



## Council of the Faculty of Applied Science & Engineering Minutes of the Meeting of October 18, 2021

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**PRESENT:** Javad Mostaghimi (Speaker), Chris Yip (Dean), Ravi Adve, Novera Ahmed, Elif Akyildirim, Dionne Aleman, Barbara Alexander, Grant Allen, Danita Allick, Jason Anderson, Julie Audet, Timothy Bender, Evan Bentz, Laura Berneaga, Archit Bhargava, Raymond Bhushan, Shlomo Bibas, Eric Bryce, Markus Bussmann, Michael Chan, Warren Chan, Alan Chong, Sam Chowdhury, Will Cluett, Fiona Coll, Tom Coyle, Chris Damaren, James Davis, Ali Dolatabadi, Natalie Enright Jerger, Greg Evans, Saima Fancy, Ayleen Farnood, Ramin Farnood, Jacqueline Fleisig, Celeste Francis Esteves, Daniel Franklin, Kevin Golovin, Sarah Haines, Benjamin Hatton, Ken Hilton, Jennifer Hsu, Albert Huang, Mark Jeffrey, Charles Jia, Shuai Jia, Bryan Karney, Omar Khan, Andrew Kidd, Dawn Kilkenny, Daeho Kim, Donald Kirk, Bruno Korst, Deepa Kundur, Christopher Lawson, Seungjae Lee, Heather MacLean, Don MacMillan, Krishna Mahadevan, Elham Marzi, Naomi Matsuura, Joy Mehany, Minnie Menezes, Emily Moore, Myrte de Alfred, Shivani Nathoo, Nelly Pietropaolo, Doug Reeve, Mark Rittinger, Jon Rocheleau, Lisa Romkey, Jonathan Rose, Ervin Sejdic, Claire Shaw, Brent Sleep, Marisa Sterling, Micah Stickel, Ken Tallman, Mindy Thuna, Deborah Tihanyi, Chris Twigge-Molecey, Chirag Variawa, Jay Werber, Elizabeth Whitmell, Lydia Wilkinson, Francis Yamashita, Ning Yan, Renee Yan

**SECRETARIAT:** Caroline Ziegler, Alex Schroen, Anna Limanni

**GUESTS:** Vanessa Andres, Inga Breede, Helen Bright, Chris Brown, Sharon Brown, Mikhail Burke, Maya Churbaji, Rachel Clement, Dani Couture, David Duong, Sandra Duong, Jennifer Fabro, Roger Francis, Leslie Grife, Cathy Grilo, Nadia Gulezko, Christina Heidorn, Angela Henshilwood, Carmen Horvath, Marit Mitchell, Don Newton, Dan Pettigrew, Zeeshan Rayees, Saif Rjaibi, Cindy Rottmann, Tom Saint-Ivany, Marsha Serrette, Allison Van Beek

### 1. **Speaker's Welcome**

Speaker Javad Mostaghimi called the first Faculty Council meeting of 2021-2022 to order at 12:10 pm. He welcomed members and guests, acknowledged the University's use of traditional land and reviewed protocols for the virtual meeting. There were no questions.

### 2. **Approval of Agenda**

The agenda and reports were distributed on October 7, 2021. On a regular motion duly moved, seconded and carried, the agenda was approved.

### **3. Introduction of New Faculty**

New faculty members Sarah Haines, Daeho Kim and Seungjae Lee of Civil & Mineral Engineering; Daniel Franklin of Biomedical Engineering; Chris Lawson and Jay Werber of Chemical Engineering & Applied Chemistry; Bruno Korst and Ervin Sejdic of Electrical & Computer Engineering; and Myrte de Alfred and Kevin Golovin of Mechanical & Industrial Engineering, were introduced by their respective chairs and directors.

### **4. Adoption of the Minutes of Previous Meetings**

No errors or omissions were noted in the minutes of the April 6, 2021 Council meeting and on a regular motion duly moved, seconded and carried, the minutes were approved.

### **5. Memorial Tributes**

#### **(a) Samuel Sandler**

Grant Allen, chair of Chemical Engineering & Applied Chemistry, read the following memorial tribute in honour of Professor Emeritus Samuel Sandler.

Be it resolved –

THAT the Council of the Faculty of Applied Science & Engineering record with sincere regret the death on April 10, 2021 of Professor Emeritus Samuel Sandler at the age of 100.

Professor Sandler received his BAsC in Chemical Engineering from the University of Toronto in 1944. His first job after his BAsC was at a munitions plant, Nitro-Quebec, in Valleyfield, Quebec. He then returned to the University of Toronto to get his MASc working on hydrogen engines for the Defense Research Board. He joined the Department of Chemical Engineering and Applied Chemistry at the University of Toronto as an Assistant Professor in 1958. He retired in 1985.

Professor Sandler was a highly respected scholar and educator in the Department of Chemical Engineering and Applied Chemistry. His research included combustion and detonation of hydrocarbons and the development of advanced analytical techniques for the analysis of chemicals in air, water, soil and body volatiles. In the late 1970's he was one of several faculty in the Department that developed a new postgraduate program in occupational health and safety with significant support from the Ontario Ministry of Labour. This program was part of a larger initiative with the Department of Chemical Engineering and Applied Chemistry and the Department of Preventive Medicine and Biostatistics in the Faculty of Medicine in the areas of occupational health engineering, safety engineering, occupational health and occupational medicine. He was highly sought out for his expertise, including expert testimony on the reliability of the breathalyzer test for impaired driving.

Professor Sandler was an outstanding teacher, covering foundational courses ranging from first year chemistry to advanced graduate courses in instrumental analysis. He had a long-time

devotion to first year chemistry and also supervised a two-week preterm boot camp on titration for second year chemical engineering students. He had an active interest in supporting each student's education and broader career interests, including actively engaging with prospective students in high school.

Though he retired over 35 years ago, Professor Sandler kept in touch with the Department on a regular basis and was well known and respected by our entire community. He attended annual dinners and holiday lunches with our faculty including a virtual lunch in December of 2020, just three weeks before he turned 100. His energy and enthusiasm for life and for science and engineering were always evident at every one of these events, where he would regularly take the stage and tell a joke and provide words of wisdom. A beloved husband of 72 years, he had three children, seven grandchildren, and four great grandchildren.

Professor Sandler was an inspiring educator and engineer who has left a lasting impact on our Department, Faculty and the University.

Be it further resolved –

THAT this tribute to Professor Emeritus Samuel Sandler be inscribed in the minutes of this Council meeting, and that copies be sent to his family as an expression of the respect and gratitude of the members of Council.

**(b) Michael R. Piggott**

Professor Allen read the following memorial tribute in honour of Professor Emeritus Michael R. Piggott.

Be it resolved –

THAT the Council of the Faculty of Applied Science & Engineering record with sincere regret the death on July 5, 2021 of Professor Emeritus Michael R. Piggott in his 92nd year.

Professor Piggott received his BSc in Physics from Imperial College, London in 1951. He went on to graduate studies at Imperial College working on thin film chemical reactions, and friction and wear of surface films. After completing his PhD at Imperial College, he went on to work in industrial research and production in England before coming to work with Atomic Energy of Canada Ltd. at their Chalk River Nuclear Laboratories. While at Atomic Energy of Canada Ltd., he began working in the new area of composite materials and their potential application to nuclear reactors. In 1968, he joined the Department of Chemical Engineering and Applied Chemistry at the University of Toronto. He retired in 1995.

After joining the University of Toronto, Professor Piggott shifted his work from reinforced metals to composite materials involving polymers. He was an active scholar who was deeply engaged in research and education in composite materials. His early work focused on the properties of the

fibre/matrix interface, and his later work called into question some of the widely accepted theories underpinning the theory of composite design. He outlined these ideas in a revised second edition of his classic text “Load Bearing Fibre Composites” and followed up by publishing a book entitled “What Engineers Should Know about Fibre Composites”.

Professor Piggott loved the outdoors. He climbed the six virgin peaks in the Canadian Arctic and built two cottages. He also sung with the Canadian Opera and was the Editor in Chief of the North Renfrew Times.

Professor Piggott was a much beloved colleague who regularly stayed in contact with the Department of Chemical Engineering and Applied Chemistry well after his retirement. He was always full of enthusiasm about his love of science and the outdoors and his family which included three children and six grandchildren.

Be it further resolved –

THAT this tribute to Professor Emeritus Michael R. Piggott be inscribed in the minutes of this Council meeting, and that copies be sent to his family as an expression of the respect and gratitude of the members of Council.

**(c) Rein Luus**

Professor Allen read the following memorial tribute in honour of Professor Emeritus Rein Luus.

Be it resolved –

THAT the Council of the Faculty of Applied Science & Engineering record with sincere regret the death on July 28, 2021 of Professor Emeritus Rein Luus at the age of 82.

Professor Luus’ family fled from Estonia to Germany to escape the imminent Soviet occupation in 1944 and then immigrated to Canada in 1949. Rein graduated from the Sault Ste Marie Collegiate and entered the Engineering Physics Division in the Faculty of Applied Science and Engineering at the University of Toronto. As the Chemical Option was founded in 1959, Rein Luus was in the first group of students choosing it. The Division was renamed Engineering Science and Rein graduated in 1961. Professor Luus completed his MASc degree in the Department of Chemical Engineering and Applied Chemistry with Professor Graydon and thereafter went to Princeton where he received the PhD in Chemical Engineering in the area of optimal control. He joined the Department of Chemical Engineering and Applied Chemistry at the University of Toronto as an Assistant Professor in 1965, advanced to Associate Professor and then to Full Professor in 1973. He retired in 2005.

Professor Luus was a highly accomplished scholar in the field of optimization, optimal process control, iterative dynamic programming and applied mathematics. He published some 200 papers in journals and refereed conference proceedings along with chapters in several books. He co-authored a book with his thesis supervisor, Prof. Leon Lapidus, that was based on his post-doctoral research and a later another book on iterative dynamic programming. He shared his

scientific insights in various consulting engagements and much of his work underpins the foundations behind the optimal and efficient operation of many processes that provide commodities we rely on today. Iterative dynamic programming continues to be a key component of the rapidly advancing field of artificial intelligence.

Professor Luus has won many prestigious awards including the Steacie Prize in 1976, which is an annual award given to a promising young scientist or engineer in Canada. Winning this prize included a special ceremony held at the Governor General of Canada's residence in Ottawa. On that visit, Professor Luus took the opportunity to engage in an in-depth conversation with then Prime Minister Pierre Trudeau who was apparently standing off to the side on his own.

Professor Luus was a rigorous and intense individual in everything he pursued, whether it was discussing the fundamentals of thermodynamics or playing a game of squash every weekday at 12:20 pm. He was a demanding but well-respected educator who also won a Departmental Teaching Award. Besides his academic and professional interests, he enjoyed sailing and learned to play the violin. He was active in the Estonian academic community and spoke often about his family with great pride.

Professor Luus was a wonderful professor, scholar, educator and colleague who left a lasting legacy on our Department, Faculty and the University of Toronto.

Be it further resolved –

THAT this tribute to Professor Emeritus Rein Luus be inscribed in the minutes of this Council meeting, and that copies be sent to his family as an expression of the respect and gratitude of the members of Council.

Professor Allen provided his personal reflection on the legacy of these colleagues and noted the passing of Adjunct Professor David Goring at the age of 100 this past summer.

The Speaker assumed concurrence with these resolutions and Council observed one minute of silence in honour of Professors Emeriti Sandler, Piggott and Luus.

## **6. Report of the Dean**

Dean Chris Yip welcomed all to the Council meeting and provided the following remarks.

### **(a) Pandemic Planning**

We continue to closely follow public health guidelines and have adapted our plans to enable a safe return to in-person activities, both at the university and at offsite facilities such as Gull Lake (Survey Camp), where students are participating in live experiential learning. Research spaces are opening up as well.

All members of the U of T community must complete UCheck every time they are on campus and must be fully vaccinated against COVID-19 by October 15. Face masks are required in all

indoor spaces on university property, including classrooms, labs, offices and other shared spaces such as lobbies, elevators and hallways.

#### **(b) Recruitment and Admissions**

Engineering welcomed 1,268 new first year students for 2021-2022, representing those who have come from institutions in 59 countries and all 10 provinces. Twenty-seven percent of first year students have come from studying outside of Canada, 39 percent are female and 29.5 percent are international. We also have 26 international exchange students from 12 countries registered this term.

#### **(c) Times Higher Education (THE) World University Rankings**

Our Faculty remains Canada's top-ranked engineering school. We are ranked twenty-sixth in the world, according to Times Higher Education (THE) World University Rankings by Subject for 2022, and seventh among North American public institutions. In terms of overall institution-level rankings, U of T ranked eighteenth in the world. The rankings, released earlier this month, mark an increase from our position last year of twenty-eighth. The continued rise in our international reputation is a direct reflection of the talent and dedication of our faculty, staff, students, alumni and partners. Thank you to all.

THE is the second-longest-running survey of its kind. Its breadth of evaluation, which aims to measure institutions across their core missions of teaching, research, knowledge transfer and international outlook, sets it apart as an influential assessment of global, research-intensive universities.

#### **(d) Annual Report Updates**

We published our new digital-only annual report, *Rising to the Challenge*, in September. This reimagined document provides an at-a-glance overview of the current state of our Faculty. Thank you to the Strategic Communications team for setting a new standard in annual reporting. We also published *By the Numbers 2021*, a complement to *Rising to the Challenge* that delivers detailed data and statistics that underpin our achievements.

Notably, we continue to attract top students from around the world and expand the diversity of our undergraduate student body. We offer a rich educational experience, including many opportunities to study and work abroad. Support for research is strong from all traditional areas, but especially from industry. We are making progress on equity, diversity and inclusion. Despite the obvious challenges, COVID-19 has brought out the best in our community.

#### **(e) Virtual Convocation**

Fall Convocation will be held virtually again this year, on November 18 at 12:00 pm. This decision is based on public health guidance, including provincial rules regarding physical distancing and capacity limits for non-instructional spaces and events on university campuses.

**(f) Coffee with Chris**

It is important for the Dean to connect with students, staff and faculty, to hear their input and answer any questions they may have. In the weeks ahead, we will set up two open discussion-style events: a Graduate Town Hall on October 21 from 1:00-2:00 pm and a Coffee with Chris for Undergraduates on November 15 from 1:00-2:30 pm. Stay tuned for details and reach out to the Dean's office if you have any questions.

The Speaker thanked the Dean for his report and invited discussion.

A member asked if there have been any negative effects of COVID-19 on admissions or on the Faculty in general. Dean Yip responded that although there have been some challenges, such as not knowing class size limits until the last moment, things have generally worked out well and students are happy to be back in person.

At a member's request, Dean Yip undertook to look into the possibility of instructors being allowed to teach without masks.

**7. Reports for Information**

**(a) Appointments to Standing Committees and the Academic Appeals Board**

The Speaker presented Report 3697, which lists the membership of the Faculty's standing committees and the Academic Appeals for 2021-2022. Graduate student members will be appointed by the end of October.

Changes to standing committees and the Academic Appeals Board, including their membership composition, will be submitted for Council's approval at its meeting of December 16. If these changes are approved, an updated membership report will be provided to Council at its February 18 meeting.

There were no questions and the report was received for information.

**(b) Engineering Graduate Education Committee: Update**

The following standing committee report was approved by the Executive Committee of Council at its September 28, 2021 meeting.

Julie Audet, Vice-Dean, Graduate Studies and chair of the Engineering Graduate Education Committee, presented Report 3695, listing new APS, BME, ECE and MIE courses; minor modifications to APS2000Y, MIE1453 and TEP1502; the creation of an Emphasis in Waterpower; and a major modification to the PhD program in Chemical Engineering & Applied Chemistry that will allow its students to enrol in the Collaborative Specialization in Next-Generation Precision Medicine (PRiME), which is led by the Leslie Dan Faculty of Pharmacy.

There were no questions and the report was received for information.

## **8. Annual Report of the Academic Appeals Board, 2020-2021**

Don Kirk, chair of the Academic Appeals Board, presented report 3698 Revised, statistics on appeals of undergraduate students against decisions of standing committees relating to petitions for exemptions from the application of academic regulations or standards. Professor Kirk also described updates, trends and observations within academic appeals, such as remote work due to COVID-19, membership turnover timelines, continuing increase in case communication and complexity, and revisions to the Board's manual which will come forward for approval at the December 16 Faculty Council meeting.

During discussions, Professor Kirk confirmed that the Academic Appeals Board heard more appeals than usual during COVID-19. The appeals came as a cluster at almost the end of the term, and he expects the numbers will continue to rise as students become more familiar with online petitioning process.

The report was received for information.

## **9. Update on the FASE Academic Plan, 2017-2022**

Dean Yip described the progress made on goals relating to the five key pillars of the Faculty's 2017-2022 Academic Plan.

### **(a) Transformative Teaching and Learning**

We are global leaders in engineering education pedagogical development and teaching innovation, building rich experiential learning and professional development opportunities for undergraduate and graduate students and encouraging life-long learning.

An example is the creation of our Institute for Studies in Transdisciplinary Engineering Education and Practice (ISTEP), launched in 2018, which has allowed us to bring in new faculty and approaches to engineering education. Under ISTEP's leadership, we have partnered with ten institutions, such as the University of São João del-Rei in Brazil, in the International Virtual Engineering Student Teams (InVEST) initiative which facilitates virtual and cross-cultural collaboration.

We are also enhancing the diversity of our learning environment. At 29.5 percent, we have almost reached our target of 30 percent international students. The diversity of source countries of our students has also increased from 43 countries in 2017 to 59 in 2021. We are on our way to reaching our target of 50 percent women undergraduate students, currently having 38.4 percent, the highest in Canada. Our percentage of women graduate students has grown to 13 percent, close to our target of 15 percent. Our ratio of undergraduate to graduate FTE students is also nearing its goal of a 60:40 percent split, with 35.5 percent graduate students in 2020-2021. Finally, we continue to grow the diversity of our teaching staff by increasing our numbers of women faculty by both numbers and rank. The hiring of Professors Sarah Haines (CivMin) and Myrte de Alfred (MIE) is a recent example.



## **(b) Student Experience**

Goals toward enhancing the student experience include improving the quality, accessibility and delivery of academic advising services, encouraging co-curricular opportunities and growing undergraduate professional development.

Our very successful Engineering Academy program, built by our Outreach team, gives admitted students who accept our offers access to a suite of established online materials to help them get up to speed on core pieces of the math and physics curriculum. This program has been particularly important during COVID-19 and sets us apart from other institutions.

The move and expansion of our PEY Co-op Program office, part of a tri-campus partnership, has allowed us to grow staff and space, and increase diversity of opportunities across all sectors, including for graduate students.

We continue to encourage co-curricular activities, which are large growth areas for the Faculty and a significant attractor for students. Two such examples are the Hatchery, which provides a comprehensive suite of programs and services designed to help students with entrepreneurial ambitions, and the AutoDrive Challenge, a three-year autonomous vehicle competition which tasks students to develop and demonstrate a fully autonomous driverless passenger vehicle.

We made significant strides to support student health and well-being in 2019-2020 by hiring administrative staff in support of diversity, inclusion and professionalism; critical incidents; and student mental health. These staff provide single points of contact and a seamless approach for students. Thank you to the Engineering Society's Student Mental Wellness group and the Graduate Engineering Council of Students' (GECoS) Mental Wellness Commission, for creating and providing student resources, advocacy and education.

Thank you as well to Professor Chirag Variawa for acting as our first Faculty-in-Residence while living at the Chestnut Residence. Many students, first years in particular, appreciate the opportunity to get to know their professors. Residency at the Chelsea Hotel has also expanded, and our First Year and Registrar's offices are working diligently to make first-year students feel welcome, especially during COVID-19.

## **(c) Innovative Research and Entrepreneurship**

We have seen a 253.8 percent increase in industry research over the past five years, well surpassing our target of \$13.2M/year to reach total of \$20.3M for 2019-2020. This reflects the efforts of our Faculty in working with corporate partners in areas directly related to industry, which are expected to increase over time. Our total research infrastructure and research operating funding for 2019-2020 was \$104.7M, an increase of 38.9 percent over the previous year.

With 125 Engineering research chairs and professorships held by 115 individual chairholders, we continue to have a significant portion of Canadian Research Chairs (CRCs) within the university and across the country.

The Dean's Strategic Fund (DSF) continues to contribute to our academic plan in the areas of teaching, research, student experience and partnerships. The 32 proposals received this year emphasize cross-divisional, cross-campus and collaborative initiatives. This investment in transformative research has helped us launch seed programs that are now rolling out to larger initiatives that help drive us toward our academic plan goals.

Engineering is partner in 80-90 percent of Institutional Strategic Initiatives across the university. An example of a successful DSF investment where we have nucleated and grown opportunities across multiple sectors was the creation of the Centre for Analytics & AI Engineering (CARTE) in 2019. Led by Mechanical & Industrial Engineering, CARTE is now a founding pillar for the Data Sciences Institute, a cross-disciplinary community of teaching and administrative staff, researchers and students collaborating to address a variety of global challenges.

Thank you to our Vice-Dean, Research and the research office for building supports and opportunities to lead growth in a strategic way.

#### **(d) Collaborations and Partnerships**

We continue to collaborate and partner in exciting initiatives across the university and with the broader community. Two examples are Blueprint, an academic enrichment program designed for highly motivated Black students currently in Grades 10 and 11 who are interested in engineering, and the Kairos Blanket Exercise, an interactive educational program that teaches the history of indigenous peoples in Canada.

We continue to place new strategic officers across the university to encourage partnerships, a practice that began almost a decade ago. Other Faculties are now following this practice.

We have also increased engagement with our alumni. Over 1,200 alumni took on volunteer roles in 2020-2021, about 20 percent more than the previous year.

Many are aware of the achievements of the Cross-Disciplinary Programs Officer under the leadership of Associate Dean Bryan Karney. There are now exciting new opportunities to expand our minor and certificate offerings outside the Faculty, in areas such as public health and building science.

International partnerships are also flourishing. Professor Dionne Aleman's co-directorship of the Toronto-Manchester Joint Translational Centre for Digital Health is an example.

#### **(e) Strategic Resources**

We have purchased two floors of the new building at 203 College Street as a home for the new Experiential Learning Hub, a partnership between our Faculty, Arts & Science and Student Life to create a better space for our PEY Co-op Program and provide a seamless on campus experience for our employer community. We will also have space at the new Schwartz Reisman Innovation

Campus, currently under construction 101 College Street, representing another growth opportunity that will anchor U of T's unique cluster of world-leading artificial intelligence scientists and start-ups.

Our chairs and directors held a mini retreat in August to identify new pillars underpinning our academic planning. We will begin pulling together teams to identify constraints and opportunities and what have we learned from COVID-19 that will allow us to leverage our amazing community as we move forward.

Undergraduate students erected large letters spelling SKULE™ outside the MC building during F!rosh Week. Facilities and Services usually immediately remove such displays but allowed us to keep it for a week because it exemplified our student's energy and school spirit.

Another resource is our people, the faculty and staff who build our great community. Thank you once again to all.

### ***Discussions***

A member asked about the process for contributing to the next academic plan, for example, how to tie in equity, diversity and inclusion. Dean Yip explained that EDI will be an important pillar for the entire academic plan, and various EDI-related initiatives will be identified during consultations and pulled together organically and synergistically under a common strategy.

Another member, stating that 40 percent of our faculty are named chairs, asked if they are also endowed chairs. Dean Yip undertook to speak with the Executive Director, Advancement as there is a large category of chairs. The Vice-Dean, Research added that we have had great advances in terms of EDI and Canada Research Chairs and that we plan to continue instituting greater gender parity.

Members also discussed the upcoming renovations of the Medical Sciences Building and subsequent loss of the animal facility, which is heavily used by Biomedical Engineering and Chemical Engineering. Dean Yip said we are in close contact with the Faculty of Medicine and invited members to send any suggestions or comments to our Vice-Dean, Research.

The Speaker thanked the Dean for his update.

### **10. Update from the Engineering & Computer Science Library**

Mindy Thuna, Associate Chief Librarian for Science Research and Information, presented an update from the Engineering & Computer Science Library on its ongoing renovations, space at Downsview's high-density storage and preservation facility, and future plans regarding Tri-agency Open Access Policy, Research Data Management, Data Management Plan, and the five-part panel series, *Following the Roadmap for Research*. She concluded by introducing her successor, Angela Henshilwood.

There were no questions and the Speaker thanked Ms. Thuna for her update.

**11. Other Business**

There were no other items of business.

**12. Date of Next Meeting**

The next Faculty Council meeting is on December 16, 2021.

**13. Adjournment**

The meeting was adjourned at 2:07 pm.

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