



## University of Alberta Quality Assurance Suite of Activities

### Faculty of Engineering: Academic Program Reviews and President’s Visiting Committee (PVC)

Excerpted Reports 2017-2018

### Faculty of Engineering: Graduate Program Review

<b>Programs Reviewed</b>	<ul style="list-style-type: none"> <li>● Master of Science in Civil and Environmental Engineering</li> <li>● Master of Engineering in Civil and Environmental Engineering</li> <li>● Joint Master of Business Administration/Master of Engineering in Civil and Environmental Engineering</li> <li>● Doctor of Philosophy in Civil and Environmental Engineering</li> <li>● Master of Science in Chemical and Materials Engineering</li> <li>● Master of Engineering in Chemical and Materials Engineering</li> <li>● Doctor of Philosophy in Chemical and Materials Engineering</li> <li>● Master of Science in Electrical and Computer Engineering</li> <li>● Master of Engineering in Electrical and Computer Engineering</li> <li>● Doctor of Philosophy in Electrical and Computer Engineering</li> <li>● Master of Science in Mechanical Engineering and in Engineering Management</li> <li>● Master of Engineering in Mechanical Engineering and in Engineering Management</li> <li>● Doctor of Philosophy in Mechanical Engineering and in Engineering Management</li> </ul>
<b>Review Dates</b>	January 16-17, 2018

<b>Reviewers</b>	<ul style="list-style-type: none"><li>• Dr. Judith Todd, Committee Chair, Pennsylvania State University</li><li>• Dr. Michel Perrier, External Member, École Polytechnique de Montréal</li><li>• Dr. Nemkumar Banthia, External Member, University of British Columbia</li><li>• Dr. Alireza Sadeghian, External Member, Ryerson University</li><li>• Dr. Mary Wells, External Member, University of Guelph</li><li>• Dr. David Stuart, Internal Member, University of Alberta</li><li>• Dr. Patrick Flood, Internal Member, University of Alberta</li><li>• Dr. Jochen Kuttler, Internal Member, University of Alberta</li><li>• Dr. Elaine Simmt, Internal Member, University of Alberta</li></ul>
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## Outcome

The External Review Committee reported that the Faculty of Engineering features strong programs with faculty and staff who are committed to high-quality programs and graduate teaching, research and scholarship. The Faculty of Engineering is internationally recognized for its impact in both fundamental and industrial research, and within Canada through receipt of multiple research awards held by faculty, graduate students and post-doctoral fellows.

Against a backdrop of unprecedented growth in research funding and areas, number of faculty members, and graduate students, the External Review Committee confirmed the unique position of the Faculty of Engineering in providing exciting opportunities, introducing new interdisciplinary and integrated research, and building upon existing excellent curricula.

In addition, the External Review Committee commended the Faculty of Engineering on being the first Engineering program in Canada to implement graduate professional development (PD) requirements for graduate students.

## Program Strengths

- Research and laboratory facilities, and technical and departmental support staff are first rate.
- The library has outstanding collections and resources.
- Both research-based and professional graduate education are given high priority.
- Industrial collaboration with, and investment in, the Faculty of Engineering is very high.
- The more mature departments and research areas have optimized funding and attracted students through their reputation and balance of academic and industrial research and educational programs.
- The quality of publications and citation counts is high and growing. Particularly



noteworthy is the number of graduate and undergraduate students contributing to these publications and to conference presentations.

- All departments are inherently interdisciplinary. This provides major opportunities for innovation in graduate education and research within and across departments and beyond the Faculty of Engineering.

## **Opportunities for Program Improvement and Enhancement**

The committee made several key recommendations:

- Introduce new interdisciplinary and integrated research and educational programs and innovate the existing curricula.
- Newer programs should exploit the opportunity to emulate more mature departments by balancing their academic and industrial research and educational programs in their future strategic planning processes.
- Departments with younger faculty should mentor new hires in best practices for attracting, supervising and mentoring graduate students and for establishing industrial partnerships.
- Diversification of the Faculty and specifically the recruitment of women into these roles but also other entry points such as post-doctoral fellowship positions should remain a high priority for the Faculty of Engineering. Support networks for women, indigenous, and disabled students and faculty should be explored. The creation of the new Associate Dean with an outreach portfolio in the Faculty of Engineering provides another avenue that should be utilized to ensure female faculty, researchers and graduate students thrive in the Faculty of Engineering.
- Diversity of the student body should remain a high priority. Support networks for women, indigenous, and disabled students should be explored across departments and Faculties, when these groups are below critical mass in the Faculty of Engineering.
- A Task force should be set up to look at the MEng program – enhance communications, student supervision, admission requirements, and the integration of MEng students in the departmental communities
- Explore opportunities for innovation in graduate education and research within and across programs and beyond the Faculty of Engineering, as the Faculty of Engineering and individual programs develop new strategic plans.

## **Implementation Plan**

In response, the Faculty made the following commitments:

- The Faculty of Engineering's Graduate Program Committee will discuss the establishment of new programs to highlight interdisciplinary work.
- All four departments and the Faculty of Engineering are in the process of starting or are developing a strategic plan, and the recommendations within this review will inform those processes.
- The Dean's office will continue to carefully consider how best to support new hires beyond



existing programs and faculty forums.

- The Faculty of Engineering has a diversity and equity plan and these recommendations echo the direction the Faculty is taking.
- Diversity in the student body is an important subject and one that the Faculty sees as a priority. The Faculty needs to explore this subject carefully and not rush to implement patchwork measures. It is proposed that as a first step, GPC consult with Dr. Ulrich, and review and understand current challenges in attracting a more diverse graduate student body; assess programs that exist elsewhere that could be adapted and implemented in our programs; and, work on messaging to encourage a more diverse pool of applicants.
- The Faculty Graduate Planning Committee will establish, before the end of the 2018 calendar year, a cross-disciplinary task force to review current practices and develop guidelines for MEng programs. Each program will be asked to implement the guidelines considering their program goals and limitations.

### **Faculty of Engineering: President’s Visiting Committee (PVC)**

<b>Review Dates</b>	April 30-May 1, 2018
<b>Reviewers</b>	Dr. John Ralston, Committee Chair, University of South Australia Dr. Kim Woodhouse, External Member, Queen's University Dr. Samuel Mukasa, External Member, University of Minnesota Dr. Hanne Ostergaard, Internal Member, University of Alberta

### **Outcome**

The President’s Visiting Committee confirmed the Faculty of Engineering’s elite status as a top five ranked institution in Canada as well as its embedded placement among the world’s top 150 institutions.

The President’s Visiting Committee concluded that although engineering education has been delivered at the University of Alberta since 1908, most of the growth that expanded and modernized the Faculty in terms of staff complement, buildings, and first-rate research facilities has occurred in the last twenty five years, and especially over the past decade. The President’s Visiting Committee applauded the Faculty’s ‘young’ energy and enthusiasm, high quality staff, excellent laboratories and equipment coupled with splendid community interactions as well as alumni outreach.

The Faculty is very ably led by its Dean, who is supported by highly competent team of academic, administrative and support staff. One of the hallmarks of the Faculty is its strong commitment to industrial interactions. The President’s Visiting Committee was pleased to see the high level of industrial research support, complemented by very substantial fundamental research support from the Province of Alberta, NSERC and international agencies.



The Faculty is well known nationally and internationally for its very fine fundamental and applied research, research awards held by faculty, graduate students and post-doctoral fellows include Canada Tier 1, Tier 2 and Research Chairs, IRCs, NSERC awards, Vanier Graduate Fellowships, Endowed Chairs, Canadian Foundation for Innovation (CFIs) and various others. Its research is published in high quality journals; both the numbers of publications and their citations are laudable, although there is a recent disturbing decrease in the latter.

The President's Visiting Committee applauded the Faculty's aspirations to be a member of the elite level of engineering education providers worldwide and confirmed the Faculty's trajectory towards that outcome.

### **Opportunities for Program Improvement and Enhancement**

The President's Visiting Committee recommended that the Faculty focus its strategic planning efforts around four identified primary areas:

- The current state of the Faculty of Engineering pertaining to its research and scholarly activities, including graduate training, research activity and planned research initiatives.
- The Faculty's existing strengths, direction and vision.
- The international standing of the Faculty of Engineering.
- The Faculty's demographics and recruitment practices, including gender diversity, among students and faculty.

### **Implementation Plan**

In response, the Faculty made the following commitments:

- The Faculty of Engineering will carefully review its assessment processes, monitoring tools and cycles to ensure each of them align with the strategic vision for the University of Alberta and the Faculty, and to understand their use in providing a comprehensive, integrated platform for driving continuous improvement. This is a multi-year effort, which will require the formation of a working group of specialists, including experts in: organizational effectiveness, financial analysis, and systems and data science. This effort will begin after the November 2018 CEAB accreditation visit and will require support from the Vice-President (Finance and Administration), Libraries, Data Warehousing, etc.
- The Faculty of Engineering has committed to a comprehensive strategic planning, branding and marketing effort. The first phase of this initiative began in 2017, although departmental-level strategic planning began in 2016, and will take place over the next three years, with the bulk of the work occurring during the next 18 months. The objectives will be to design a comprehensive, global branding, marketing, and communications campaign and plan that will establish the Faculty's unique value promise that differentiates the University of Alberta's Faculty of Engineering from its national and international competitors.
- The Faculty of Engineering will undertake a multi-year strategy, *Shifting our Culture*, which



will require the formation of a working group that is populated by leading faculty members. This effort will begin during 2019 and will be informed through interaction with the *Shifting our Culture* Working Group, which will focus on initiatives in this area, will confront rewarding what the Faculty values; promote highest quality research at strong levels of productivity; encourage faculty to take-up our world's grand challenges, while ensuring our teaching and research remain relevant to Alberta; urge faculty members to stretch publish (i.e., target the top journals in their field); and press for innovation in teaching at all levels.