibration against other ChemE chairs from west coast schools (e.g., UC Davis or UCSB) shows that our undergrad job placement rates are well aligned with our west coast peers. Grad job placement data are scarce and difficult to obtain due to very low response rates, but we will continue to seek new ways to improve responses and obtain high quality longitudinal tracking.

### 3. Lecturer Career Path

We believe this item has been addressed through implementing a more robust mentoring program with the arrival of a new chair. Departmental lecturers now have official mentors, and the lecturer in question mentioned in the 10 year review report had a lengthy discussion with the chair to clarify next steps.

### 4. Dilution and Fragmentation in Graduate Curriculum

This is a continuing issue that has faced the department over the last review cycles. ChemE graduate education beyond the first quarter has been rather irregular and this issue has been noted by many faculty over the years. Given our current faculty size, the level of involvement of many of our faculty in substantial leadership and/or service activities, and the substantial variance in views among the faculty about the 'right' way to approach a more streamlined graduate curriculum, there are not obvious choices about how to address this issue.

Strategically, we feel it is imperative to first address the issue of PhD class size and recruiting and for the faculty to arrive at realistic targets for our MS class sizes and program offerings. We expect this to take on the order of 1-2 academic years and during Autumn of 2021 or 2022 the faculty will be ready to devote effort towards a comprehensive revamp of the graduate curriculum, which would allow us to address these concerns in a holistic way.