OPEN SESSION

3:30 Consent Agenda

Motion: To approve or receive for information by consent items 1-5 below.

1. Minutes of the 18 September 2017 Meeting
   Decision

2. Reports from Committees and Councils
   a. Graduate & Research Council
   Information
   b. Undergraduate Council
   Decision/Information

3. Report of the President
   a. Recognition and Commendation
   Information

4. Reports from the Faculties
   Information

5. Committee Appointment
   Decision

Regular Agenda

6. Business Arising from the Minutes
   a. Course Evaluation Project Follow-Up
   Decision
   b. Undergraduate Council Follow-Up
   Information

3:50 7. Teaching Presentation – Marcel O’Gorman, director of Critical Media Lab, English Language and Literature
   Information

8. Reports from Committees and Councils
   a. Graduate & Research Council
   Decision
   b. Undergraduate Council
   Decision

9. Report of the President
   a. Environmental Sustainability Strategy Presentation
   Information
   b. Strategic Plan 2013-2018 – Fall 2017 Update†
   Information

4:40 10. Q&A Period with the President
    Information

    a. Sexual Violence Response Coordinator Presentation
    Information
    b. Degrees, Diplomas, and Certificates* [list of graduands to be available for review online prior to the Senate meeting]
    Decision

5:00 12. Report of the Vice-President, University Research*
    Information

5:05 13. Other Business

CONFIDENTIAL SESSION

5:25 14. Minutes of the 18 September 2017 Meeting
    Decision

5:30 15. Business Arising from the Minutes

5:35 16. Naming Proposal*
    Decision
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*to be distributed
†packages will be distributed by mail

25 September 2017
KJJ/ees

Karen Jack
University Secretary
Secretary to Senate
OPEN SESSION

Consent Agenda
The chair welcomed members to the meeting and expressed his hope that all had enjoyed the summer. He welcomed Bryan Tolson to his first meeting as FAUW president and noted the two items at members’ places: the report of the Vice-President, University Research and a handout re: the United Way 2017 campaign. He also advised that a by-election is required for the vacant faculty seat on the Board of Governors due to Sally Gunz’ departure as FAUW president, and that it will occur soon.

Senate heard a motion to approve or receive for information the items on the consent agenda.

Dea and Clubine.

1.  MINUTES OF THE 19 JUNE 2017 MEETING
Senate approved the minutes of the meeting.

2.  REPORTS FROM COMMITTEES AND COUNCILS
Graduate & Research Council. Senate received the report for information.

Undergraduate Council. Senate received the report for information.

3.  REPORT OF THE PRESIDENT
Recognition and Commendation. Senate received the report for information.
4. REPORT OF THE VICE-PRESIDENT, ACADEMIC & PROVOST

Call for Nominations for University Professor. Senate received the report for information.

University Research Chairs. Senate received the report for information.

5. REPORTS FROM THE FACULTIES

Senate received the reports for information.

The question was called and the motion carried unanimously.

Regular Agenda

6. BUSINESS ARISING FROM THE MINUTES

There was no business arising.

7. REPORTS FROM COMMITTEES AND COUNCILS

Graduate & Research Council

Master of Health Informatics. Following Casello’s brief review, Senate heard a motion to approve the deletion of the existing masters in health informatics (MHI) and MHI – co-operative program in computer science, as of January 2018.

Casello and Watt. Carried unanimously.

Undergraduate Council

Articulation Agreement. Senate heard a motion to approve the articulation agreement with George Brown College per the attachment.

Coniglio and Dea.

In discussion, Senate heard that “XX” in the course equivalency list means that there is no equivalent course at Waterloo, and that the language in the agreement is common to other agreements coming from Arts.

The question was called and the motion carried with two abstentions.

2+2 Agreements. Following a review by Coniglio which included some clarifications, including that science and environment are also involved, Senate heard a motion to approve the five new agreements for 2+2 programs with China University of Geosciences Beijing, East China University of Science and Technology, Harbin Institute of Technology, Shandong University of Finance and Economics, and Zhongnan University of Economics and Law effective 1 January 2018.

Coniglio and Peers.

In discussion, Senate heard: the intellectual property framework is being worked on; assessments of the partner institutions are undertaken as to their quality and reputation; no substantive changes will be made to the agreements following Senate’s approval, if given.

The question was called and the motion carried with one abstention.

School of Architecture. Senate heard a motion to approve changes to offerings within the School of Architecture as described in the report.
Coniglio and Freeman.

In discussion: normally, such changes have been delegated to council, but given the number of changes, council thought it necessary to bring them to Senate to satisfy the Institutional Quality Assurance Process; there are some discrepancies between what is presented and what is in the current calendar. Coniglio agreed to follow up with one senator regarding one course offline, and to advise Senate about clarifications regarding the other apparent discrepancies.

The question was called and the motion carried with three abstentions.

Senate heard a motion to the following effects:

Conrad Business, Entrepreneurship and Technology Centre. To approve changes to the minor in entrepreneurship as described in the attachment, effective 1 September 2018.

Conrad Business, Entrepreneurship and Technology Centre. To approve changes to the option in entrepreneurship as described in the attachment, effective 1 September 2018.

Coniglio and Sullivan.

In response to a question, Coniglio agreed to follow up with a senator offline.

The question was called and the motion carried unanimously.

Senate heard a motion to the following effects:

Environmental Sciences. To approve a new plan in environmental science as described in the report, effective 1 September 2018.

Environmental Sciences. To approve a new co-operative plan in environmental science as described in the report, effective 1 September 2018.

Coniglio and Lemieux. Carried unanimously.

8. REPORT OF THE PRESIDENT

The president provided senators with a broad update including: reflections on the recent orientation activities and positive interactions with incoming students and their parents; fall enrollment estimates; congratulations to the new Royal Society of Canada Fellows (David Blowes, Geoffrey Fong, and Weihua Zhuang); new faculty hire data; world university ranking data to date; federal and provincial government developments (Naylor Report and U15 requests, work on a joint collaborative centre with NRC, Sheldon Levy stepping down); the federal Innovation Supercluster initiative with results still to come; a progress update on the Strategic Mandate Agreement (will be posted online once final, graduate student target information); a brief review of the recent Innovation Summit; building activities (new residence is open, Engineering 7 is progressing); HeForShe update (Parity Report to be launched tomorrow, grant and scholarship activities continue as planned); notification that Parry is working on the University’s indigenous strategy and next steps; an update on the President’s Advisory Committee on Student Mental Health activities; a welcome to new executive members (George Dixon, Charmaine Dean, Susan Tighe, Beth Sandore Namachchivaya, and Diana Parry); a report that the search committee for the Vice-President, Academic & Provost has met two times and is making good progress.
9. Q&A PERIOD WITH THE PRESIDENT

After opening the floor to questions, in response to a senator’s inquiry about deferred maintenance and renovation plans with respect to the residences, Glen Weppler, the director of Housing & Residences, advised that capital work is undertaken every year and a long-term plan is being worked on between Housing and Plant Operations regarding renovations. In response to a question about the budget model and teaching activities where one Faculty takes responsibility for teaching material also offered by another Faculty without consultation, the president advised that he is grateful that we now have a model, acknowledged that some issues like this need to be worked out, noted that Susan Tighe’s role will assist the provost with such issues, and asked Tighe to say a few words. Tighe spoke to consultation activities she has undertaken and plans to continue, and invited individuals to raise concerns with their deans so that she will hear about them. Dixon agreed to investigate how many of the 74 new faculty members hired are tenured or on tenure-track.

10. REPORT OF THE VICE-PRESIDENT, ACADEMIC & PROVOST

Course Evaluation Project – Report and Recommendations.

Following Dixon’s brief remarks about the initiative’s process thus far, Coniglio introduced the report and recommendations, tying the project team’s work to the strong academic programming theme of the strategic plan. He thanked the group for its work and invited Senator Seasons, chair of the Course Evaluation Project Team, to make a short presentation outlining key points in the report (the challenges; historical practice; reasons for change; best practices elsewhere; key recommendations, including: changes in terminology, the use of complimentary evaluation methods, three levels of questions, information management protocols and standardization; developing training; the next phase: designing, testing and refining; monitoring, evaluating and revising post-implementation; accessing expert advice; committing resources).

Following Seasons’ presentation, Senate heard a motion to endorse the principles and recommendations provided in the CEPT report dated 27 April 2017 and endorse Phase 2 of the project to commence in fall 2017.

Dixon and Clubine.

In a lengthy discussion, senators heard:

- a suggestion by one member to amend the motion, and subsequent agreement that debate about the original motion should proceed first; followed by agreement by another senator to raise the amendment later in the meeting due to the initiator of the amendment having to leave the meeting;
- support from two senators, separately, for the recommendations and acknowledgement from both that while the plan represents a step in the right direction, it is not the final destination, more will need to be done to address the bias concerns, but what is proposed significantly improves what exists now;
- historical perspective from one senator who was involved in a previous review of this activity ten years ago who advised that many of that group’s recommendations are addressed in this report;
- a commitment from Seasons that bias issues were top of mind for the project team and the intention is to continue to assess and develop the tool once it is in place;
- a suggestion that a distinction needs to be made between the use of course evaluations as tools to improve teaching and tools by which to determine remuneration;
- a response to that point that Policy 77 speaks to how these evaluations are used and a review of that policy was not part of this group’s mandate;
- a summary by one senator of the collection of communications she and another senator received from approximately 30 colleagues regarding the report, including concerns about: bias and the use of course evaluations in relation to compensation not being covered.
properly, the CAUT policy statement regarding the use of these evaluations and OCUFA’s
cautions apparently not being recognized, their potential use as a measure of instructional
quality, and the apparent unwillingness of the project team to consult with Waterloo faculty
with expertise in this area;
• a suggestion that students need an outlet to tell the University about their experiences with
the teaching enterprise, the link to several of the strategic plan’s themes, a suggestion that
bias can be assessed better with data, and a suggestion that faculty concerns about how the
tool is used is an employee relations matter and not one in which either the project team or
Senate should be involved;
• a perspective from a member of the project team who has had much experience with
reviewing evaluations, his support for the motion because it formalizes that which is ad hoc
currently, and that maintaining the status quo does not enable positive change;
• a question as to the University’s support of the in-house built platform, assurances that
security has been addressed, and whether more frequent feedback is possible with this
system (from Andrea Chappell, director Instructional Technologies and Media Services in
IST that indeed support is in place, security has been carefully considered, and the software
is capable of different feedback frequency options);
• a request for clarification as to whether the tool will continue to be used in faculty
performance evaluations and whether this will be considered in phase two, and a response
that since it is a policy matter, it was and remains out of scope for the project team;
• a rejection of the suggestion that biases can be addressed, and a statement by the senator that
he will vote against the motion;
• from another senator that he disagrees bias cannot be addressed as long as the right controls
are put in place;
• a reminder from a senator that any ties to faculty performance require Policy 77 to be
changed;
• a statement that faculty do take student opinions about teaching seriously, but bias is not
properly addressed in the report, and while more has been stated at this meeting about that
subject, what Senate is being asked to approve is less clear;
• a caution that CAUT’s policy statements rarely match Waterloo faculty perspectives and so
its statement on this subject should be considered carefully; and that in the senator’s
experience, bias colours every aspect of performance reviews, so chairs already manage it;
• a reading of the relevant text in Policy 77 (re: Assessment of Teaching, “Student course
evaluations are an important source of information, but they should be supplemented with
peer evaluation of teaching skills, course content and course materials.”) and a caution that a
key problem is that the policy is not applied uniformly.

Seasons thanked Senate for a healthy and constructive discussion which echoes what he has heard
over the last three years. A round of applause followed.

The question was called and the motion carried with ten opposed and one abstention.

As agreed at the start of the discussion, Senator Wray moved the following motion and Senator
Bruce seconded it: that Senate requests that the administration provide sufficient resources for the
development of Phase 2 with the objective of running a pilot in the Fall Term 2017 with the goal of
full implementation in the Winter Term 2018.

In discussion: concern that the timeline is impossible to meet if the process is intended to consider
equity and bias issues properly; a suggestion that while the intention is well meant, the testing and
redesign will suffer if rushed; a request for, and a subsequent commitment to the necessary resources
from the chair and Dixon for the project.
The question was called and the motion was defeated unanimously.

Senator Dea requested to bring a new motion to the floor. Senate heard a motion to strike a working group to research and develop methods of assessing teaching and learning complementary to Student Course Perception surveys.

Dea and Clubine.

The president suggested that this motion be brought forward to the next meeting of Senate, to which both Dea and Clubine agreed and the motion was withdrawn.

11. REPORT OF THE VICE-PRESIDENT, UNIVERSITY RESEARCH
Dean provided members with a brief report on activities and mentioned how pleased she was with the recent achievements of faculty, staff and students. She particularly highlighted the University’s stellar performance with the Ontario Centres of Excellence as noted in her report.

12. OTHER BUSINESS
There was no other business.

Senate convened in confidential session.

30 September 2017
Karen Jack
University Secretary
CONFIDENTIAL SESSION

Confidential minutes have been removed.
Senate Graduate & Research Council met on 11 September 2017, and on behalf of Senate approved the name change of one centre, membership to research ethics committees, curricular submissions, graduate awards and three final assessment reports. Council agreed to forward these items to Senate for information. Council recommends that these items be included in the consent agenda.

Further details are available at: https://uwaterloo.ca/secretariat/committees-and-councils/senate-graduate-research-council

FOR INFORMATION

NAME CHANGE OF SENATE-APPROVED CENTRE
On behalf of Senate, council approved the name change of the Centre for Mental Health Research (CMHR) to “Centre for Mental Health Research and Treatment (CMHRT)”.

MEMBERSHIP TO RESEARCH ETHICS COMMITTEES
On behalf of Senate, council approved new and continuing membership to research ethics committees.

CURRICULAR SUBMISSIONS
On behalf of Senate, new courses, course revisions, course inactivations, and minor program revisions were approved for the Faculties of applied health sciences (kinesiology, recreation and leisure studies) and arts (history, political science, psychology).

GRADUATE AWARDS
On behalf of Senate, council approved the Mechanical and Mechatronics Engineering Graduate Association (MMEGA) Symposium Award, the Lenora Hume International Mobility Award, the Huawei Graduate Entrance Award in Electrical & Computer Engineering, the Chemical Engineering Master’s Presentation Award and the Inch Engineering Research Award.

ACADEMIC PROGRAM REVIEW REPORTS
a. Final Assessment Report – School of Pharmacy [Attachment #1]
b. Final Assessment Report – Intercultural German Studies (MA) [Attachment #2]
c. Final Assessment Report – Master of Mathematics for Teachers (MMT) [Attachment #3].

/ar

Jeff Casello
Associate Vice-President, Graduate Studies and Postdoctoral Affairs

Charmaine Dean
Vice President, University Research
Final Assessment Report
Pharmacy (MSc, PhD)
March 2017

Summary of the Program Review:
In accordance with the University Institutional Quality Assurance Process (IQAP), this final assessment report provides a synthesis of the arm’s length external evaluation and the internal response and assessments of the MSc and PhD programs delivered by the School of Pharmacy. The Self-Study Volume I, was provided to the Associate Provost, Graduate Studies in June 2016. Self-Study Volume I, included program descriptions, learning outcomes, and an analytical assessment of the programs, as well as, the standard data package prepared by the Office of Institutional Analysis & Planning (IAP). Volume II of the Self-Study contained the CVs for full-time tenured, tenure-track positions and continuing lecturers affiliated with these programs.

Two arm’s-length external reviewers were selected by the Associate Provost, Graduate Studies: Professor Afsaneh Lavasanifar (Pharmacy and Pharmaceutical Sciences, University of Alberta) and Associate Dean of Research Stephane Angers (Faculty of Pharmaceutical Sciences, University of Toronto). Professor Lutz-Alexander Busch (Department of Economics) served as the University’s internal reviewer.

Lavasanifar and Angers reviewed the Self-Study documentation and conducted a site visit on November 7-8th, 2016. The visit included interviews with the Vice-President Academic & Provost, Associate Provost, Graduate Studies, Associate Dean, Graduate Studies and Research of the Faculty of Science, the Hallman Director of the School of Pharmacy, Associate Director, Graduate Studies and Research, School of Pharmacy, as well as a Liaison Librarian and Library Department Head of Information Services, various faculty members, administrative staff and a group of current graduate students.

A tour of the School of Pharmacy building included research labs and core facilities, graduate student offices, graduate lounge and animal holding facility. The research labs are an open concept design, well lit, spacious, and nicely finished with excellent bench space and numerous small rooms available for instrumentation, microscopy, tissue culture, radioactive material, freezers, etc. Graduate students/post docs have good work areas within shared office space and a comfortable lounge for informal meetings. The facility does not seem to be completely full and there seems to be some space to grow, especially with some renovations being completed in the basement that could house a biomedical researcher in the future.

March 2017
This final assessment report is based on information extracted, in many cases verbatim, from the self-study, the external reviewers’ report and the program response.

Program characteristics:

**MSc in Pharmacy:** The MSc in Pharmacy program has two fields of study 1) Pharmaceutics: Drug and Vaccine Delivery Systems and Nanomedicine; and 2) Drug Design: Molecular Pharmacology, Pharmacokinetics and Toxicology. These fields prepare students for further academic study or for careers in the pharmaceutical industry or health professions, including those in hospitals, other healthcare facilities and government.

**PhD in Pharmacy:** The PhD program in Pharmacy has one, broad field of study: Pharmaceutical Discovery and Evaluation. The PhD in Pharmacy prepares students for advanced research careers in academia, government, healthcare or industry. The program provides students with the experience and skills needed to be able to design and implement independent and creative research projects, to effectively analyze and evaluate research data, and to communicate their analysis of research data in a variety of academic and non-academic settings. It is expected that their independent work will lead to both peer-reviewed publications and oral conference presentations. Upon graduation, our PhD students are anticipated to make significant contributions in their chosen career path.

**Summary of strengths, challenges and weaknesses based on self-study:**

**Strengths**

- Supportive & encouraging environment; good student/faculty relationship
- Strength and diversity of research faculty
- Pleasant physical working environment, ‘office space and open-concept laboratory space’
- Program offers a cohesive approach with experiences that can cross boundaries within the pharmaceutical sciences or the study of pharmacy practice
- Newly created Associate Dean, Research and Graduate Studies position fosters both research success in the environment and career support within the graduate student community (e.g., bi-weekly research seminars and a research and career skills program)
Challenges/ Weaknesses

- Dynamic changes in the School as it has developed its programs, transitioned to the PharmD (entry-to-practice Doctor of Pharmacy), and finally secured a definite budget
- Task of developing a suitable support structure for pharmacy practice research
- Evolving the program in an environment that is not affiliated to a health centre and not fully familiar with the unique tasks and opportunities that are inherent to a professional school
- Long process to balance the initial emphasis on the pharmaceutical sciences with clinical teaching in the undergraduate program
- Recruitment of a full complement of practice-based faculty (principally qualified Pharmacists) was not complete until 2015
- Greatest weakness for the graduate program itself at this point is the absence of any ‘clinical’ (practice-based) courses
- Having a pharmacy school located in a university that has no medical school or similar institution has perhaps delayed the rapid development of a graduate program with a superior [inter]national profile
- There is a divide between the local operating environment and the practices and potential characteristic of a research endeavor and graduate program within a professional school. These center on two issues: (i) expectations around evaluation of performance (e.g., Evaluation of a trainee in a health professional graduate program is not comparable to that of a trainee in a quantitative program in pure science), and (ii) administrative support (e.g., there are both pharma- and internationally-based research opportunities that are currently not being explored due to a need for more administrative support for research activities)

Opportunities for Improvement and Enhancement

- There is a great deal of interest among current as well as prospective graduate students for a graduate program that includes an aspect of practical training, either through internships and/or co-op programs
- Discussions with industry partners are on-going, and it is expected that within the next two years, these can be included as part of the Pharmacy graduate programs
- The elimination of the post-baccalaureate PharmD program at the University of Toronto has created a void and has led to discussions at both Waterloo and the University of Toronto about the development of a clinical MSc program that would include didactic coursework, advanced clinical training and a clinical research project
Within the Faculty of Science, there are a number of international joint (PhD) degree programs, ranging from 2 + 2 PhD programs (where students spend a total of two years at Waterloo and two years at their home institution) to dual degree and cotutelle programs, which are open for participation in by Pharmacy faculty. These programs provide an opportunity for international collaboration, further enhancing our programs.

Summary of key findings from the external reviewers:
Overall, the reviewers were impressed with the dedication and strength of the faculty members and of the support staff as well as the quality of the graduate programs. Since the last review, several steps were taken towards advancing graduate studies in the School of Pharmacy. These include: the implementation of a seminar series; preparation of a handbook for rules and regulations; and hiring of a lab technician. In the last few years, the School has been focused on the transition to the PharmD program, which required the development and implementation of a new curriculum. This necessitated double teaching duties for most Faculty members (to finish teaching the BSc cohort and begin the PharmD program courses).

Therefore, perhaps expectedly, less attention was directed towards the Graduate programs. As a result, there is a shortage of graduate course offerings, especially in clinical areas and this was identified by the students as a limitation for the programs. Now that the School has reached a critical mass of graduate Faculty members, including in the Pharmacy Practice and clinical areas and that the PharmD curriculum is fully implemented, the School should focus on developing, (or offering on a more regular basis) additional graduate courses especially in the clinical and pharmacy practice areas.

Program response to external reviewer recommendations:
Recommendations

1. We recommend the School to be pro-active and reach out to the Faculty of Science to identify CFI opportunities and secure funding allocations.

Response:
The School of Pharmacy was successful in receiving a CFI allocation for the Fall 2016 JELF competition. Unfortunately this grant was not successful and the School intends to re-apply in the Fall 2017 competition.
2. We recommend use of a shuttle system or allocation of transportation funds to individual graduate students to facilitate transport of supplies and movement of students between the main campus and the School.

Response:
The School currently provides a shuttle service between the Pharmacy building and the main UW campus for transportation of research samples and supplies; this service is to be used only where transportation of materials is required, and not for general transit between campuses. All UW students have access to Grand River Transit, which operates multiple bus routes that stop at both the Pharmacy building and on main campus, providing excellent transportation options to graduate students; this service is included in the graduate student fees for full-time service, allowing them access to the transit system at no additional cost. In 2018, a new light rail transit system will begin operation within the Region of Waterloo, with stops right outside the Pharmacy building and on the main campus; this will provide even more transportation options for students.

3. We recommend that the University and School of Pharmacy think about a sustainable budget plan that can guarantee the stipend for at least 4 years (during the funding cohort) for PhD students and 2 years for MSc students in both streams should the research funding of the supervisor face trouble in renewal.

Response:
The School of Pharmacy is currently working with both the Faculty of Science and the Graduate Studies Office to develop a funding strategy for students should supervisor funding not be renewed.

4. We recommend that the School reaches out to the Graduate Office of the Faculty of Science to explore alternative funding strategies and models for graduate student support.

Response:
See response 3, above.

5. Development of a recruitment strategy for attracting excellent, prospective graduate students is strongly recommended.

Response:
The Faculty of Science Graduate Studies and Research committee (of which the School of Pharmacy is a part) is currently developing recruiting strategies to recruit outstanding potential graduate students. A key component of this is a complete redesign of Graduate Studies web pages both within the School of Pharmacy and the Faculty of Science. The new Pharmacy

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Graduate Studies web page can be found at https://uwaterloo.ca/ pharmacy/ graduate-students-0.

6. The School should focus on developing, (or offering on a more regular basis) additional graduate courses especially in the clinical and pharmacy practice areas

**Response:**
The School is committed to the development of additional graduate courses and several strategies will be employed to increase the number of course offerings. The Associate Director, Research and Graduate studies will work with the Associate Director Curriculum and the Curriculum Committee to examine courses in the PharmD curriculum which could be offered to graduate students with additional assignments and/or assessments. Similarly, we will explore opportunities for the delivery of courses in conjunction with other academic units (e.g., School of Optometry; Faculty of Applied Health Sciences) that could be team taught, decreasing the workload for faculty offering graduate courses. In addition, the School will work with the offices of the Dean of Science, and the Associate Dean of Science for Graduate Studies to examine ways in which recognition of, and reward for graduate teaching can be provided.

One option may be to advertise our graduate course offerings to other departments, increasing the enrollment to a level such that the course could be counted towards a faculty member’s teaching load; as an example, because our core course must be delivered at a minimum of once per year, the faculty member delivering this course does receive credit for it with respect to their annual teaching load. The Graduate Studies and Research Committee will also work to develop terms of reference for a new school award for Outstanding Teaching in the graduate program.

With respect to “additional graduate courses especially in the clinical and pharmacy practice areas” the School is exploring the development of a new clinical MSc and/or PhD program. The goal of the program will be to develop clinical scientists and medication experts to meet the needs of academia, government, and health care institutions. It is likely that a number of clinical and applied courses would need to be developed to support this program. The continued growth of the faculty at the School of Pharmacy and the possibility of offering courses jointly with University of Toronto should make the development of this program feasible within the next three years. A new faculty member in clinical pharmacy has been recruited (JM Gamble) and will begin his appointment in September 2017. The School is anticipating a second new hire in this area in late 2017/early 2018.
Additional Reviewer Comments and Suggestions:

Comment:
Some students commented that the name of the degree could be misleading. Indeed, a designation of MSc or PhD in Pharmaceutical Sciences could better represent the scholarly activities of the School. However, it is likely that administrative constraints prevent changing the designation of the degree. In any case, this could be explored. (External Reviewer’s Report pg. 3)

Response:
The School is comfortable with the current name. The names of the graduate programs (MSc in Pharmacy and PhD in Pharmacy) were originally approved by the Ontario Council on Graduate Studies in 2010 and 2012, respectively. At the time of program submission, the names of the programs were chosen to broadly encompass research in all relevant areas of Pharmacy, including Pharmacy Practice, Clinical Pharmacy, and Pharmaceutical Sciences.

Comment:
Both students and faculty voiced the necessity for the development and consistent offering of more graduate courses at the School of Pharmacy particularly in the clinical stream. Several limitations restricting the capability of the faculty in offering of Pharmacy based graduate courses were recognized. To overcome the problem, development of hybrid courses that can be taken by both PharmD students and graduate students was suggested. In this case, the expectations for completing the course may be different for the graduate students. For instance, the graduate students may be required to complete an additional essay or term paper. We also suggest that the School thinks about avenues to reward graduate teaching as part of their evaluation system to incentivize Faculty members to develop new courses and offer them on a regular basis. (External Reviewer’s Report pg. 4)

Response:
As suggested, we may be able to offer some of our current courses in the PharmD curriculum to graduate students with the graduate students completing additional assignments. Faculty can and will receive appropriate recognition for offering graduate courses in our annual performance review process, particularly when courses benefit students from multiple laboratories/research programs. We also remain committed to offering new clinical graduate programs which will require the development of a number of new courses. The School will soon have a sufficiently large complement of clinical/applied faculty to be able to offer a clinical MSc/PhD program and we have recently hired a staff member to provide guidance and support for obtaining the necessary approvals for these new programs.

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The School of Pharmacy is exploring the possibility for the development of graduate industrial internship. This is recognized as a positive addition to the program. The timing of the program was discussed, and we suggest that students be allowed to participate in internships or co-op only upon completion of all their program requirement and before the thesis defence. (External Reviewer’s Report pg. 4-5)

Response:
The Director and Associate Director, Research and Graduate Studies are working with various potential industry partners to explore opportunities for internships/co-op work placements. Should these opportunities become available, the above suggestion with respect to timing of the internships will be considered. We note that our experiences gained from our co-op PharmD program is that students are often more engaged with certain subject matter if they have been exposed to it, or have gained relevant experience related to such material in “real-world” settings. There may be benefit associated with having such internships take place early in the program, as opposed to after the completion of all other degree requirements.

Appropriate policies and procedures are in place for monitoring the progress and performance of students through graduate supervisory committee meetings. MSc students interested to transfer to the PhD program or direct entry PhD students are expected to complete a “comprehensive exam” within 2 years in the program. Whether this consists of a true traditional “comprehensive exam” that tests the depth of knowledge of the students on all aspects of the Pharmaceutical Sciences/Clinical Pharmacy or this is a more typical “transfer exam” that assess the knowledge on topics more directly related to the project of the students was unclear. If the latter, perhaps this exam should be re-named “Transfer exam” (for MSc) or “Qualifying exam” (for direct entry students). It is also suggested that this exam become more structured, with members of the supervisory committee determining the areas to be covered in the exam beforehand. (External Reviewer’s Report pg. 5)

Response:
The “Comprehensive Exam” terminology applies to all PhD programs across the University of Waterloo and is a requirement for all PhD programs; as such, renaming the exam is not feasible. With respect to exam structure, currently supervisors are required to submit the names of the Comprehensive Examination Committee members (may or may not be the same as the Supervisory Committee) and the proposed topics and literature references to the Associate Director 10 weeks in advance of the examination date. References are then provided to the student 8 weeks in advance of the examination date. Approximately 4 weeks prior to the

March 2017
examination, the supervisor provides both the proposed questions (3 per examiner) along with an outline of expectations for a “correct” answer. The questions are reviewed and approved by the Associate Director. This process is similar to those of other departments/schools within the University and appears to be consistent with the above recommendation. It may be the case that more detailed information regarding the timelines for the Comprehensive Examination need to be provided to graduate students, and the Graduate Officer will prepare a “Comprehensive Examination Information” document which can be provided to graduates students with questions about the process.

The School has experienced a healthy increase in funding from industrial partners and public non-profit sector in recent years, which is very good. Several faculty have been successful in CFI and NSERC RTI Funding for infrastructure. *Faculty members will need to continue seeking new and innovative sources of research funding. The initiative in industry/community partnered research is a good avenue.* (External Reviewer’s Report pg. 5-6)

**Response:**
The School of Pharmacy was successful in receiving a CFI allocation for the Fall 2016 JELF competition that was unfortunately not funded. This grant will be revised and resubmitted in the Fall 2017 competition. The Associate Director will work with faculty members to explore other avenues for industry/community sponsored research.

Most faculty have been involved in the supervision of MSc and PhD students. *When needed, Clinical Faculty may benefit from mentoring to ensure success in the supervision of graduate students in MSc, PhD and forthcoming clinical MSc program.* (External Reviewer’s Report pg. 6)

**Response:**
There are a number of mentoring opportunities available to all faculty members engaged in the supervision of graduate students that include: mentoring by other senior faculty within the School of Pharmacy; participation in graduate supervision workshops offered by the Center for Teaching Excellence; and participation as a member of a graduate supervisory committee. As the possibility of a clinical MSc program is developed, clinical faculty will be consulted regarding any additional mentorship (particularly in a clinical setting) which may be required. In addition, the Director and Associate Directors within the School will investigate a more formalized mentoring program for faculty within the School of Pharmacy, in which junior faculty are paired with one or more senior faculty members for mentoring in areas of graduate supervision, granting strategies, and graduate course development.
A minimum stipend is available to students. This minimum level has been increased since last review by more than $2000/year, to $22,350 and $33,630 per year for domestic and international students, respectively, but it still seems modest. The Faculty of Science contributes $3,000/IMSc and $6,000/PhD students. We recommend that the University and School of Pharmacy think about a sustainable budget plan that can guarantee the stipend for at least 4 years (during the funding cohort) for PhD students and 2 years for MSc students in both streams should the research funding of the supervisor face trouble in renewal. (External Reviewer’s Report pg. 7)

**Response:**
See response 3 (page 5).

There appear to be sufficient travel funds for graduate students to present their research at scientific conferences. However, the distribution structure of the funds may be revised for better use of the available resources. For example, instead of offering $500/year to each student which is not enough to even cover the expenses of a flight, allocation of $1000-2000 per program (MSc and PhD) for each student may be considered. (External Reviewer’s Report pg. 7)

**Response:**
Offering smaller amounts of funding (e.g. $500 per student) allows us to support the travel needs of a larger number of students. We are aware that it would be ideal to be able to offer larger amounts per student and the School will continue to explore additional funding opportunities in this area.

*Development of a recruitment strategy for attracting excellent, prospective graduate students is strongly recommended. It is apparent that there may be opportunities to expand the number of students holding Tri-Council funding or other scholarships. Some faculty mentioned that the timing of the application for the recruitment scholarships offered by the University (May of each year) is too late for the recruitment of good students as those individuals are usually proactive and apply to other competitive institution perhaps in January. The timing of scholarship announcements should be re-examined.* (External Reviewer’s Report pg. 7)

**Response:**
Unfortunately the School of Pharmacy has little control over the timing of University scholarship applications. The School of Pharmacy, along with the Faculty of Science and Graduate Studies and Postdoctoral Affairs, is working to improve the timeline associated with student acceptance timelines as a means of helping to alleviate the issue of scholarship.
applications vs. recruiting. The School will examine recruitment strategies employed by other departments and faculties that are used to attract major scholarship holders (such as direct-entry to PhD (currently offered), and top-up funding).
## Implementation Plan:

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Proposed Actions</th>
<th>Responsibility for Leading and Resourcing (if applicable) the Actions</th>
<th>Timeline for addressing Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. We recommend the School to be pro-active and reach out to the Faculty of Science to identify CFI opportunities and secure funding allocations. (External Reviewer’s Report pg. 6)</td>
<td>The School of Pharmacy was successful in receiving a CFI allocation for the Fall 2016 JELF competition. This was unsuccessful. The proposal will be revised and resubmitted in the Fall 2017 competition.</td>
<td>Associate Director, Graduate Studies and Research</td>
<td>October 1, 2017 submission deadline.</td>
</tr>
<tr>
<td>2. We recommend use of a shuttle system or allocation of transportation funds to individual graduate students to facilitate transport of supplies and movement of students between the main campus and the School. (External Reviewer’s Report pg. 6)</td>
<td>All UW students have access to Grand River Transit (this service is included in the graduate student fees for full-time service, allowing them access to the transit system at no additional cost), which operates multiple bus routes that stop at both the Pharmacy building and</td>
<td>N/A</td>
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<table>
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<tr>
<th></th>
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<th>main campus, providing excellent transportation options to graduate students; In 2018, a new light rail transit system will begin operation within the Region of Waterloo, with stops right outside the Pharmacy building and on the main campus; this will provide even more transportation options for students.</th>
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<tbody>
<tr>
<td>3.</td>
<td>We recommend that the University and School of Pharmacy think about a sustainable budget plan that can guarantee the stipend for at least 4 years (during the funding cohort) for PhD students and 2 years for MSc students in both streams should the research funding of the supervisor face trouble in renewal. (External Reviewer’s Report pg. 7)</td>
<td>The School has implemented a process for approving bridging funding for these situation. Supervisors must first apply to both GSPA and the Faculty of Science bridge funds before being approved at the School level.</td>
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<td>4.</td>
<td>We recommend that the School reaches out to</td>
<td>Currently in progress.</td>
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March 2017
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<tr>
<th></th>
<th>the Graduate Office of the Faculty of Science to explore alternative funding strategies and models for Graduate student support. (External Reviewer’s Report pg. 7)</th>
<th>Research and Graduate Studies</th>
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<tbody>
<tr>
<td>5.</td>
<td>Development of a recruitment strategy for attracting excellent, prospective graduate students is strongly recommended. (External Reviewer’s Report pg. 7)</td>
<td>Redesign of School Graduate Studies Web page Work with Faculty of Science on Faculty-wide recruiting strategies Incentive (bridging) funding for domestic students</td>
<td>Associate Director, Research and Graduate Studies</td>
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<td>Completed</td>
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<td>Currently available</td>
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<tr>
<td>6.</td>
<td>The School should focus on developing (or offering on a more regular basis) additional graduate courses especially in the clinical and pharmacy practice areas. (External Reviewer’s Report pg. 8)</td>
<td>Consult with undergraduate curriculum committee to explore possibility of hybrid courses</td>
<td>Associate Director, Research and Graduate Studies</td>
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<tr>
<td></td>
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<td>Feasibility assessment Completed Implementation Fall 2017 New hybrid course offerings Fall 2018</td>
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<table>
<thead>
<tr>
<th>Provide relief from undergraduate teaching to clinical faculty to free time for development of graduate courses</th>
<th>Hallman Director, School of Pharmacy</th>
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<tbody>
<tr>
<td>Develop a new clinical MSc and/or PhD program</td>
<td>Associate Director, Research and Graduate studies and Graduate Studies and Research Committee in conjunction with clinical/practice faculty</td>
</tr>
<tr>
<td>Teaching relief begins Winter 2018 Course development Winter/Spring 2018 New graduate course offerings Fall 2018</td>
<td>A new clinical graduate program will require the approval of the provincial government. Draft program proposal FALL 2017 Submission of program proposal to Senate FALL 2018 Submission of program proposal to OCGS Spring 2019 Site Visit and program approval Fall 2019 First student admissions Fall 2020</td>
</tr>
</tbody>
</table>

The Department Chair/Director, in consultation with the Dean of the Faculty shall be responsible for monitoring the Implementation Plan.

March 2017
Final Assessment Report
Intercultural German Studies (MA)
June 2017

Summary of the Program Review:
In accordance with the University Institutional Quality Assurance Process (IQAP), this final assessment report provides a synthesis of the external evaluation and the internal response and assessments of the program (MA) delivered by the Department of German and Slavic Studies (GSS). A self-study (Volume I) was submitted to the Associate Provost, Graduate Studies (APGS) on September 14, 2016. The self-study presented the program descriptions and learning outcomes, an analytical assessment of this program, and program data including both the standard package prepared by the Office of Institutional Analysis & Planning (IAP) and data collected from a student survey. Appended were the course outlines for all courses in the program and the CVs (Volume II) for each full-time faculty member in the Department.

Two arm’s-length external reviewers (Volume III), (Dr. Glenn Levine, Professor of German, University of California and Dr. Stephan Jaeger, Professor of German, University of Manitoba) were ranked and selected by the APGS; in addition one internal reviewer (Dr. Stephen Evans, Professor of Earth and Environmental Sciences) was selected by the APGS.

The reviewers were provided the self-study documentation and then conducted a site visit to the University of Waterloo on October 13-14, 2016. The visit included interviews with: the Vice-President Academic and Provost; Associate Provost, Graduate Studies; Dean of the Faculty of Arts; Arts Associate Dean of Graduate Studies; Chair of the Department of Germanic and Slavic Studies; Faculty members; and staff. The review team also conducted meetings with a group of current graduate students. Because this program is joint with the Universitaet Mannheim in Germany, the graduate student meeting took place both in Waterloo and via the internet with students currently in Germany. Done through Adobe Connect with reviewers in a faculty member’s office and with four IcGS MA students in Mannheim (3 Canadian cohort; 1 German cohort).

This final assessment report is based on information extracted, in many cases verbatim, from the self-study, the external reviewers’ report and the program response.

Program characteristics:
Master of Arts in Intercultural German (IcGS) is an innovative, Bologna-compliant MA program, first accredited in 2011, in both Ontario, Canada and Baden-Wuerttemberg, Germany. IcGS
combines the academic study of linguistics/applied linguistics and literary/cultural/media studies with intercultural and experiential elements. Over two-years, study is divided equally between the University of Waterloo and Universitaet Mannheim, where co-mingled student cohorts from each institution follow an almost identical course of study that also corresponds to each university’s specific institutional structure.

**Summary of strengths, challenges and weaknesses based on self-study:**

**Strengths**

- Unique intercultural focus
- Excellent collaborative relationship between University of Waterloo and partner institution in Germany (Universitaet Mannheim)
- Student exposure experiential learning by studying and living abroad
- High student satisfaction
- Since its inauguration, the program has had no withdrawals and a 100% graduation rate
- Grant-funded research on best practices in studying abroad

**Challenges**

- Recruitment of Canadian students
- Increasing visibility of program in Canada and abroad
- Restricted selection of courses at University of Waterloo
- Co-supervising/co-assessing theses written in Germany (Recommendation 5)
- Intricate program structure requires a larger than usual amount of student advising
- Challenge in securing funding as Deutscher Akademischer Austauschdienst (DAAD) or German Student Exchange Service in English, cancelled their support which means students lose some financial support that helped pay for some subsistence
- Lack of available teaching and student space within Department

**Weaknesses**

- Immense efforts to attract Canadian students have not always resulted in the targeted enrolment numbers
- Space issues as mentioned under “Challenges”
- Measuring long-term program outcomes as German students tend to be disinterested in contact with their alma mater
Summary of key findings from the external reviewers:

MA in Intercultural German goes well beyond any conventional MA to integrate experiential learning, intercultural learning and engagement in nearly every phase of the student’s educational experience. The IcGS program is genuinely innovative and should serve as a model not only to German Studies programs in Canada, the US and elsewhere, but rather also for other programs offering graduate degrees in languages other than English.

The reviewers were “deeply impressed with how well all faculty members work together, which is, unfortunately, uncommon in a large department with this sort of balance between applied linguistics/linguistics and literature/media studies. An interdisciplinary, intercultural program of this sort with a high output in experiential learning and an international joint degree requires a very well-functioning, enthusiastic and highly committed faculty. We are pleased to report that this is the case.”

“What struck us the most was that the program does not have weakness in its pedagogy and programmatic set-up, or in its administration or advising protocols. The only areas for improvement we observed have to do with promotion of the program and recruitment of students, which we detail in the final Recommendations section below.”

Program response to external reviewer recommendations:

Recommendations

1. Change of admission requirements. We recommend that the program prioritize attracting greater numbers of potentially qualified domestic Canadian applicants to the program...[by] reforming the program admission requirements, to open it to students general German major programs...as well as in other fields in the humanities and social sciences....such as history, philosophy, art history, European Studies, political science, and international studies (instead of restricting it to students from German programs). This should be implemented as soon as possible.

Response
The GSS Department fully agrees with this recommendation, and voted on changing the wording for the admission requirements at its November 2016 meeting. Pending further University approval, these changes will be implemented in Winter 2017. This will allow
in particular Canadian applicants whose background has not been in German Studies per se to potentially enrol in this graduate program, since the Canadian pool of optional students in German in Canada is small.

Even though lcGS has succeeded in attracting students to the program from across the country, the GSS faculty understand that we need to continue recruiting a sufficient number of excellent Canadian students as well as potentially broaden our recruitment potential.

2. **Create one study position for a US student.** “Simply put, to our knowledge there is no program in the US that even comes close to the innovative goals, structure, depth and breadth of curricular content, and programmatic outcomes of the Waterloo-Mannheim joint degree program. We therefore recommend that the University of Waterloo facilitate the allocation of the funds to support one member of each year’s cohort from the United States, which according to discussions during our visit would cost roughly $30,000 per student (for the two-year period of the MA program). This would permit the Department to promote the program widely in the US, which would mean Waterloo could then accept the very best student from among the applicants.”

**Response**
The Department fully agrees with the reasoning of the reviewers. We also welcome the recommendation and are eager to find the funding to carry it out. Currently, resourcing such a position are beyond the Department’s resources. The Department will continue to apply for external scholarships for students and explore other options to increase base funding.

3. **Promotion of the program at home and abroad.** The reviewers suggest that although Graduate Studies and the Faculty of Arts already provide some support regarding marketing of program, they argue that “Graduate Studies and the Faculty of Arts provide ample support for the production and dissemination of both paper and digital promotional materials, including posters, brochures, fliers, etc.” The reviewers also recommend the Department should “consider facilitating travel of current students or recent graduates to institutions around Canada to promote the program.”

**Response**
The Department agrees that there is a need to update existing promotional materials (e.g. a poster done internally, the Arts flyer promoting all German grad programs together). A flyer specifically promoting the lcGS is now in the works. While the Department is grateful for the financial and personal resources made available for this purpose from the Faculty of Arts for this redesign, the reviewers point out the need for
expert help, which would require additional financial support. Also, the Departments' students and recent graduates are interested in promoting the program at other institutions, and we are exploring ways to raise the financial support to do so. We are currently exploring a more systematic approach to following the professional paths of our students for their post-graduation achievements for which the Chair will solicit the input of the Alumni Office. The GSS faculty has started promoting the IcGS program in the Departments' first and second year German program and a more systematic approach for this is under development.

4. **Importance of campus profile and visibility.** The reviewers encourage the Faculty of Arts and the Graduate Studies Office to highlight the IcGS program as a model of intercultural engagement and international institutional cooperation and experiential learning.

**Response**
The Department welcomes this recommendation and the GSS faculty will discuss a plan with the Arts Communication Manager on a date to be scheduled for winter 2017. A Graduate Recruitment/Promotion Office at the University (a possibility currently being discussed) or other University support would be useful.

5. **Programmatic recommendations: Advising of students.** Canadian students should, prior to departure for Mannheim or upon arrival, be provided with a detailed orientation on aspects of the German academic system, including the writing of German academic papers, class presentations, and other genres of academic work. Additionally, Waterloo students’ advising upon their return to campus should be enhanced. Lastly, both groups of students, would benefit from more concrete and targeted advising for the summer period between the two respective study abroad semesters.

**Response**
The Department welcomes these recommendations. The Graduate Officer has integrated the "orientation on aspects of the German academic system" into the already existing pre-departure workshop, and will continue to do so. We are also working with the University of Waterloo library to acquire some reference works on the German academic system, especially the writing of German academic papers, class presentations, and other genres of academic work. With regard to better advising for the summer period and for the time after, a committee of faculty, current students and
alumni chaired by the Graduate Officer is in the process of developing a plan for better procedures. Advising will also be done with regard to the restricted number of courses the department is able to offer (5-6 per year). There is the possibility for students to take other courses in the Faculty of Arts.

6. **Funding.** This is not a formal recommendation, but embedded within the reviewers’ report: Market program as “fully funded” since students receive a strong and competitive financial package with the base funding of $15,000/year (disregarding the fees for international students), an additional travel grant through donations received by the Waterloo Centre for German Studies (WCGS) on the UW campus, and a small remuneration for experiential learning components that students receive from our partners in Mannheim

**Response**

Although not a formal recommendation, but a statement by the reviewers, this is our comment: As long as these funds are stable, the GSS faculty feels that this program can indeed be called "fully funded". In addition, the department, together with partners in Germany, will continue to apply for external funding, whenever possible, in order to leverage the costs for students, which are not inconsiderable due to the international aspect of the program and to the high demands that require a full-time commitment such that students cannot take on part-time work outside of their TA/RA work. One present example to acquiring such external funding is the successful Erasmus+ application by Mannheim partners for 2017-2018, which includes funding for Joint lGGS MA students’ and lGGS staff mobility.
**Implementation Plan:**

<table>
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</thead>
<tbody>
<tr>
<td>1. <em>Change of admission requirements</em></td>
<td>Graduate Officer rewrote admission requirements</td>
<td>Graduate Officer</td>
<td>Nov 2016 - vote in department done W 2017 - passed GAG</td>
</tr>
<tr>
<td>2. <em>Study position for a US student</em></td>
<td>Initial discussion with Linda Warley and Jeff Casello at December 2016 Department meeting</td>
<td>Graduate Officer/Chair initiated discussion; resourcing beyond department</td>
<td>Under consideration by the AVPGSPA and Associate Dean, Graduate Studies</td>
</tr>
<tr>
<td>3. <em>Promotion of the program at home and abroad</em></td>
<td>a) promotion emails to German Studies lists in Canada/internationally, emails to colleagues at universities in the US sent; create IcGS flyer (rather than poster and bookmarks as in the past) b) explore possibility of student travel for promotion c) devise strategies for better tracking of alumni</td>
<td>a) Graduate Officer/GSS faculty; Graduate Officer/ Faculty Associate Dean of Arts b) pending on resourcing beyond Department c) Department/Alumni Officer d) UG Officer</td>
<td>a) promotion e-mails done in Fall 2016; will be done every year; IcGS flyer by Fall 2017 b) Ongoing c) by December 2017 d) Immediately</td>
</tr>
<tr>
<td></td>
<td><strong>Campus profile and visibility</strong></td>
<td>Find strategy/plan for opportunities to promote the IcGS program on campus</td>
<td>Chair/Graduate Officer, Arts Communication Manager</td>
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<tr>
<td>4.</td>
<td><strong>Advising of students</strong>&lt;br&gt;a) pre-departure (esp. German system)&lt;br&gt;b) return and summer advising</td>
<td>a) make part of fall workshops&lt;br&gt;b) discuss and create advising procedure plan</td>
<td>a) Graduate Officer, library liaison&lt;br&gt;b) Graduate Officer/department</td>
</tr>
<tr>
<td></td>
<td><strong>Funding</strong></td>
<td>Explore other potential funds to leverage the costs for this international program</td>
<td>GSS faculty, Chair</td>
</tr>
</tbody>
</table>
The Department Chair/Director, in consultation with the Dean of the Faculty shall be responsible for monitoring the Implementation Plan.
Date of next program review: 2024

Signatures of Approval:

Chair/Director
Date

AFIW Administrative Dean/Head (For AFIW programs only)
Date

Faculty Dean
Date

Associate Vice-President, Academic
(For undergraduate and augmented programs)
Date

Associate Vice-President, Graduate Studies and Post-Doctoral Affairs
(Formerly known as the Associate Provost, Graduate Studies)
(For Graduate and augmented programs)
Date
Final Assessment Report
Master of Mathematics for Teachers (MMT)
May 2016

Review Process
The review covers the Master of Mathematics for Teachers (MMT) program, which is housed in the Centre for Education in Mathematics and Computing (CEMC). The review was led by the Director of the MMT, who consulted with the MMT Graduate Committee, with the faculty who teach in the MMT, with the CEMC Administrative Assistant (who also acts as the Graduate Coordinator for the MMT), and with the CEMC Business Manager (who handles finances for the MMT), as well as with the previous and current Associate Deans, Graduate Studies, for the Faculty of Mathematics. Feedback from roughly 50 graduates of the MMT who had previously responded to a post-graduation survey was also incorporated. The MMT was launched in 2010, and so this was the first review of the program, and so there were no previous recommendations to which to respond.

The self-study documents were assembled over the first half of 2015. The MMT external review was undertaken by Dr. Doug McDougall (Professor and Associate Dean, Programs, from the Ontario Institute for Studies in Education at the University of Toronto) and Dr. Gerda de Vries (Professor and Associate Chair, Undergraduate, from the Department of Mathematical & Statistical Sciences at the University of Alberta). The internal reviewer was Dr. Paul Ward from the Department of Electrical and Computer Engineering. The site visit occurred on Friday 29 January 2016.

The Program
The MMT is a part-time, online only, professional Master's program aimed at current high school teachers. The MMT is an outreach program created to strengthen the mathematics abilities of teachers and enrich their appreciation of the breadth and utility of the discipline. Most teachers in the program teach full-time while taking one or more courses each term. The primary goal of the program is to help current teachers deepen their knowledge of mathematics. A secondary goal is to help teachers become aware of the breadth of the mathematical sciences.

The MMT is housed in the CEMC, which is a unit within the Faculty of Mathematics. The CEMC aims to increase enjoyment, confidence and ability in these disciplines among students and teachers in Canada and internationally. Through contests, face-to-face workshops, online courseware and resources, and this online Master’s degree, the CEMC provides curricular and enrichment support to elementary and secondary schools. The activities of the CEMC emphasize the relevance and importance of mathematics and computer science in the 21st century. Each year, the CEMC reaches hundreds of thousands of students and teachers through its contests and website, and tens of thousands through its face-to-face workshops.

The faculty members who participate in the MMT come from almost all units in the Faculty of Mathematics. Each of these faculty members has primary duties within his or her home unit, and then participates in the MMT with consent from his or her Chair/Director. Despite the fact that there are no faculty members whose primary responsibility is to the MMT, the program receives strong support and commitment from across the Faculty, chiefly in the form of support from units in allowing some of their
best instructors to participate in MMT course development and instruction and in providing many of their highest-rated teaching assistants to MMT courses.

The faculty members who have developed MMT courses, regularly teach in the MMT, and/or participate in MMT oversight represent a broad cross-section of the members of the Faculty of Mathematics, from Lecturers with no research or supervision component to their appointment to full Professors with active research and supervision programs. This spectrum is crucial to the success of the MMT, as it allows courses to be created and taught from a variety of different perspectives, each of which is of value to the audience.

It is worth noting that among the 15 core faculty members, there are four winners of the University’s Distinguished Teacher Award and four winners of the Faculty of Mathematics Award for Distinction in Teaching. This demonstrates quite ably the care for and abilities in education among those with important roles in the MMT.

Since the MMT is a course-based, part-time, professional Master’s program, there is no explicit traditional research component to the program, nor is funding available from the University to MMT students. Most of the faculty members associated with the MMT are Lecturers with no research component to their appointment, but with strong interests and abilities in teaching and education.

The MMT does have a “supervision component” through its capstone project, which is a required component of the program taken by each student through the course MATH 699. Through their work in MATH 699, students will design a mini-course on an approved subject in mathematics. As part of their project, students are required to design lessons and create problems and solutions to accompany these lessons. The capstone project is designed to give students an opportunity to work on an independent project that demonstrates their knowledge of the subject matter that they teach and/or the knowledge that they have gained in the program and to provide a forum for bringing that knowledge into their own classroom. Each student working on his or her capstone project is assigned a capstone reviewer. Because the MMT is an online program, this review is done remotely. Because of the “school” focus of these projects, this supervision/review is done in a non-standard way, using a combination of faculty members (some of whom are also involved in the program in other ways) and retired secondary school teachers.

As an online program, the MMT does not have laboratory facilities, computing facilities, or graduate student space.

Specific Learning Outcomes
The CEMC expects that every graduate of the MMT can:
• Demonstrate broad understanding of several areas of the mathematical sciences and their applications in the real world and apply this knowledge to their professional practice
• Demonstrate a deep understanding of one or more areas of the mathematical sciences and their applications in the real world and apply this knowledge to their professional practice
• Analyze and create solutions to problems and formal arguments using curriculum topics taught in secondary school and using mathematical topics that underpin the secondary school curriculum
• Understand connections between diverse fields in mathematics and how these relate to the curriculum they are teaching
• Communicate, to their colleagues, their students, and their students’ parents, the importance of mathematics, both for its inherent beauty and for its applicability to other fields and to society
• Produce self-contained, rigorous and effective activities and mini-courses designed for enrichment and curricular use, including teaching materials and student tasks
• Evaluate their own mathematical strengths and weaknesses, understand the limits of their own knowledge in fundamental areas of mathematics, and develop ongoing strategies to improve their abilities

MMT Courses
Since its launch in September 2010, the MMT has progressed from a single online course to a suite of 24 online courses that that were offered by Winter 2016. Most MMT courses have an enrollment of between 30 and 60 students, although some classes have been as large of 100.

Students access course materials through LEARN. Lectures are available as videos that can be watched online or downloaded to the student’s computer. In most course offerings, all lecture material is available at the beginning of the course. Assignments and other resources are posted on LEARN and can be downloaded. Courses use a combination of electronic assignments (multiple choice quizzes) and written assignments that are completed by the students and uploaded to LEARN. Written assignments are electronically hand-marked by graduate students in the Faculty of Mathematics and returned, with comments, to the students through LEARN. LEARN also has Discussion Boards where students can post questions and respond to other students’ questions. Course instructors and teaching assistants can post responses to questions on the Discussion Boards. Students also communicate with instructors through email. MMT instructors respond to virtually all questions via email and Discussion Boards within 24 hours. Because of the assessment structure of MMT courses, there have been occasional concerns raised about academic integrity; after a number of conversations within the program and within the faculty, we are satisfied that this is not a significant concern.

Most MMT courses are offered once per year or once every second year. The MMT has a single entry point (Fall) which allows all incoming students to take MATH 600 (Mathematical Software) and MATH 692 (Mathematical Proofs) in their first term. These consecutive six-week courses help to give all students in the program the tools that they need to continue and succeed. MATH 699 (Capstone Project) is normally offered in both Winter and Spring each year. In most terms, the MMT offers between 1.5 and 2.5 units of courses.

Students
Since Fall 2010, more than 400 students have started the MMT. As of Spring 2016, there are more than 180 graduates with 190 students currently in the program. Retention for each cohort of students admitted to date is between 85% and 91%. Roughly half of the students in the program live and work in Ontario, and roughly 20% live and work outside of Canada. Many of these “international” students are in fact Canadian citizens working in international schools abroad.

In practice, the range of backgrounds of mathematics teachers in the province of Ontario and across the country is enormous. While some such teachers have mathematics degrees or science degrees in a more technical field, many more are teaching secondary school mathematics (and are even teaching senior courses such as Calculus) with only three or four post-secondary mathematics courses in their academic background. As a result, the program has adopted the approach of admitting teachers with at least three or four mathematics courses in their post-secondary background whose academic and professional backgrounds suggest that they have a chance of success in the program, and letting them
determine whether or not they have the ability to succeed. Since most applicants to the program have been away from formal learning for at least a few years, their academic background seems to be less correlated to their success in the program than their willingness to learn and work. It is also worth noting that, from the perspective of trying to improve mathematics education in Ontario and in Canada, it is likely those with the weakest backgrounds who gain the most from their pursuit of and success in the MMT.
In each of Fall 2014 and Fall 2015, roughly 100 applications to the MMT were received and roughly 70 students began in the program. We anticipate similar numbers in Fall 2016.

**Strengths and Challenges**

Some of the strengths identified in the self-study document were:

- Meeting a clearly identified need among mathematics educators
- The focus of the program on the broadening and deepening the mathematical knowledge of teachers thus instilling greater understanding and confidence in their mathematical skills, and thereby enhancing their classroom teaching
- Some of the best instructors in the Faculty of Math as course authors and instructors
- Willingness of the instructors in the program to be available for frequent online questions, especially during evenings and on weekends, at which times professional teachers are most likely to be working on their course material
- The high quality of courses available, both in terms of content and production values
- The suitability of the courses to the audience consisting of a broad range of abilities and backgrounds and a broad range of times since last formal education
- Reasonable cost of program compared to other programs and courses for teachers, and reasonable rewards for completion
- Commitment at the Faculty and University level to support the program and its goals
- High success and low attrition rates in courses and program
- Size of program in terms of enrollments (allowing for greater course diversity)
- Geographic diversity of students

Some of the challenges identified in the self-study document were:

- Creating and maintaining community difficult with students who never or rarely meet each other face-to-face, and then maintaining contact and relationships with MMT alumni
- Maintaining quality and size of application pool; reaching teachers to promote the program
- Maintaining and enforcing academic integrity in a program with no formal examinations
- Uncertainty in future funding and availability of on campus resources, particularly from the Centre for Extended Learning (CEL)
- Targeting course materials to teachers who teach using a different style than Universities do
- Working within University policies and procedures not always well-suited to off-campus, online, professional graduate programs (eg. policies for consecutive inactive terms, drop/refund deadlines for half-term and Winter terms courses)
Recommendations from Reviewers and Responses from the MMT

The reviewers made the following recommendations (in boxes) to which the MMT has responded (in italics). No additional resources will be required at the program level to implement any of these recommendations. A few of these changes will require formal approval through the proper channels.

**Recommendation a)**
Consideration should be made to separating the role of the program coordinator from the Director of CEMC. There are too many expectations in each of the roles for one person. It would also allow for greater cohesion if the tasks were divided.

*The MMT sees advantages (workload) and disadvantages (removal of single-point of contact for relationship building with educational community) to this. The CEMC/MMT Director finishes his current term on 30 June 2017 and so the conversation about the Directorship of the MMT will occur while future governance of the CEMC is discussed.*

*Timeline: To be completed by mid-2018*

**Recommendation b)**
The regulations and guidelines within the Graduate Studies Office should be reviewed to better match the living experiences of part-time online students. It should be possible for MMT students to elect one, two or three term absences without penalty. The part-time online professionals (normally teachers) have different needs than full-time on campus students.

*Since the review was completed in early 2017, practices in the Graduate Studies Office appear to have been relaxed somewhat. There still are some policies and procedures (eg. refund deadlines) which are not as friendly as they could be towards students in this type of program. The MMT will raise these concerns again in the near future.*

*Timeline: To be completed by the end of 2017*

**Recommendation c)**
We suggest that the Faculty of Mathematics investigate the possibility that the part-time online model of the MMT be used for expanding to other markets for different fields within Mathematics. However, it should be recognized that the online model does not scale easily: interactions with students through email and discussion boards takes significant time. That is, the online model works well only with relatively small class sizes (unless there is significant additional instructional support).

*The question about further programs is beyond the scope of the MMT. The MMT will continue to monitor class sizes and to seek out best practices for managing class sizes in an online environment.*

*Timeline: Ongoing*
Recommendation d)
The wording of the admission requirements posted on the MMT website (http://cemc.uwaterloo.ca/mmt/mmt-admissions.html) should be reviewed, with an eye to aligning the wording with current practice and encouraging any applicant who is actively teaching in mathematics, science, or computer science (not just those with a Bachelor’s degree in a STEM field) to apply provided they have taken at least 3-4 post-secondary courses in mathematics.

The MMT will review its formal admissions criteria and propose changes through the proper channels.

Timeline: To be completed by the end of 2017

Recommendation e)
The development of a curriculum map to visualize the co-/prerequisite structure of the courses in the MMT program would be helpful.

This will be done in conjunction with recommendation f).

Timeline: To be completed by the end of 2017

Recommendation f)
Now that the program is mature and there is a good selection of courses available, it is worth considering whether the program would benefit from establishing a set of core requirements to ensure as complete a coverage of the GDLEs as possible. Core requirements should include at least MATH 600, 692, and MATH 699. Additional requirements could be MATH 647, 661, 680, and one of MATH 630 or 631. Alternatively, additional requirements could be set up by area (e.g., student must complete at least X credits in courses with a modelling component, Y credits in courses with a computing component, etc.).

The MMT Graduate Committee has begun to discuss this recommendation and will continue to do so. Analysis of the courses taken by the first 160 graduates of the MMT shows that, in practice, an informal core already exists. MATH 600, MATH 692 and MATH 699 will be formally put forward as the “core” in the near future. Adding a new course (MATH 681, Problem Solving) to the core is also being discussed. Beyond that, it is likely that a set of “recommended courses” will be created. The Committee feels that it is important to give teachers in the program the flexibility to pursue the courses that are most relevant to their current practice.

Timeline: To be completed by the end of 2017

Summary
The Faculty of Mathematics and the CEMC are very pleased with the success of the MMT, both in terms of its growth and in terms of its quality. We are also very pleased that the reviewers recommended no substantial changes, and view this as a strong endorsement of the program’s mission and of its quality. We look forward to the MMT continuing to be an excellent professional graduate program which is apparently both very attractive and very helpful to an important sector of society.
### MMT Implementation Plan:

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Proposed Follow-up</th>
<th>Responsibility for Leading and Resourcing (if applicable) Follow-up</th>
<th>Timeline for addressing Recommendation</th>
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Senate Undergraduate Council met on 12 September 2017, and on behalf of Senate approved course submissions, minor plan and Faculty regulation changes. Council also recommends four regulation changes to Senate. Council recommends that the items described be included in the consent agenda.

Further details are available: https://uwaterloo.ca/secretariat/committees-and-councils/senate-undergraduate-council

FOR APPROVAL

FACULTY REGULATION CHANGES

Faculty of Arts
English Language Proficiency

1. **Motion:** To inactivate the Faculty of Arts’ existing English Language Proficiency Requirement and remove the following calendar text, effective 1 September 2018.

   The University of Waterloo believes that students must have a basic competency in written English in order to prosper in their university studies.

   Students entering the Faculty of Arts in September 2004 or thereafter may fulfil the English Language Proficiency Requirement (ELPR) in one of the following ways:

   1. Write the English Language Proficiency Exam (ELPE) once and achieve a grade of 65 by the end of their 2B term; or
   2. Achieve a grade of 65% or higher in one of the following courses: ARTS 102 (formerly ARTS 101), ENGL 109, ENGL 129R, ENGL 140R, EMLS 102R, EMLS 129R.

   **Notes**
   1. Students entering the Faculty of Arts prior to September 2004 should consult the ELPE Requirement as laid out in the calendar of their year of entry.
   2. Students may write the ELPE only once. Those who have written and failed the ELPE should consult the Writing Centre.
   3. Students who have not completed the ELPR by the end of their 2B term will have their future registrations cancelled and will be allowed to proceed only after successful completion of this requirement.
   4. A completed English Proficiency milestone on a student's academic record will indicate successful completion of this requirement.
   5. Transfer credits cannot be used to satisfy the ELPR.

   **Rationale:** This requirement will be replaced with the proposed Communication Skills Requirement, which is item #2 of this report.

2. **Motion:** To approve the new Communication Skills Requirement for the Faculty of Arts’ as described below and effective 1 September 2018.

   **Arts Degree Requirements**

   Communication skills are essential to academic, professional, and personal success. The Arts First program fosters the development of foundational competencies in inquiry, communication, and analysis in
students’ first year to support their success. All Arts students must successfully complete ARTS 130 and ARTS 140 (see Note 3).

Notes:
1. Successful completion of ARTS 130 and ARTS 140 requires a minimum grade of 50% in each course.
2. A completed English Language Proficiency milestone on a student's academic record will indicate successful completion of this requirement.
3. Students enrolled in Accounting and Financial Management (AFM) and Computer and Financial Management (CFM) satisfy the Communication Skills Requirement within their degree requirements.
4. An English Language Proficiency milestone obtained while enrolled in another University of Waterloo faculty shall satisfy this requirement.
5. Students transferring to Arts at the University of Waterloo from other universities may request an exemption from one or both of ARTS 130 and ARTS 140 from the Arts First Director with proof of the appropriate equivalent.
6. Students are expected to complete ARTS 130 or ARTS 140 by the end of their 2A term. It is expected that one course be taken in fall term and the other in winter term. Both courses cannot be taken in the same term. Failure to complete these courses by the end of 3A term will result in a hold placed on the student’s account, preventing self-enrolment in courses for the following term.
7. ARTS 130 and ARTS 140 do not fulfil any of the Bachelor of Arts breadth requirements.
8. Students enrolled in a Faculty of Arts plan prior to the 2018-2019 calendar should consult the English Language Proficiency Requirement as outlined in the calendar of their plan year.

Rationale: Arts First courses will work as a course-based replacement for the English Language Proficiency Exam (ELPE), and will follow through on the recommendations for communication learning outcomes made by SCELCI (the Steering Committee for the English Language Competency Initiative). The goal of this program is to support student success in University by providing concrete preparation in communication competencies (especially in comprehension, conceptualization, and contextualization). These courses (passed at the March 2017 SUC meeting) are also intended to enhance students’ experience in first year by ensuring that each student has two engaging small-class experiences.

Faculty of Science

English Language Proficiency

3. Motion: To inactivate the Faculty of Science existing English Language Proficiency Requirement and remove the following calendar text, effective 1 September 2018.

All Faculty of Science students entering degree programs must satisfy the English Language Proficiency Requirement. Successful completion of this requirement is mandatory for graduation.

The English Language Proficiency Requirement can be satisfied by one of the following:
- writing and obtaining a “pass” on the first attempt of the English Language Proficiency Examination (ELPE).
- successfully completing a university-level English course with a grade of 60% or better. Acceptable University of Waterloo courses are ENGL 109, ENGL 129R, ENGL 210E, ENGL 210H, EMLS 102R, or EMLS 129R.

Note
Students who have not completed the English Language Proficiency Requirement by the end of second year may have their enrolment cancelled.

Rationale: This requirement will be replaced with the proposed Communication Requirement, which is item #4 of this report.
4. **Motion:** To approve the new Communication Requirement for the Faculty of Science as described below and effective 1 September 2018.

All Faculty of Science students entering degree programs must satisfy the Communication Requirement (formerly, the English Language Proficiency Requirement). Successful completion of this requirement is mandatory for graduation.

Students are required to demonstrate communication skills throughout their degree program. The mandatory Communication Requirement will help prepare Science students for successful academic and professional communication.

The Faculty of Science has developed a communication-intensive course that is incorporated into each BSc program as a degree requirement. Successful completion of SCCOM 100 fulfils the Communication Requirement.

**Notes**

1. Students enrolled in Faculty of Science programs before September 2018 should consult the English Language Proficiency Requirement described in the Calendar of their entry year.
2. Students in the Doctor of Optometry and Doctor of Pharmacy programs meet the Communication Requirement by satisfying their relevant communication-related admission and program requirements.
3. Successful completion of the Communication Requirement will result in a Communication milestone on the student record.
4. Students transferring to another Faculty should note that additional courses may be required to satisfy the other Faculty’s Communication Requirement.
5. Students transferring into the Faculty of Science who have completed their Communication Requirement in another Faculty will be eligible to have it count for their Science Communication Requirement.
6. Normally, transfer credits cannot be used to satisfy the Communication Requirement.
7. General Science students completing their entire degree online should contact their academic advisor for information about completing the Communication Requirement.

**Rationale:** The new Communication Requirement page will replace the existing English Language Proficiency Requirement. A new communication-intensive course has been developed to meet the Universities Foundational Communication Outcomes. This course will be incorporated into each BSc program within Science. As of September 2018, students entering Faculty of Science programs will be able to meet their mandatory Communication Requirement with this course.

### FOR INFORMATION

#### ACADEMIC PROGRAM REVIEW REPORTS

1. **Two-Year Report – Women’s Studies (Attachment #1).**
   
   Council observes that a wide-ranging consultation was undertaken with the recent transfer of the program to the Department of Philosophy, and that a detailed proposal for the revision and updating of the program (including a change of its name) was shared with Council, which supported the Department’s affirmation that the pending revisions satisfy the reviewer recommendations.

#### CURRICULAR MODIFICATIONS

Course submissions, minor plan changes and Faculty regulation changes were approved for the Faculties of arts (anthropology; breadth requirements; co-op requirements; East Asian studies; English language and literature; global business and digital arts; history; mutually-exclusive plans; peace and conflict studies; psychology; sociology and legal studies) and science (biomedical sciences; chemistry; earth and environmental sciences; first-
year academic plans; general science; grievances, petitions, and reassessments; honours science; international programs; joint honours arts major and science; joint honours non-science major plans; optometry; pharmacy; psychology; regulations for assignments, tests and final exams; science and aviation; science and business; science minors and options).

Mario Coniglio

/sg

Associate Vice-President, Academic
Two-Year Progress Report
Women’s Studies (B.A.)
March 2017

Background:
The most recent Women’s Studies (WS) self-study was submitted January 27, 2014 and the site visit occurred March 3-4, 2014. The review team’s report was received on May 8, 2014, and the program’s response and implementation plan were submitted on January 30, 2015. (Note: The program’s response was delayed by the resignation of its previous Director and the eventual appointment, in November 2014, of a new Director.) The Dean of Arts indicated his endorsement of the plan on February 1, 2015. The Final Assessment Report was approved at Senate Undergraduate Council on March 10, 2015, and at Senate April 20, 2015.

It will be useful to begin with some contextual information. Beginning in 2013-14, the Faculty of Arts undertook a process of finding departmental homes, for administrative purposes, for the various interdisciplinary programs in Arts. This was done, at least in part, in response to feedback received during the Arts Strategic Planning consultations in 2011-12. There was a widespread perception that these programs did not have an appropriate voice in decision-making at the Faculty level, and that while in general the oversight by whatever ad hoc arrangements were put in place when a particular program was created was adequate, they were not universally well run. Furthermore, in cases where they were well-run they were often dependent on a single champion, or a small group of champions, for their continuing wellbeing. Providing such programs with departmental homes assures that there will be Chairs or Directors (in the sense of someone selected under Policy 40 as a head of a genuine academic unit, rather than someone called “director” but with no defined role under university policy) with a commitment to the each program’s well-being, because the success of that program is now part of the success of the department. It also provides departmental committees and other resources that will continue to exist long term to provide appropriate academic oversight for the programs, and so makes them less dependent on the presence of individual champions. (Of course, the corresponding challenge is to ensure that the programs maintained a suitably interdisciplinary character after they moved into a department.)

As part of this process, and after considering the results of the program review and input from stakeholders—including asking the members of the WS Advisory Board for their endorsement for this decision—and in consultation with the Provost, the Dean decided in 2015 that as of April 2016 the Department of Philosophy would become the administrative home of the Women’s Studies program. In November 2015, the Dean appointed Shannon Dea, Associate Professor in Philosophy, as the Director of WS to prepare for the transition—including taking action in response to recommendations by the program reviewers, as described below. The most important such preparation was a wide ranging
consultation, led by Dea, on the shape a revised and updated WS program should have so that it won’t merely continue, but will thrive in the coming years.

With the move of WS into Philosophy, there have been important changes to the organization of WS. The Women’s Studies Advisory Board has been dissolved. There is no longer a Director of Women’s Studies. Instead, the Philosophy Department appoints a Women’s Studies Advisor (henceforth WSA), a role that involves many of the organizational and advising duties formerly part of the role of WS Director. Shannon Dea is currently in the WSA role.

This report describes the steps the program has undertaken in the two years since the approval of the Final Assessment Report to respond to the recommendations suggested by the external reviewers. The reviewers made 16 recommendations organized into three categories: (A) governance, (B) program name, mission and curriculum, and (C) resources.

A detailed proposal for the revision and updating of the WS program, including a change of its name, has resulted from the consultations led by Dr. Dea. A version of the proposed program revision was shared with the Senate Undergraduate Committee. It is not included in this final report to Senate, as the revision has not yet received Faculty and Senate approval. This approval of the Arts Undergraduate Affairs Group will be sought in November 2017. As part of thorough consultation with stakeholders, Dr. Dea has had dozens of meetings, several also involving the Chair of Philosophy, with all departments and AFIW programs currently involved in WS, and with others that are or might have been interested in being involved in the revised program. In all of these meetings, support has been expressed for the changes, and those concerns that were raised, the Department believes, have since been worked through. The proposal has twice been presented at UGAG, to general approval, so it will not arrive there as a surprise in November. As a result, Senate Undergraduate Committee was satisfied with the Department’s suggestion that the pending revisions satisfy the reviewer recommendations.

Progress on Implementation Plan:

Recommendations

(A) Governance recommendations

Recommendation 1: Initiate a strategic discussion about the representation of additional Faculties on the Women’s Studies Advisory Board.

Status: Not implementable as stated, but the spirit of the recommendation, and implementable parts of it, are completed or underway.
Details: The WS Advisory Board was disbanded when WS joined Philosophy. However, the spirit of the recommendation has been implemented. In the year before WS’s official move into Philosophy, the Director of WS led an extensive consultation on the appropriate strategic direction for the WS program. Even before opting to accept the move into Philosophy, the WS Advisory Board took steps to assure itself that Philosophy is attuned to the need for WS to retain its interdisciplinary character. Since the amalgamation, Philosophy has taken steps that we think will prove more effective than mere advisory board membership to involve scholars from disciplines besides Philosophy in the program. In addition to the Philosophy faculty members who teach in the program, and the faculty in other departments who teach courses cross-listed with WS, WS courses are taught by sessional instructors with PhDs in History, English, and Gender Studies. As well, Dr. Anne Innis Dagg, a feminist biologist who was for many years affiliated with the Independent Studies program, has joined the program as an adjunct professor, and regularly interacts with WS students at departmental events. When an opportunity to hire a regular faculty member with teaching duties in WS arose, Philosophy worked with the Dean so that an interdisciplinary DACA was struck, with representation from three different departments, to ensure that the selected candidate would be a researcher whose work was of genuine interdisciplinary interest.

(B) Program Name, Mission, and Curriculum recommendations

Program name

Recommendation 2: Initiate a process to discuss the re-naming the program with an eye to distinguishing it from related programs at Wilfrid Laurier University and St. Jerome’s University and to building a more gender and otherwise diverse student cohort. One possibility would be Equity, Diversity, and Social Justice Studies, which would align the program to the University of Waterloo’s strategic priorities.

Status: In progress.

Details: As mentioned above, Professor Dea, during her year as Director of WS, led a broad consultation with stakeholders, including with then current and former WS Advisory Board members, the Department of Philosophy, students, and faculty with relevant research and teaching interests. One product of this consultation is a new proposed name, mission, degree-level learning outcomes, and core curriculum for WS. In her current role as WSA, Dea is leading a process of consulting with other departments on the proposed changes. The proposed changes, which have the endorsement of the Philosophy Department, were presented to the Senate Undergrad Committee, but are not included in the report to Senate as they still await Faculty of Arts approval. As is described below, the process of consultation with other departments and programs in the university are ongoing, so that the changes do not go forward.
for approval until it is clear that the new name and direction have broad support, and so the final version may yet differ somewhat from the proposal.

**Mission**

**Recommendation 3:** If renamed, engage in a re-branding exercise, which would include creating a fresh mission statement, the development of a communications plan and promotional materials for the purposes of student recruitment and retention, and the marketing of the benefits of a three- and four-year major, honours and joint honours.

**Status:** In progress

**Details:** As indicated above, the WSA is currently leading a consultation with other departments on a proposed mission change for WS. Once WS has general buy-in for the proposal, it will take the proposed plan changes, including a name change, to the Faculty of Arts’ Undergraduate Affairs Group (UGAG) for approval, and we hope from there to the appropriate Senate committees. The WSA will work with the Philosophy Chair, Undergraduate Chair, and Undergraduate Committee, in consultation with the Arts Undergraduate Office, to develop and implement a corresponding communications plan.

Meanwhile, the Department is taking other steps to promote the programs. For instance, the Women’s Studies Undergraduate Society, which had become dormant, has been revived with support for a dedicate faculty liaison and explicit communication to the leadership of the Society that the Department will support WS student initiatives and activities. This approach is starting to bear fruit. By using the enthusiasm of the current undergraduate students in the program to help create a better student experience for WS students, we anticipate that more students will become majors or joint majors in WS.

**Curriculum**

**Recommendation 4:** Given that many of the current students in the program are joint honours students, the strategic promotion of the joint honours is critical; consideration should also be made to the strategic promotion of WS double major and minor for students in other University of Waterloo programs.

**Status:** In progress.

**Details:** The Faculty of Arts’ recent undergraduate plan-standardization project is already making it easier for students to pursue joint honours and minor plans. Further, the new relationship between WS and Philosophy has led to a number of students undertaking academic plans in both programs (either through joint majors or through major + minor). We
also anticipate that the proposed program revisions will make the value of a WS joint honours or minor much more salient to students in other programs. Among the likely revisions to WS plans is the addition of a number of courses from related programs as approved WS electives. Having additional electives available to WS students will make it easier for students in other programs to add a WS joint honours or minor and double-count their existing courses towards that plan.

**Recommendation 5:** Extend and clarify learning outcomes (intellectual and skills-based competencies) at each program level and identify clearer pathways through the program.

**Status:** In progress.

**Details:** The proposed new curriculum makes degree level learning outcomes and pathways through WS plans much more explicit. As noted, the Department, led by the WSA, is currently consulting with other departments on the proposed changes.

**Recommendation 6:** Undertake a modest redesign of the WS “hosted” curriculum, with a focus on student recruitment and retention at the 100- and 200-levels and establishing a capstone and preparatory course for three- and four-year general majors and honours students respectively. This redesign would involve adjustments to the 100-level courses, the creation of an alternative 200-level recruitment/retention course, the development of a “Research in Action” course at the 300-level, and the strategic retitling of courses as necessary.

**Status:** In progress.

**Details:** The proposed curricular redesign includes some of the recommended changes. The WSA is currently consulting with other departments on the proposed changes. An additional virtue of being housed in the Philosophy Department is access to the Department’s Extended Learning resources, including the Extended Learning Coordinator, whose presence in the Department helps make the development and delivery of high quality online courses efficient and economical. The Department has, as part of its long-term online strategy, the development strategic first and second year WS courses as soon as the new curriculum is approved.

**Recommendation 7:** Strengthen and integrate intersectional course content and courses that focus on colonialism, contemporary neo-colonial realities, and Indigenous feminisms; racialization, transnationalism, and the experiences of people of colour; queer and trans studies; and disability issues.

**Status:** In progress.
Details: As mentioned above, the WSA is currently consulting with other departments on the proposed changes. In the meanwhile, the Department is scheduling special topics courses in topics of the sort mentioned by the reviewers, and assigning them to regular faculty as part of their regular teaching load giving those most consistently involved with the program influence over how they are designed and delivered.

Recommendation 8: Consider incorporating an honours defense as a component of the capstone experience of WS honours students.

Status: Rejected.

Details: After the consultation described above, this recommendation was rejected as unfeasible. Both the existing honours thesis and the reviewers’ proposed honours defense are time-consuming for faculty, and were judged, on balance, to be more time-consuming than present faculty complement permits as it would prevent faculty time being devoted to other important things (including being able to offer a wider variety of upper year courses). Philosophy some years ago dropped its undergraduate thesis requirement in order to focus supervisory activity on graduate supervision; the Philosophy undergraduate thesis was replaced with senior honours seminars for Philosophy students. If anything, Philosophy students who went to grad school were judged better prepared (and were more successful) after this change than they were before, so the adjustment was judged to be an academic benefit to students as well. The proposed WS program changes adopt this model for WS.

Recommendation 9: Undertake a review of existing cross-listed and approved courses, taking into account demonstrated student demand, consistency with the unit’s program goals, mission statement, coherence, and level-specific learning outcomes, as well as the elimination of repetition of content.

Status: In progress.

Details: As part of the consultation she led, Professor Dea conducted an initial review of the kind described. The results are reflected in the proposed program changes. In her role as WSA, Dea is currently consulting with other departments on the proposed changes, and as part of that process is explicitly seeking other departments’ advice on the appropriateness of existing cross-listed and approved courses.

Recommendation 10: Re-negotiate, if possible, the WS seat allocation in high demand cross-listed and approved courses.

Status: Judged no longer relevant.
Details: For various reasons (including the new course scheduling system), the pressures that led to Recommendation 10 are no longer issues.

Recommendation 11: Foster broader connections with academic units and potential affiliated faculty whose areas of research and teaching expertise may focus more on, for example, gender, equity, diversity, and social justice issues than specifically on women.

Status: Done.

Details: In discussions in anticipation of the move of WS into Philosophy, the Philosophy Chair undertook to ensure that resources will be available to support WS activities, including activities that involve cooperation across departmental and Faculty boundaries. (For instance, a proportion of the Department’s visiting speaker budget is dedicated to WS activities each year, and has increasingly been used in co-sponsored events.) In the past two years WS has increased the number of active collaborations with other units on events and programming related to gender, equity, diversity, and social justice issues. Once again, it is also relevant to note the proposed program changes, which extend the program’s focus beyond women to the areas identified in Recommendation 11. The WSA is presently consulting with other departments on those proposed changes and on possible cooperation between departments on teaching and learning related to social justice.

Recommendation 12: Negotiate the establishment of a new required course, Gender, Human Rights, and Equity in the Workplace, which would add further and significant breadth to the existing WatPD course offerings, would be consistent with the university’s strategic priorities, and, given its relevance, would potentially increase the number of WS honours students enrolled in the Arts and Business Co-op Program.

Status: On hold.

Details: The proposed new WatPD course falls outside of the scope of the proposed program changes currently in the works. However, this is a matter of ordering priorities, not a rejection of the proposal as a bad one. Once the current initiatives have been rolled out, the Department will consider the advisability of such developing a course of the sort recommended; if it makes sense, WS could draw on Philosophy’s strengths in extended learning to develop it.

Recommendation 13: Implement, if feasible, the fuller or strategic use of the course timetable, with an eye to creating more student options, increasing enrollments, and eliminating timetable conflicts among WS “hosted” and cross-listed courses.

Status: Judged no longer relevant.
Details: The new UW-wide scheduling software obviates the need (and Departmental ability) to implement Recommendation 13.

Recommendation 14: Initiate a discussion with sessional instructors and students about appropriate reading loads in WS “hosted” courses by year level.

Status: Done.

Details: Consultation with students, as noted, was part of the program redesign process. The Philosophy Department has for a few years had a Peer Review of Teaching process that is mandatory for probationary faculty, and is optional for all faculty. The process drew strong praise in the recently completed program review of Philosophy. With its move into Philosophy, these rules apply to faculty with WS teaching duties who have Philosophy as their home Department; more generally, WS has extended the peer review of teaching process to all non-tenured faculty in the program, and has moreover developed better lines of communication between core faculty and sessional instructors to ensure that courses are well-aligned with levels of study and to reduce overlap in content coverage.

(C) Resource recommendations

Recommendation 15: Negotiate the allocation of a Women’s Studies meeting space in close proximity to the Women’s Studies offices for student and affiliated faculty use.

Status: Done.

Details: When WS joined Philosophy, some Philosophy common space was reallocated as Philosophy and WS common space. When the WS administrative assistant’s job was redesigned and moved into philosophy (as a position in support of the WS program and the new Applied Philosophy PhD program), that staff member’s office was moved into the Philosophy Department. Philosophy and English traded an office to afford space in the Philosophy Department for the new Philosophy hire with teaching responsibilities in WS. The WS Student Society space, which was in a different building from either the Philosophy Department or the former WS offices, was given up in exchange for a larger space that is now shared between the WS Society and the undergraduate Philosophy Society.

Recommendation 16: To create greater continuity, as well as enhance the strength and the further growth and development of the WS program which students, affiliated faculty, and members of the Advisory Board indicated was a pressing necessity, the allocation of one full-time faculty position to the program. This faculty member could either assume the Director
position or a full-time faculty position with a regular teaching load; in either case, the faculty member would be tasked with teaching some of the WS “hosted” courses and would contribute to the labour-intensive administrative, academic planning, and promotional and outreach work of the program.

**Status:** Done.

**Details:** In late 2015, as part of the agreement by the Department of Philosophy to take on the extra work involved in administering an additional program, Philosophy received approval to make a tenure-track incremental hire with primary undergraduate teaching responsibilities in WS and primary graduate supervisory duties in the newly approved Applied Philosophy PhD program. As noted above, an interdisciplinary DACA was hired to select the appropriate candidate. In July 2016, Dr. Katy Fulfer, joined the Philosophy Department and the WS program. This is the first time in the 40 year history of the WS program that a permanent, regular faculty member has been hired whose primary undergraduate teaching duties are in the WS program.

**Explain any circumstances that have altered the original implementation plan:**

The original implementation plan anticipated that the new program would be approved sooner than will now be possible. As part of the consultation process led by Professor Dea in the year before WS officially joined Philosophy, a faculty member was hired on a fixed-term, 12-month contract with a 50% weighting for service (and 50% for teaching); the intention was that she would do much of the legwork involved in preparing the ground for the program changes. The implementation process was delayed significantly because this person resigned her position halfway through the year to take a permanent job elsewhere; when she left it was judged that it did not make sense to try to replace her, since a steep learning curve would make hiring another person with a six month appointment unlikely to accelerate the process. The delay was exacerbated by a number of staff changes, including the retirement of the long-serving WS administrative assistant, and a leave of absence by a member of the Philosophy Department’s support staff.

**Address any significant developments or initiatives that have arisen since the program review process, or that were not contemplated during the review:**

As discussed above, WS is now part of the Department of Philosophy. This new administrative arrangement was not anticipated at the time of the external review, although it was a clear possibility by the time Senate approved the Final Assessment Report in 2015.
**Updated Implementation Plan:**

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Proposed Actions</th>
<th>Responsibility for Leading and Resourcing (if applicable) the Actions</th>
<th>Timeline for addressing Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Initiate a strategic discussion about the representation of additional Faculties on the Women’s Studies Advisory Board</td>
<td>Not implementable as stated; the spirit of the recommendation has been completed</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>2. Initiate renaming process.</td>
<td>In progress.</td>
<td>WSA, Philosophy Chair, Philosophy Undergraduate Associate Chair</td>
<td>Proposed program changes to UGAG by September 2017.</td>
</tr>
<tr>
<td>3. Develop and implement new mission statement and communications plan.</td>
<td>In progress.</td>
<td>WSA, Philosophy Chair, Philosophy Undergraduate Associate Chair</td>
<td>Proposed program changes to UGAG by September 2017.</td>
</tr>
<tr>
<td>4. Strategically promote WS joint honours and minors plans.</td>
<td>In progress.</td>
<td>WSA, Philosophy Chair, Philosophy Undergraduate Associate Chair</td>
<td>Proposed program changes to UGAG by September 2017.</td>
</tr>
<tr>
<td>5. Extend and clarify learning outcomes; articulate clearer pathways through plans.</td>
<td>In progress.</td>
<td>WSA, Philosophy Chair, Philosophy Undergraduate Associate Chair</td>
<td>Proposed program changes to UGAG by September 2017.</td>
</tr>
<tr>
<td></td>
<td>Task Description</td>
<td>Status</td>
<td>Responsible Parties</td>
</tr>
<tr>
<td>---</td>
<td>-------------------------------------------------------</td>
<td>--------------</td>
<td>--------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>6</td>
<td>Redesign curriculum.</td>
<td>In progress.</td>
<td>WSA, Philosophy Chair, Philosophy Undergraduate Associate Chair</td>
</tr>
<tr>
<td>7</td>
<td>Strengthen and integrate intersectional course content</td>
<td>In progress.</td>
<td>WSA, Philosophy Chair, Philosophy Undergraduate Associate Chair</td>
</tr>
<tr>
<td>8</td>
<td>Incorporate honours defence.</td>
<td>Rejected.</td>
<td>n/a</td>
</tr>
<tr>
<td>9</td>
<td>Review cross-listed and approved courses.</td>
<td>In progress.</td>
<td>WSA, Philosophy Chair, Philosophy Undergraduate Associate Chair</td>
</tr>
<tr>
<td>10</td>
<td>Renegotiate WS seat allocation in high demand cross-listed and approved courses.</td>
<td>No longer applicable.</td>
<td>n/a</td>
</tr>
<tr>
<td>11</td>
<td>Foster broader connections with faculty and academic units in cognate areas.</td>
<td>Done.</td>
<td>n/a</td>
</tr>
<tr>
<td>12</td>
<td>Negotiate establishment of new required WatPD course.</td>
<td>On hold.</td>
<td>n/a</td>
</tr>
<tr>
<td>13</td>
<td>Implement fuller use of course timetable.</td>
<td>No longer applicable.</td>
<td>n/a</td>
</tr>
<tr>
<td>14</td>
<td>Initiate discussions with instructors about reading loads.</td>
<td>Done.</td>
<td>n/a</td>
</tr>
<tr>
<td>15</td>
<td>Negotiate nearby WS meeting space.</td>
<td>Done.</td>
<td>n/a</td>
</tr>
<tr>
<td>16</td>
<td>Hire new WS faculty member.</td>
<td>Done.</td>
<td>n/a</td>
</tr>
</tbody>
</table>

The Department Chair/Director, in consultation with the Dean of the Faculty shall be responsible for monitoring the Implementation Plan.
<table>
<thead>
<tr>
<th>Date of next program review:</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td></td>
</tr>
</tbody>
</table>

**Signatures of Approval:**

<table>
<thead>
<tr>
<th>Chair/Director</th>
<th>Date</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Faculty Dean</th>
<th>Date</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Associate Vice-President, Academic</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>(For undergraduate and augmented programs)</td>
<td></td>
</tr>
</tbody>
</table>
Recognition and Commendation

Winners of the annual Velocity Fund Finals were announced on Thursday 20 July 2017. During the competition, 10 companies pitched their businesses to a panel of judges representing the investment, startup and business communities. Judges considered innovation, market potential, market viability and overall pitch. The following three companies were grand-prize winners of $25,000 and space at Velocity: Altius Analytics Lab is a health-tech startup that helps occupational groups better manage musculoskeletal injuries; EPOCH is a skills and services marketplace that connects refugees and community members, using time as a means of exchange; and, VivaSpire is making lightweight wearable machines that purify oxygen from the air without the need for high pressure. Three of the five top-prize-winning companies are based at Velocity Science. For the first time, the prize of $10,000 for best hardware or science company went to a team that was not among the grand-prize winners. Vena Medical is making navigating through arteries faster, easier and safer by providing physicians with a camera that sees through blood. During the VFF event, an additional 10 teams of University of Waterloo students competed for three prizes of $5,000 and access to Velocity workspaces. The winners of the Velocity $5K are described as follows: HALo works to provide manual wheelchair users with accessible solutions to motorize their wheelchairs; QuantWave provides faster, cheaper and simpler pathogen detection for drinking water and food suppliers; and, SheLeads is a story-based game that helps girls realize their unlimited leadership potential. The judges for the Velocity Fund $25K competition travelled from Palo Alto, San Francisco and Toronto. (adapted from the Daily Bulletin, 24 July 2017)

For the third year in a row, management engineering students have captured the top prize at the Canadian Operational Research Society (CORS) student paper competition. Alexandra Hayes, Christian Gould, Kevin Chu, and Srikajan Santhirakumaran came in first in the undergraduate category of this year’s competition held recently in Québec City. Their paper, entitled “End-to-End Analytics: Wait Time Management of Ontario MRI Services,” was based on the students’ Capstone Design project. The team previously won a 2016 Baylis Medical Capstone Award and also captured the top prize at the 2017 Management Engineering Design Symposium. The project was supervised by Hossein Abouee Mehrizi, a management sciences professor. In addition, Gizem Nemutlu, a management sciences doctoral candidate supervised by management sciences professor Fatih Safa Erenay, won second prize in the open category for her paper entitled “Optimal Vaccine Administration Policies Using Multi-dose Vials of Different Sizes.” The student paper competition recognizes the contribution of a paper directly to the field of operational research through the development of methodology or to another field through the application of operational research. The competition showcases the high quality of operational research education in Canada as well as the excellence of the new generation of operational researchers. (adapted from the Daily Bulletin, 25 August 2017)

The federal government announced on 30 August 2017 that Blair Feltmate, head of the Intact Centre on Climate Adaptation and faculty member in Environment, will chair a federal panel on climate change adaptation. Minister of Environment and Climate Change Catherine McKenna announced that Feltmate will chair the newly-launched Expert Panel on Climate Change Adaptation and Resilience Results. The Expert Panel will advise the Government of Canada on measuring progress on adaptation and climate resilience to better understand how federal, provincial, and territorial adaptation efforts are
building Canada’s resilience to climate change, for instance, by providing up-to-date information, supporting climate-smart infrastructure, and updating building codes. The panel will also support the federal government in better communicating to Canadians how it is preparing for and adapting to the current and future impacts of climate change. The panel will support the Pan-Canadian Framework on Clean Growth and Climate Change, which is Canada’s plan to meet its greenhouse gas emissions reduction target, build resilience to the impacts of climate change, and create clean growth and jobs through investments in clean technology, innovation, and infrastructure. (adapted from the Daily Bulletin, 31 August 2017)

Three researchers from the University of Waterloo are among the new fellows of The Royal Society of Canada (RSC) announced on Thursday 7 September 2017. The RSC fellows were recognized by their peers for outstanding scholarly, scientific, and artistic achievement. This year, 89 new fellows were elected by RSC. The Waterloo’s new RSC fellows are: David Blowes (earth and environmental sciences), Geoffrey Fong (psychology), and Weihua Zhuang (electrical and computer engineering). Blowes is recognized as an international leader in the field of environmental geochemistry. Through sophisticated laboratory, field and modelling studies, he has made groundbreaking contributions to our understanding of the release of contaminants from mine wastes. He has also made important contributions to the development of management practices for mine wastes and to the development of novel groundwater remediation technologies. Fong is one of world’s leading global health researchers, and has created and leads an immense research program that is evaluating the population-level impact of tobacco control policies in over 25 countries, covering over two-thirds of the world’s tobacco users. The International Tobacco Control (ITC) Project has made groundbreaking contributions to advancing science and policies to accelerate and strengthen governmental and advocacy efforts to combat the global tobacco epidemic. Zhuang is an internationally eminent researcher and a Tier I Canada Research Chair in wireless communication networks. She has made profound research contributions to resource allocation, distributed network control, and mobile user positioning. Her prolific achievements have led to significant advances in engineering solutions, and generated high impacts in the research community. (adapted from the Office of Research news, 7 September 2017)

Sarah Burch (geography and environmental science) and Frank Gu (chemical engineering) are among the new members of the Royal Society of Canada (RSC) College of New Scholars, Artists and Scientists. Members are awarded this distinction in recognition of having reached a high level of achievement at an early stage of their careers. They represent the emerging generation of scholars and leaders in science and the arts across the country. Burch, Canada Research Chair in Sustainability Governance and Innovation, is uncovering the pathways that communities follow as they transition toward resilient, low carbon patterns of development. She leads an international team of scholars exploring the governance of transformative change in urban spaces. Her widely cited research has influenced local, national, and international policymaking on climate change, biodiversity conservation, sustainability, and urban planning. Gu is internationally recognized for his pioneering contributions to nanotechnology engineering, particularly as they apply to targeted drug delivery and water treatment systems. A highly accomplished researcher and inventor, he pioneered the use of mucoadhesive nanoparticles for unprecedentedly high retention eye drops, demonstrated the first magnetically recyclable photocatalysts for water treatment, and developed stealth copolymers for targeted cancer therapy. He is now one of the foremost nanoengineering researchers in Canada. Founded in 2014, the College is a handpicked selection of top mid-career scholars and artists in Canada. Together, the members of the College will address issues of particular concern to new scholars, artists and scientists, for the advancement of understanding and the benefit of society, taking advantage of the College’s interdisciplinary approaches. Burch and Gu were among the 70 incoming members named by the Royal
Society. The presentation of this cohort, sponsored by the Université de Montréal, will take place on Friday 24 November 24 in Winnipeg, Manitoba. (adapted from the Daily Bulletin, 9 September 2017)

The University of Waterloo, in collaboration with Mike and Ophelia Lazaridis, has launched a new $8-million research chair to further solidify Waterloo’s leadership in quantum information research.

Raymond Laflamme becomes the Mike and Ophelia Lazaridis “John von Neumann” Chair in Quantum Information. Both Waterloo and Mike and Ophelia Lazaridis will support Laflamme’s research on error correction in quantum systems that is critical to the development of the quantum computer and other robust new quantum technologies. Harnessing the power of technologies at the atomic scale requires mechanisms to control these fragile, yet powerful behaviours. “This pioneering research in quantum technologies at Waterloo’s Institute for Quantum Computing (IQC) will help further establish our impact as a global leader in quantum research,” said Feridun Hamdullahpur. “The combination of Raymond Laflamme’s expertise and the Lazaridis family’s generosity ensures that the world can continue to look to Waterloo for the latest advancements in quantum knowledge and technology.” During his keynote address at the Waterloo Innovation Summit, Mike Lazaridis praised Laflamme’s continued commitment to quantum research and his extensive achievements in positioning Canada as a quantum research powerhouse. “Raymond Laflamme is broadly recognized as a globally leading researcher in quantum error correction,” Lazaridis said. “His research contributions have led the development of quantum control, which is a building block to realizing quantum computing. His leadership and his many contributions to the University of Waterloo as the founding director have helped establish IQC as one of a handful of centres in the world for top researchers in quantum information science.” Laflamme joined the University of Waterloo in 2001 as a professor in the Department of Physics and Astronomy. He was the founding director of the IQC until his term ended earlier this year. Laflamme holds a Canada Research Chair in Quantum Information and was awarded the CAP-CRM Prize in Theoretical and Mathematical Physics earlier this year. He received the Queen Elizabeth II Jubilee Medal in 2013, and an honorary degree from the Université de Sherbrooke in 2012. He is a fellow of the American Association for the Advancement of Science, the American Physical Society, and the Royal Society of Canada, and is a founding faculty member at the Perimeter Institute for Theoretical Physics. (adapted from the Daily Bulletin, 21 September 2017)
FOR INFORMATION

A. APPOINTMENTS

Adjunct Appointments
Graduate Supervision

GARNER, Rochelle, Assistant Professor, School of Public Health and Health Systems, September 1, 2017 – December 31, 2018.

SERAFINI, Toni, Associate Professor, School of Public Health and Health Systems, September 1, 2017 – December 31, 2018.

Graduate Supervision and Research

McKELVIE, Robert, Professor of Medicine, Department of Kinesiology, July 1, 2017 – June 30, 2019.

Adjunct Reappointments
Graduate Supervision and Research

HARRINGTON, Daniel, Assistant Professor, School of Public Health and Health Systems, September 1, 2017 – December 31, 2020.

Special Appointments
Undergraduate Instruction

BURNS, Robert, Lecturer, Department of Kinesiology, September 1, 2017 – December 31, 2017.


GHEORGHIIU, Cristina, Lecturer, School of Public Health and Health Systems, September 1, 2017 – December 31, 2017.

STEWART, Nicole, Lecturer, Department of Kinesiology, September 1, 2017 – December 31, 2017.

Graduate Instruction

HYNDMAN, Brian, Lecturer, School of Public Health and Health Systems, September 1, 2017 – April 30, 2018.

Postdoctoral Fellow to Research Appointment

IBEY, Robyn, Lecturer, Department of Kinesiology, September 1, 2017 – April 30, 2018.

JUUTILAINEN, Sandra, School of Public Health and Health Systems, September 1, 2017 – August 31, 2018.

QAZI, Hammond, School of Public Health and Health Systems, September 1, 2017 – August 31, 2018.

HUDON, Anne, School of Public Health and Health Systems, September 18, 2017 – September 17, 2019.
SAARI, Margaret, School of Public Health and Health Systems, September 1, 2017 – August 31, 2019.

WOOD, Katelyn, Department of Kinesiology, August 9, 2017 – August 31, 2019.

Cross-re-appointment
COOK, Richard, Professor, Statistics and Actuarial Science, Faculty of Math to School of Public Health and Health Systems, Faculty of Applied Health Sciences, September 1, 2017 – June 30, 2022.

B. SABBATICAL
For Approval by the Board of Governors
CALLAGHAN, Jack, Professor, Department of Kinesiology, January 1, 2018 – June 30, 2018, 100% salary.

James W.E. Rush, Dean
Faculty of Applied Health Sciences
A. APPOINTMENTS

Probationary Term Appointments
QUINLAN, Andrea (BA 2006 MA 2008 University of Calgary, PhD 2013 York University), Assistant Professor, Department of Sociology & Legal Studies, July 1, 2017 – June 30, 2020. Dr. Quinlan recently completed a postdoctoral fellowship in Science and Technology Studies at Cornell University in 2014-2015 and was an Assistant Professor in the Department of Gender & Women’s Studies at Trent University in 2016-17. Dr. Quinlan is an expert in contemporary social theory, science and technology studies, gender studies, and legal studies. She is the author of *The Technoscientific Witness of Rape: Contentious Histories of Law, Feminism, and Forensic science* (2017, University of Toronto Press) and nine refereed articles in top-tier journals. Dr. Quinlan will bring to the department much needed expertise in contemporary social and feminist theory. She will also contribute to the department’s research and teaching strength in *crime, law, and security studies* and to the emerging strength at UW in the interdisciplinary field of science and technology studies.

Definite Term Appointments
ARNASON, Mark (BMath 1989 University of Waterloo, MBA 2011 York University), Lecturer, School of Accounting & Finance, September 1, 2017 to August 31, 2020. Mark has a 28-year career in the high tech industry, including 10 years in management consulting with companies like Accenture and Deloitte, and 15 years of senior executive experience in the enterprise software space. He was a global executive at IBM Software Group for six and a half years and ran their $1.4B communications sector business between 2005 and 2008. He has 25 years of experience in teaching for the School of Accounting & Finance, the Faculty of Mathematics, the School of Computer Science, the Arts & Business program, and the Conrad Business, Entrepreneurship and Technology centre. Mark will teach strategy and international business and will participate in enhancing teaching and improving learning outcomes within the school.

ROGOZYNSKI, Dan, (BA 1991 MA 1992 University of Waterloo), Lecturer, School of Accounting & Finance, September 1, 2017 to August 31, 2019. Dan has a 20-year career as a Senior Financial Officer in various companies including Big Sky Hospitality Limited, Cara Operations Limited, and Sleeman Breweries Limited. He has six years of adjunct teaching experience including courses for the School of Accounting & Finance. Dan will teach taxation and will participate in enhancing teaching and improving learning outcomes within the school, as well as supporting the Waterloo Centre for Taxation in a Global Economy.

Definite Term Reappointments
IV, Kieng, Lecturer, School of Accounting & Finance, September 1, 2017 to August 31, 2018.

Adjunct Appointments – Instruction
ANDERSON, Vikki, Lecturer, Department of Drama and Speech Communication, September 1, 2017 to December 31, 2017.

REDDOCK, Jennifer, Lecturer, Department of Drama and Speech Communication, September 1, 2017 to December 31, 2017.

ROSSITER, Simon, Lecturer, Department of Drama and Speech Communication, September 1, 2017 to December 31, 2017.
WEST, Alana, Lecturer, Department of Fine Arts, September 1, 2017 to December 31, 2017.

Adjunct Appointments – Miscellaneous (research, consultations, etc.)
EICHINGER, Ludwig, Professor, Department of Germanic and Slavic Studies, September 1, 2017 to August 31, 2020.

Adjunct Appointments – Graduate Supervision
BOYD, Jennifer, Clinical Supervision, Department of Psychology, September 1, 2017 to August 31, 2018.

COUPLAND, Richard, Clinical Supervision, Department of Psychology, September 1, 2017 to August 31, 2018.

COVIN, Roger, Clinical Supervision, Department of Psychology, September 1, 2017 to August 31, 2018.

GAVRIC, Dubravka (Dee), Clinical Supervision, Department of Psychology, September 1, 2017 to August 31, 2018.

HENDRY, Carol-Anne, Clinical Supervision, Department of Psychology, September 1, 2017 to August 31, 2018.

HUEY, Laura, Professor, Department of Sociology and Legal Studies, September 1, 2017 to August 31, 2019.

HUNTER, Tevya, Clinical Supervision, Department of Psychology, September 1, 2017 to August 31, 2018.

PARKIN, Melanie, Clinical Supervision, Department of Psychology, September 1, 2017 to August 31, 2018.

SPERE, Katherine, Clinical Supervision, Department of Psychology, September 1, 2017 to August 31, 2018.

WEISER, Margaret, Clinical Supervision, Department of Psychology, September 1, 2017 to August 31, 2018.

WILSON, Carolyn, Clinical Supervision, Department of Psychology, September 1, 2017 to August 31, 2018.

Adjunct Reappointments – Instruction
ADAMS, Russell, Assistant Professor, Department of Anthropology, September 1, 2017 to December 31, 2017.

ATOCHE, Cristina, Lecturer, Department of Spanish and Latin American Studies, September 1, 2017 to December 31, 2017.

BALAISIS, Nicholas, Lecturer, Department of Drama and Speech Communication, September 1, 2017 to December 31, 2017.

BALTRUSAITIS, Jonathan, Lecturer, Stratford Programmes, Faculty of Arts, September 1, 2017 to December 31, 2017.
BERGSTROM, Anders, Lecturer, Department of Drama and Speech Communication, September 1, 2017 to December 31, 2017.

BESSETTE, Chantale, Lecturer, Department of French Studies, September 1, 2017 to December 31, 2017.

BULLOCH, Dean, Lecturer, Department of Psychology, September 1, 2017 to December 31, 2017.

CAMPBELL, Greg, Lecturer, Department of Drama and Speech Communication, September 1, 2017 to December 31, 2017.

CARVER, Matthew, Lecturer, Department of Fine Arts, September 1, 2017 to December 31, 2017.

CYR, Dylan, Lecturer, Department of History, September 1, 2017 to December 31, 2017.

DAL CASTEL, Kate, Lecturer, Department of Drama and Speech Communication, September 1, 2017 to December 31, 2017.

DE ROOIJ-MOHLE, Margreet, Lecturer, Department of Germanic and Slavic Studies, September 1, 2017 to December 31, 2017.

ENNS, Richard, Lecturer, Department of Psychology, September 1, 2017 to December 31, 2017.

EVERINGHAM, Scott, Lecturer, Department of Fine Arts, September 1, 2017 to December 31, 2017.

FERNANDEZ, Stephen, Lecturer, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

GAMEZ, Hector, Lecturer, School of Accounting and Finance, September 1, 2017 to December 31, 2017.

GLADKOVA, Olga, Lecturer, Department of Drama and Speech Communication, September 1, 2017 to December 31, 2017.

GIBBONS, Sarah, Lecturer, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

HANCE, Michael, Lecturer, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

HARVIE, Jo, Lecturer, Department of Drama and Speech Communication, September 1, 2017 to December 31, 2017.

HENRY, George, Lecturer, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

HILL, Heather, Lecturer, Department of Drama and Speech Communication, September 1, 2017 to December 31, 2017.

HOLLAND, Michael, Lecturer, Department of Sociology and Legal Studies, September 1, 2017 to December 31, 2017.
HOLMES, Trevor, Lecturer, Department of Philosophy, September 1, 2017 to December 31, 2017.

HUNTER, Natalie, Lecturer, Department of Fine Arts, September 1, 2017 to December 31, 2017.

HUTCHISON, Jesse, Lecturer, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

JAMIES-DOMINGUEZ, Luis, Lecturer, Department of Spanish and Latin American Studies, September 1, 2017 to December 31, 2017.

KERNOHAN, Sarah, Lecturer, Department of Fine Arts, September 1, 2017 to December 31, 2017.

KNOX, Rochelle, Lecturer, Department of Drama and Speech Communication, September 1, 2017 to December 31, 2017.

LABADIE, Colin, Lecturer, Department of Drama and Speech Communication, September 1, 2017 to December 31, 2017.

LAIKEN, Stan, Lecturer, School of Accounting and Finance, September 1, 2017 to December 31, 2017.

LAM, Ibis, Lecturer, Department of Spanish and Latin American Studies, September 1, 2017 to December 31, 2017.

LAZAR, Karen, Lecturer, Department of Drama and Speech Communication, September 1, 2017 to December 31, 2017.

LESIUK, Michael, Lecturer, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

LIN, David, Lecturer, School of Accounting and Finance, September 1, 2017 to December 31, 2017.

LITTLE, Melinda, Lecturer, Department of Drama and Speech Communication, September 1, 2017 to December 31, 2017.

MCCARTHY, Megan, Lecturer, Department of Psychology, September 1, 2017 to December 31, 2017.

MCCAULEY, Eva, Lecturer, Department of Fine Arts, September 1, 2017 to December 31, 2017.

MCDERMOTT, Neil, Lecturer, Department of Psychology, September 1, 2017 to December 31, 2017.

MEINYKEVYCH, Viktorya, Lecturer, Department of Germanic and Slavic Studies, September 1, 2017 to December 31, 2017.

MOTA, Fatima, Lecturer, Department of Spanish and Latin American Studies, September 1, 2017 to December 31, 2017.

NABERT-CHUBB, Rebecca, Lecturer, Department of Political Science, September 1, 2017 to December 31, 2017.

O’HARA, Kathleen, Lecturer, Department of Drama and Speech Communication, September 1, 2017 to December 31, 2017.
PECKHAM, William, Lecturer, Department of Psychology, September 1, 2017 to December 31, 2017.

RAHMAN, Fiona, Lecturer, Department of Economics, September 1, 2017 to December 31, 2017.

RICHARDS, Edward, Lecturer, Department of Philosophy, September 1, 2017 to December 31, 2017.

ROWLAND, Samuel, Lecturer, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

SABZIAN, Saeed, Lecturer, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

SCHOLZ, Kyle, Lecture, Department of Germanic and Slavic Studies, September 1, 2017 to December 31, 2017.

SCHWARTZ, Shira, Lecturer, Department of Drama and Speech Communication, September 1, 2017 to December 31, 2017.

SHAKESPEARE, Robert, Lecturer, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

SHOEMAKER, Corrie, Lecturer, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

SLETHAUG, Gordon, Professor, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

SNYDER, Carrie, Lecturer, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

STACEY, Jeffery, Lecturer, Department of Drama and Speech Communication, September 1, 2017 to December 31, 2017.

STETTNER, Shannon, Lecturer, Department of Philosophy, September 1, 2017 to December 31, 2017.

WIENS, Brianna, Lecturer, Department of Drama and Speech Communication, September 1, 2017 to December 31, 2017.

WHITE, Matthew, Lecturer, Department of Drama and Speech Communication, September 1, 2017 to December 31, 2017.

Adjunct Reappointments – Graduate Supervision

BEHARRY, Edward, Assistant Professor, Department of Psychology, September 1, 2017 to August 31, 2018.

BEHARRY, Pamela, Assistant Professor, Department of Psychology, September 1, 2017 to August 31, 2018.

BIELING, Peter, Assistant Professor, Department of Psychology, September 1, 2017 to August 31, 2018.
COATES, Ken, Professor, Department of History, September 1, 2017 to December 31, 2017.

DODGSON, Philip, Assistant Professor, Department of Psychology, September 1, 2017 to August 31, 2018.

DUBOIS, Stephanie, Clinical Supervision, Department of Psychology, September 1, 2017 to August 31, 2018.

DUWYN, Michelle, Clinical Supervision, Department of Psychology, September 1, 2017 to August 31, 2018.

EITHER, Nicole, Assistant Professor, Department of Psychology, September 1, 2017 to August 31, 2018.

GIFFORD, Shannon, Assistant Professor, Department of Psychology, September 1, 2017 to August 31, 2018.

GUYITT, Brendan, Clinical Supervision, Department of Psychology, September 1, 2017 to August 31, 2018.

LANE, Christopher, Assistant Professor, Department of Psychology, September 1, 2017 to August 31, 2018.

LEMARQUAND, David, Clinical Supervision, Department of Psychology, September 1, 2017 to August 31, 2018.

MACLEOD, Karen, Clinical Supervision, Department of Psychology, September 1, 2017 to August 31, 2018.

MIKAIL, Samuel, Assistant Professor, Department of Psychology, September 1, 2017 to August 31, 2018.

STEVENS, Elizabeth, Assistant Professor, Department of Psychology, September 1, 2017 to August 31, 2018.

TOMAN, Philip, Assistant Professor, Department of Psychology, September 1, 2017 to August 31, 2018.

Graduate Students Appointed as Part-Time Lecturers

ABDULLA, Rosanne, Department of French Studies, September 1, 2017 to December 31, 2017.

ANDERSON, Rebecca, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

BREY, Elizabeth, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

CARPENTER, Justin, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

CARROLL, James Ryan, Department of Germanic and Slavic Studies, September 1, 2017 to December 31, 2017.
DEFRAEYE, Julien, Department of French Studies, September 1, 2017 to December 31, 2017.

DRECUN, Darlene, Department of Philosophy, September 1, 2017 to December 31, 2017.

FAST, William, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

FEZOLLARI, Ergela, Department of French Studies, September 1, 2017 to December 31, 2017.

GIBSON, Ian, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

HAIDER, Amna, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

HOBIN, Nicholas, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

HONG, Minna, School of Accounting and Finance, September 1, 2017 to December 31, 2017.

HUYNH, Alex, Department of Psychology, September 1, 2017 to December 31, 2017.

IRWIN, Ashley, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

JAFARI, Zahra, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

LALONDE, Patrick, Department of Sociology and Legal Studies, September 1, 2017 to December 31, 2017.

LAWRENCE, Christopher, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

MACDONALD, Ian, Department of Philosophy, September 1, 2017 to December 31, 2017.

MARSH, Sara, Department of Germanic and Slavic Studies, September 1, 2017 to December 31, 2017.

MEHRABIAN, Houman, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

MILETIC, Philip, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

NEUPANE, Dhruba, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

OFILI, Patricia, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

RILEY, Meghan, Department of Drama and Speech Communication, September 1, 2017 to December 31, 2017.
SHANG, Nan, Department of French Studies, September 1, 2017 to December 31, 2017.

SMITS, Tessa, Department of French Studies, September 1, 2017 to December 31, 2017.

SULLIVAN, Alexander, Department of Germanic and Slavic Studies, September 1, 2017 to December 31, 2017.

VAN DE KEMP, Jessica-Leigh, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

VALNION, Taylor, Department of French Studies, September 1, 2017 to December 31, 2017.

WOODFORD, Benjamin, Department of English Language and Literature, September 1, 2017 to December 31, 2017.

YESAYA, David, Department of French Studies, September 1, 2017 to December 31, 2017.

Staff Appointments to Faculty
DIGRAVIO, Katrina, Lecturer, Department of Psychology, September 1, 2017 to December 31, 2017.

GLOVER, Adam, Lecturer, Department of Fine Arts, September 1, 2017 to December 31, 2017.

MITTELSTAEDT, Walter, Clinical Supervision, Director, Campus Wellness, Department of Psychology September 1, 2017 to August 31, 2018.

B. ADMINISTRATIVE APPOINTMENTS
BATTEN, Alicia, Associate Chair, Undergraduate Studies, Department of Religious Studies, September 1, 2017 to August 31, 2019.

BOIDO, Mario, Acting Chair, Spanish & Latin American Studies, September 1, 2017 to August 31, 2018.

NACKE, Lennart, Associate Director, Graduate Programs (Stratford campus), August 1, 2017 to June 30, 2018.

Administrative Reappointment
TINGLEY, Jane, Associate Director, Undergraduate Programs (Stratford campus), July 1, 2017 to June 30, 2018.

C. SABBATICAL LEAVES
For approval by the Board of Governors:
KELLY, Allison, Assistant Professor, Department of Psychology, January 1, 2018 to June 30, 2018, six months at 100% salary.

WARLEY, Linda, Associate Professor, Department of English Language and Literature, July 1, 2018 to December 31, 2018, six months at 85% salary.

WILKINS-LAFLAMME, Sarah, Assistant Professor, Department of Sociology & Legal Studies, July 1, 2018 to December 31, 2018.
SABBATICAL LEAVE – Cancelled
MCGREGOR, Ian, Professor, Department of Psychology, September 1, 2017 to February 28, 2018.

SABBATICAL LEAVE – Change in Dates
KROEKER, Greta, Associate Professor, Department of History, from July 1, 2017 to December 31, 2017 to January 1, 2018 to June 30, 2018.

Douglas M. Peers
Dean, Faculty of Arts
For Information:

**A. APPOINTMENTS**

**Probationary Term**

ARAMI, Arash, Assistant Professor, Department of Mechanical & Mechatronics Engineering, November 1, 2017 – June 30, 2021. PhD Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland 2014; MSc University of Tehran, Iran 2009; BSc University of Tabriz, Iran 2006. This is a new position in support of the Mechatronics Engineering program expansion. Dr. Arami area of research is in Assistive Robotics, one of the main thrusts of the MME department.

CAO, Dongpu, Associate Professor, Department of Mechanical & Mechatronics Engineering, January 1, 2018 – June 30, 2021. PhD Concordia University, Montreal, Quebec 2008; MSc Yanshan University, China 2002; BSc Yanshan University, China 1999. This is a new position in support of the Mechatronics Engineering program expansion. Dr. Cao is an expert in autonomous driving and will expand our research in this strategic area to the MME department.

**Probational Term Reappointment**

SIMAKOV, David, Assistant Professor, Department of Chemical Engineering, July 1, 2018 – June 30, 2021. PhD Israel Institute of Technology, Haifa, Israel 2010; MSc Israel Institute of Technology, Haifa, Israel 2004; Diploma in Biology and Chemistry, Far Eastern State University of Humanities, Khabarovsk, Russia 2008.

**New Definite Term – full-time**

BASHA, Mohamed, Research Associate Professor, Department of Electrical & Computer Engineering, August 1, 2017 – February 28, 2020. PhD University of Waterloo 2007; MSc University of Waterloo 2002; BSc Mansoura University of Mansoura, Egypt, 1996. Dr. Basha will assist Prof. Ali Safavi-Naeini and the CIARS lab with their silicon waveguide technology platform by working on a phase shifter for ka-band phased arrays.

JIN, Chao, Research Assistant Professor, Department of Systems Design Engineering, July 1, 2017 – March 31, 2018. PhD University of Waterloo 2015; MASc Harbin Institute of Technology (HIT), Harbin China 2009; BASc Harbin Institute of Technology, Harbin, China 2007. Dr. Chao Jin is undertaking work at the intersection of Civil Engineering and Systems Design Engineering, working on computational modelling and artificial intelligence for water monitoring and assessment of algae blooms and parasites.

KHADEMMOHTARAM, Nima, Lecturer, Department of Systems Design Engineering, July 4, 2017 – July 3, 2020. PhD University of Victoria, Victoria BC 2014; MSc Iran Polymer and Petrochemical Institute, Tehran, Iran 2008; BSc Tehran Polytechnic, Tehran, Iran 2006. Dr. Mohtaram brings a passion for teaching and significant experience in Biomaterials, both dovetailing well with the Biomedical Engineering program housed in Systems Design. He has interests in outreach, undergraduate mentoring, technology transfer, and design, all of which will be valuable contributions to undergraduate students.
SEDWARDS, Sean, Research Assistant Professor, Department of Electrical & Computer Engineering, October 1, 2017 – March 31, 2018. PhD University of Trento, Italy 2008; BSc Oxford Brookes University 2005; BEng University College London, UK 1985. Dr. Sedwards will work with Prof. Krzysztof Czarnecki on autonomous vehicles, and in particular in the area of verification and validation of cyber-physical systems. Dr. Sedwards held a position at INRIA-Rennes from 2014 to 2017.

SHAFIEE, Mohammad Javad, Research Assistant Professor, Department of Systems Design Engineering, September 1, 2017 – August 31, 2019. PhD University of Waterloo 2017; MASE Shiraz University, Shiraz, Iran 2011; BASc Shiraz University, Shiraz, Iran 2008. Dr. Javad Shafiee is undertaking research in the area of machine learning and artificial intelligence, developing probabilistic graphical models which lead to efficient algorithms. His application interests include healthcare, transportation, and security.

Visiting Appointments


CHEN, Luyao (Ray), Scientist, Department of Electrical & Computer Engineering, June 1, 2017 – May 31, 2019.

DHAINI Ahmad, Assistant Professor, Department of Electrical & Computer Engineering, September 1, 2017 – December 31, 2017.


HUANG, Chin-Ching, Professor, Department of Chemical Engineering, February 1, 2018 – January 31, 2019


KOK, Matthew, Scholar, Department of Chemical Engineering, July 31, 2017 – January 31, 2018.


LI, Bingzheng, Scholar, Department of Chemical Engineering, March 1, 2017 – February 28, 2018.
LI, Yanfei, Scholar, Department of Electrical & Computer Engineering, July 9, 2017 – August 31, 2018.


LIU, Yong, Researcher, Department of Electrical & Computer Engineering, October 30, 2017 – April 29, 2018.

MORALEJO, Carol, Scholar, Department of Chemical Engineering, August 1, 2017 – December 31, 2017.

NOH, Miyeon, Scholar, Department of Chemical Engineering, October 3, 2017 – February 28, 2018.

PAN, Junjie, Scholar, Department of Mechanical & Mechatronics Engineering, September 30, 2017 – September 29, 2018.


RABIEE, Sayedmahmood, Scholar, Department of Mechanical & Mechatronics Engineering, December 1, 2017 – November 30, 2018.


SARIKHANI, Kaveh, Scientist, Department of Chemical Engineering, July 1, 2017 – June 30, 2018.

SHEN, Jingfang, Scholar, Department of Mechanical & Mechatronics Engineering, November 1, 2017 – October 31, 2018.

SOLTANI, Madjid, Assistant Professor, Department of Electrical & Computer Engineering, June 26


WANG, Liang, Assistant Professor, Department of Chemical Engineering, October 20, 2017 – October 19, 2018.

WANG, Quan, Scholar, Department of Chemical Engineering, January 10, 2018 – January 9, 2019.
WANG, Yahui, Scholar, Department of Systems Design Engineering, October 15, 2017 – April 14, 2018.

XIAO, Shaohua, Scholar, Department of Chemical Engineering, October 1, 2017 – September 30, 2018.

XU, Tao, Scholar, Department of Mechanical & Mechatronics Engineering, September 4, 2017 – September 3, 2018.


Visiting Reappointments
ZHANG, Lei, Scholar, Department of Chemical Engineering, January 1, 2017 – May 31, 2017.

Special Appointments
Undergraduate Instruction
AHMADI, Lena, Lecturer, Department of Chemical Engineering, September 1, 2017 – December 31, 2017.

ALAEFOUR, Ibrahim, Lecturer, Department of Mechanical & Mechatronics Engineering, September 1, 2017 – December 31, 2017.

BECK RUBIN, Eric, Lecturer, School of Architecture, September 1, 2017 – December 31, 2017.

BERNBAUM, Piper, Lecturer, School of Architecture, September 1, 2017 – December 31, 2017.

BIZMARK, Navid, Lecturer, Department of Chemical Engineering, September 1, 2017 – December 31, 2017.

CHEN, Wei-Ting (Scott), Lecturer, Department of Electrical & Computer Engineering, September 1, 2017 – December 31, 2017.

DEAN, Tom, Lecturer, Department of Chemical Engineering, September 1, 2017 – December 31, 2017.

FOHRING, Michael, Lecturer, School of Architecture, September 1, 2017 – December 31, 2017.

GERTLER, Miles, Lecturer, School of Architecture, September 1, 2017 – December 31, 2017.

GHAVAMI, Ahmad, Lecturer, Department of Chemical Engineering, September 1, 2017 – December 31, 2017.
HOSSEINKHANI, Yasin, Lecturer, Department of Mechanical & Mechatronics Engineering September 1, 2017 – December 31, 2017.

KRAWECKA, Malgorzata, Lecturer, School of Architecture, September 1, 2017 – December 31, 2017.


PICKEL, Daniel, Lecturer, Department of Civil & Environmental Engineering, September 1, 2017 – December 31, 2017.

POURNAZERI, Mohammad, Lecturer, Department of Mechanical & Mechatronics Engineering, September 1, 2017 – December 31, 2017.

SCHREINER, Kristin, Lecturer, School of Architecture, September 1, 2017 – December 31, 2017.

SJAARDA, Matthew, Lecturer, Department of Civil & Environmental Engineering, September 1, 2017 – December 31, 2017.

TOWN, Chloe, Lecturer, School of Architecture, September 1, 2017 – December 31, 2017.

TYRELL, Jonathan, Lecturer, School of Architecture, September 1, 2017 – December 31, 2017.

Special Appointments

Graduate Instruction

CHERNEY, Ed, Lecturer, Department of Electrical & Computer Engineering, May 1, 2017 – August 31, 2017.

FRIEDMAN, Jonathan, Lecturer, School of Architecture, May 1, 2017 – August 31, 2017.

HENDERSON, Vimy, Lecturer, Department of Civil & Environmental Engineering, September 1, 2017 – December 31, 2017.


RAYMOND, Christopher, Lecturer, Department of Civil & Environmental Engineering, September 1, 2017 – December 31, 2017.


SCHUMACHER, Christopher, Lecturer, School of Architecture, September 1, 2017 – December 31, 2017.
Special Appointments
Undergraduate & Graduate Instruction
HIASSAT, Abdelhalim, Lecturer, Department of Management Sciences, September 1, 2017 – December 31, 2017.

MURESAN, Matthew, Lecturer, Department of Civil & Environmental Engineering

Special Reappointments
Undergraduate Instruction
BALESHTA, James, Lecturer, Department of Mechanical & Mechtronics Engineering

LIAO, Lihua (Melody), Lecturer, Department of Mechanical & Mechatronics Engineering

LIM TUNG, Fiona, Lecturer, School of Architecture, September 1, 2017 – December 31, 2017.

MEUNIER, Sarah, Lecturer, Department of Chemical Engineering, September 1, 2017 – December 31, 2017.

NGUYEN, Tam, Lecturer, Department of Mechanical & Mechatronics Engineering

OKYAY, Ahmet, Lecturer, Department of Mechanical & Mechatronics Engineering,

PEARSON, Christine, Lecturer, School of Architecture, September 1, 2017 – December 31, 2017.

SHAMS, Shoelhe, Lecturer, Department of Civil & Environmental Engineering,

TEERTSTRA, Peter, Lecturer, Department of Mechanical & Mechatronics Engineering

Special Reappointments
Graduate Instruction
HIASSAT, Abdelhalim, Lecturer, Department of Management Sciences, September 1, 2016 – December 31, 2016.

JACKSON, Tim, Lecturer, Conrad Business Entrepreneurship and Technology Centre

SORLI, Scott, Lecturer, School of Architecture, September 1, 2017 – December 31, 2017.

Special Reappointments
Graduate Instruction & Undergraduate Instruction
MATHER, David, Lecturer, Department of Mechanical & Mechatronics Engineering,
**Special Reappointments**

Other

**GRIFFITHS-FULTON, Karl,** Teaching Assistant, Department of Systems Design Engineering, September 1, 2017 – December 31, 2017.

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**Adjunct Appointments**

Graduate Supervision

**ALIREZAIE, Javad,** Professor, Department of Systems Design Engineering, June 1, 2017 – May 31, 2017.

**SMITH, William,** Professor, Department of Chemical Engineering, May 1, 2017 – September 30, 2021.

**WEST, Jeffrey,** Professor, Department of Civil & Environmental Engineering, October 1, 2017 – September 30, 2019.

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**Adjunct Reappointments**

Graduate Supervision

**HAAS, Ralph,** Professor, Professor Emeritus, Department of Civil & Environmental Engineering, September 1, 2017 – August 31, 2020.

**SYKES, Jonathan,** Professor, Professor Emeritus, Department of Civil & Environmental Engineering, September 1, 2017 – August 31, 2020.

**TOPPER, Timothy,** Professor, Professor Emeritus, Department of Civil & Environmental Engineering, September 1, 2017 – August 31, 2020.

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**Adjunct Reappointments**

Other

**WRIGHT, Douglas,** Professor, Professor Emeritus, Former President, Department of Systems Design Engineering, September 1, 2015 – August 31, 2018.

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**Changes in Appointments**

**TRI PUNITARA, Mahesh,** Associate Director, Software Engineering Programming, Department of Electrical & Computer Engineering, was September 15, 2015 – August 31, 2018 changed to September 15, 2015 – August 31, 2017.

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**B. ADMINISTRATIVE APPOINTMENTS**

**BHATTACHARYA, Kankan,** Associate Chair, Graduate Studies, Department of Electrical & Computer Engineering, September 1, 2017 – August 31, 2020.

**HE, Qi-Ming,** Interim Associate Chair, Graduate Studies, Department of Management Sciences September 1, 2017 – December 31, 2017.

**KARIM, Karim,** Associate Dean, Outreach, Department of Electrical & Computer Engineering, September 1, 2017 – August 31, 2020.

**RAYSIDE, Derek,** Associate Director, Software Engineering Programming, Department of Electrical & Computer Engineering, September 1, 2017 – August 31, 2018.
TSUI, Ting, Associate Director, Nanotechnology Undergraduate Program, Department of Chemical Engineering, September 1, 2017 – August 31, 2019.

WALBRIDGE, Scott, Program Director, School of Architecture, September 1, 2017 – August 31, 2020.

ADMINISTRATIVE REAPPOINTMENTS
BARBY, Jim, Senior Associate Chair, Department of Electrical & Computer Engineering, September 1, 2017 – August 31, 2018.

FIEGUTH, Paul, Chair, Department of Systems Design Engineering, September 1, 2017 – August 31, 2018.

HURWITZ, Marc, Associate Director, Undergraduate Studies, Conrad Business, Entrepreneurship and Technology Centre, August 1, 2017 – July 31, 2018.

ROSE, David, Associate Director, Graduate Studies, Conrad Business, Entrepreneurship and Technology Centre, August 1, 2017 – July 31, 2018.

SMUCKER, Mark, Associate Chair, Undergraduate Studies, Department of Management Sciences September 1, 2017 – August 31, 2019.


C. RESIGNATIONS
BASHA, Mohamed, Definite Term Research Associate Professor, Department of Electrical & Computer Engineering, July 31, 2017.

WEST, Jeffrey, Professor, Department of Civil & Environmental Engineering, September 30, 2017.

FOR APPROVAL BY THE BOARD OF GOVERNORS

D. SABBATICAL
SALAMA, Magdy, Professor, Department of Electrical & Computer Engineering, January 1, 2018 – December 30, 2018, twelve months at 85% salary.

Pearl Sullivan
Dean, Faculty of Engineering
FOR INFORMATION

A. APPOINTMENTS

Probationary Term Appointment

BARRY, Janice, Assistant Professor, School of Planning, July 1, 2018 to June 30, 2021: PhD, University of British Columbia, 2011; MA, Trent University, 2004; BSc, Trent University, 2000. Dr. Barry currently holds a position at the University of Manitoba in the Department of City Planning. Her research focuses on planning governance, and the structures and processes that support community engagement in decision-making, with specific application to the relationship between Indigenous peoples and state-based planners. The potential for Dr. Barry to bring a new area of expertise into the School around Indigenous populations will be a tremendous asset.

Adjunct Appointments

Graduate Supervision

FOLEY, Paul, Assistant Professor, School of Environment, Enterprise and Development, September 1, 2017 to August 31, 2018.

Lavery, John, MES Committee Member, School of Environment, Resources and Sustainability, August 1, 2017 to December 31, 2019.

Special Appointments

Instruction

ANDERSON, Dana, Lecturer, School of Planning, September 1, 2017 to December 31, 2017.

KNAFELC, Paul, Lecturer, School of Environment, Enterprise and Development, September 1, 2017 to December 31, 2017.

LEHMANN, Robert, Lecturer, School of Planning, September 1, 2017 to December 31, 2017.

MacDONALD, Patricia, Lecturer, School of Environment, Enterprise and Development, September 1, 2017 to December 31, 2017.

PULVER, Nina, Lecturer, School of Planning, September 1, 2017 to December 31, 2017.

SARKANY, Laszlo, Lecturer, School of Environment, Enterprise and Development, September 1, 2017 to December 31, 2017.

TRUONG, Evan, Studio Facilitator, School of Planning, September 1, 2017 to December 31, 2017.

Cross Appointments

HALL, Heather, Assistant Professor, School of Environment, Enterprise and Development to the Department of Geography and Environmental Management, September 1, 2017 to August 31, 2020.

SWATUK, Larry, Professor, School of Environment, Enterprise and Development to the Department of Geography and Environmental Management, May 1, 2017 to April 30, 2020.

Graduate Student Appointed as Part-Time Lecturer

REVINGTON, Nicholas, School of Planning, September 1, 2017 to December 31, 2017.
B. ADMINISTRATIVE APPOINTMENTS

NAYAK, Prateep, Director, International Development Program [Undergrad], School of Environment, Enterprise and Development, January 1, 2018 to December 31, 2021.

WEBER, Olaf, Director, Master of Environmental Studies in Sustainability Management Program, School of Environment, Enterprise and Development, September 1, 2017 to August 31, 2019.

C. SABBATICAL LEAVES

For Approval by the Board of Governors

FLETCHER, Christopher, Associate Professor, Department of Geography and Environmental Management, January 1, 2018 to June 30, 2018, at 85% salary.

ZHU, Qian, Associate Professor, School of Planning, May 1, 2018 to October 31, 2018, at full salary.

Jean Andrey
Dean
FOR INFORMATION

A. APPOINTMENTS (for approval by the Board of Governors)

Adjunct Appointments
Instructor


MARCOTT, Cameron, Lecturer, Dept. of Combinatorics & Optimization, September 1, 2017 – December 31, 2017.

Adjunct Reappointments
Instructor

MARSHMAN, Beverly, Associate Professor, Dean of Mathematics Office, September 1, 2017 – December 31, 2017.

SHARMA, Puneet, Lecturer, Dept. of Applied Mathematics, September 1, 2017 – August 31, 2018.


Postdoctoral Fellows appointed as Part-time Lecturers

B. RETIREMENT
ANDRE, Robert, Lecturer, Dept. of Pure Mathematics, effective December 31, 2017.
C. SPECIAL LEAVE
DE STERCK, Hans (Professor), Dept. of Applied Mathematics, September 1, 2017 – September 30, 2017. This is an unpaid leave.

Stephen M. Watt
Dean
For information:

A. **APPOINTMENTS**

*New Probationary Term*

**MUSCHIK, Christine**, Assistant Professor, Department of Physics and Astronomy, November 1, 2017 to June 30, 2021. [Vordiplom (B.Sc.) Ludwig-Maximilians-Universität (1999); Munich hauptsdiplom/ diplom (M.Sc.), Max Planck Institute for Quantum Optics, Ludwig-Maximilians-Universität (2006); Ph.D., Max Planck Institute for Quantum Optics, Technical University Munich (2011).]  Dr. Christine Muschik will join the Department of Physics and Astronomy faculty as a member of the Institute for Quantum Computing. She is currently a postdoctoral fellow at the Institute für Quantenoptik and Quanteninformation in Innsbruck. Dr. Muschik is a theoretical physicist who has made significant strides in quantum error correction, quantum metrology, and lattice gauge dynamics.

*Adjunct Appointments*

*Research*

**DMITRIENKO, Gary I.**, (Professor Emeritus), Associate Professor, Department of Chemistry, December 1, 2017 to August 31, 2020.

*Graduate Supervision and Research*

**YOSHIDA, Beni**, Assistant Professor, Department of Physics and Astronomy, July 1, 2017 to June 30, 2022.

*Graduate Instruction, Graduate Supervision and Research*

**MIRKOVIC, Jelena**, Assistant Professor, Department of Chemistry, July 1, 2017 to August 31, 2018.

*Adjunct Reappointments*

*Undergraduate Instruction*

**BOWLES-JORDAN, Janie**, Clinical Assistant Professor, School of Pharmacy, September 1, 2017 to December 31, 2020.

**BROWN, Douglas**, Clinical Assistant Professor, School of Pharmacy, September 1, 2017 to December 31, 2020.

**BYNKOISKI, Kaitlin**, Clinical Assistant Professor, School of Pharmacy, September 1, 2017 to December 31, 2020.

**de VILLIERS, Peet**, Clinical Assistant Professor, School of Pharmacy, September 1, 2017 to December 31, 2020.

**EDWARDS, Donnie**, Clinical Assistant Professor, School of Pharmacy, September 1, 2017 to December 31, 2020.
FOLEY, Heather, Clinical Assistant Professor, School of Pharmacy, September 1, 2017 to December 31, 2020.

HEINTZMAN, Angela, Clinical Assistant Professor, School of Pharmacy, September 1, 2017 to December 31, 2020.

KNOPPERT, David, Clinical Assistant Professor, School of Pharmacy, September 1, 2017 to December 31, 2020.

PATODIA, Rosemarie, Clinical Assistant Professor, School of Pharmacy, September 1, 2017 to December 31, 2020.

ROBERT-KAPPEL, Noella, Clinical Assistant Professor, School of Pharmacy, September 1, 2017 to December 31, 2020.

SADIKIAN, Stephan, Clinical Assistant Professor, School of Pharmacy, September 1, 2017 to December 31, 2020.

WENTZELL, Jason, Clinical Assistant Professor, School of Pharmacy, September 1, 2017 to December 31, 2020

Graduate Supervision

LEE, Sung-Sik, Associate Professor, Department of Physics and Astronomy, July 1, 2017 to June 30, 2020.

PANDAY, Sorab, Professor, Department of Earth and Environmental Sciences, May 1, 2017 to April 30, 2020.

PARKER, Beth, Professor, Department of Earth and Environmental Sciences, May 1, 2017 to April 30, 2020.

WEN, Xiao-Gang, Professor, Department of Physics and Astronomy, May 1, 2017 to April 30, 2020.

Graduate Supervision and Research

CAMPBELL, Larry, Associate Professor, Department of Chemistry, September 1, 2017 to August 31, 2020.

FARWELL (CUDE), Andrea, Assistant Professor, Department of Biology, October 1, 2017 to September 30, 2020.

Cross Appointment

CHARBONNEAU, Benoit, Associate Professor, Department of Pure Mathematics, cross appointed to Department of Physics and Astronomy, July 1, 2017 to June 30, 2020.
Cross Reappointments

BAJCSIY, Michal, Assistant Professor, Department of Electrical and Computer Engineering, cross appointed to Department of Physics and Astronomy, July 1, 2017 to June 30, 2020.

NEKKAR RAO, Praveen, Associate Professor, School of Pharmacy, cross appointed to Department of Biology, November 1, 2017 to October 31, 2020.

SANDERSON, Joseph, Associate Professor, Department of Physics and Astronomy, cross appointed to Department of Chemistry, September 1, 2017 to August 31, 2020.

SCHIFF, Sherry, Professor, Department of Earth and Environmental Sciences, cross appointed to Department of Biology, September 1, 2017 to August 31, 2020.

SLAVCEV, Roderick, Associate Professor, School of Pharmacy, cross appointed to Department of Chemistry, September 1, 2017 to August 31, 2020.

Special Reappointment

Undergraduate Instruction

BARNES, Derek, Lecturer, School of Optometry and Vision Sciences, September 1, 2017 to December 31, 2017.

DYMOCK, Ken, Lecturer, Department of Earth and Environmental Sciences, September 1, 2017 to December 31, 2017.

HRYCYSYN, Matthew, Lecturer, Department of Biology, January 1, 2018 to April 30, 2018.

Staff Reappointed as Part-time Lecturer

DINH, Tan, Lecturer, Faculty of Science, September 1, 2017 to December 31, 2017.

Postdoctoral Fellow Reappointed as Part-time Lecturer

LYNCH, Michael, Lecturer, Department of Biology, January 1, 2018 to April 30, 2018.

Research Associate Reappointed as Part-time Lecturer

VARIKOOTY, Jalaiah, Lecturer, School of Optometry and Vision Science, September 1, 2017 to December 31, 2017.

Changes in Appointments

SCHIPPER, Derek, Assistant Professor, Department of Chemistry. Second probationary term extended by one year in accordance with Policy 76, Section 3.B. New end date is June 30, 2021.
B. **ADMINISTRATIVE APPOINTMENT**

**JONES, Debbie**, Associate Director, Academics, School of Optometry and Vision Science, July 1, 2017 to June 30, 2018.

C. **RETIREMENT**

**DIMITRIENKO, Gary I.**, Associate Professor, Department of Chemistry, effective December 1, 2017.

FOR APPROVAL BY THE BOARD OF GOVERNORS

D. **SABBATICAL**

**FURTADO, Nadine Maria**, Assistant Clinical Professor, School of Optometry and Vision Science, Special Early Sabbatical, January 1, 2018 to June 30, 2018, 100% salary arrangements.

**McCULLOCH, Daphne L.**, Professor, School of Optometry and Vision Science, Early Sabbatical, January 1, 2018 to June 30, 2018, 85% salary arrangements.

**MIKKELSEN, Susan**, Professor, Department of Chemistry, January 1, 2018 to December 31, 2018, 89.2% salary arrangements.

**RADOVANOVIC, Pavle**, Professor, Department of Chemistry, January 1, 2018 to December 31, 2018, 100% salary arrangements.

**SLAVCEV, Roderick**, Associate Professor, School of Pharmacy, January 1, 2018 to June 30, 2018, 100% salary arrangements.

R.P. Lemieux  
Dean
FOR APPROVAL

Senate Committee Appointments

Motion: To approve the following appointment:

• **Senate Nominating Committee for Honorary Degrees:** Marcus Shantz, replacing James Pankratz, as the faculty member of Senate from the affiliated and federated institutions of Waterloo, term to 30 April 2018.
Senate Graduate & Research Council met on 11 September 2017, and considered two proposals to modify program fields. Council agreed to forward the following items to Senate for approval. Council recommends these items be included in the regular agenda.

Further details are available at: https://uwaterloo.ca/secretariat/committees-and-councils/senate-graduate-research-council

FOR APPROVAL

CHANGES TO ACADEMIC PLANS

Faculty of Arts

1. Motion: To approve the modification of the PhD program in History, as of January 2018, as presented in Attachment #1.

Rationale: The Tri-University Program in History, a joint graduate History program consisting of the History Departments at Wilfrid Laurier University, the University of Guelph, and the University of Waterloo, will be offering a new Doctoral Major Field called the Indigenous History Major Field. This new field covers the history of Indigenous peoples in what is now Canada and the United States. The field stands to be very attractive to our students. It is one of the most dynamic in both Canadian and American history, in terms of publications and awards. The status of Indigenous peoples is as well one of the most important public matters of our time, and understanding their pasts from a historical perspective is a vital responsibility. The field will draw students with an intellectual interest in the subject; those looking for academic careers in one of the few growth areas for tenure-track hiring; and those seeking non-academic professional careers in business, public service, and the arts.

Other graduate programs in eastern Canada tend to subsume the subject under broader fields, but the case for a full-on major field in Indigenous history is compelling, considering the great variety and diversity of cultures involved, and the particular epistemological questions involved in their study. The Tri-University program is well positioned to be an innovator in this area.

2. Motion: To approve the modification of the Master of Arts program in Psychology, as of January 2018, as presented in Attachment #2.

Rationale: Currently when students apply for graduate studies in Cognitive Psychology, they are only provided the option of PhD. However, this field admits some students to an MA program prior to the PhD program. Thus, such admitted applicants are required to send an email saying that they agree to be admitted to MA program (even though they applied to the PhD program).

This change would reflect the current state of affairs and would avoid the added administrative responsibility of requesting that each applicant who is admitted send confirmation that they agree to be admitted to the MA-level program.

/ar Jeff Casello
Associate Vice-President, Graduate Studies and Postdoctoral Affairs

Charmaine Dean
Vice President, University Research
Prior to form submission, review the content revision instructions and information regarding major/minor modifications. For questions about the form submission, contact Trevor Clews, Graduate Studies Office.

Faculty: Arts

Program: Doctor of Philosophy (PhD) in History

Program contact name(s): Andrew Hunt (extension 32767; aehunt@uwaterloo.ca)

Form completed by:

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Course/Milestone-New/Revision/Inactivation form (PC docx version or MAC docx version).

The Tri-University Program in History, a joint graduate History program consisting of the History Departments at Wilfrid Laurier University, the University of Guelph, and the University of Waterloo, will be offering a new Doctoral Major Field called the Indigenous History Major Field. The Tri-University Program’s Doctoral Program currently consists of seven major fields: Canadian History; Cold War Era History; Early Modern European History; Modern European History; Scottish History; War and Society; and World History. There are also numerous Minor Fields (too many to list here). Currently, Indigenous History is a Minor Field at the Doctoral Level. This change will make it a Major Field, which entails offering a Major Field Seminar and allowing doctoral candidates to specialize in Indigenous History. As is currently the case with other Major Fields, the proposed addition of an Indigenous Major Field will offer a more rigorous Seminar, supplemented with additional summer readings under the direction of the doctoral candidate’s supervisor, and a Comprehensive Exam in the Field area. It will also enable doctoral candidates to write dissertation theses on Indigenous History subjects.

Is this a major modification to the program? Yes

Rationale for change(s):

This field covers the history of Indigenous peoples in what is now Canada and the United States. The term Turtle Island signals not merely an Indigenous label for this geographical place, but highlights Indigenous historical understandings and is culturally relevant to the Indigenous peoples—Neutral, Anishnawbe, and Haudenosaunee—on whose traditional territories all three universities in the Tri-University Graduate Program in History are situated.

The field stands to be very attractive to our students. It is one of the most dynamic in both Canadian and American history, in terms of publications and awards. The status of Indigenous peoples is as well one of the most important public matters of our time, and understanding their pasts from a historical perspective is a vital responsibility. The field will draw students with an intellectual interest in the subject; those looking for academic careers in one of the few growth areas for tenure-track hiring; and those seeking non-academic professional careers in business, public service, and the arts.

Other graduate programs in eastern Canada tend to subsume the subject under broader fields (e.g., the University of Toronto’s “Empires, Colonialism, and Indigeneity”), but the case for a full-on major field in Indigenous history is compelling, considering the great variety and diversity of cultures involved, and the particular epistemological questions involved in their study.

The Tri-University program is well positioned to be an innovator in this area. With six specialists (Anderson, Lackenbauer, Leddy, Luby, Neylan, and Roy), no other graduate History program in the country has such a
concentration of talent and expertise in the field. Our students who have studied the subject as an "other minor field" already have a tremendous track record of success, including two tenure-track hires and employment in the public service. The major field, in particular, would signal to the Canadian academic community what is already the case—that we are a centre of excellence for the subject.

Major field seminars meet biweekly throughout the Fall and Winter terms for discussion of a reading list of 50 books selected by the instructor. During the subsequent Spring term major field participants read a further 50 books selected by the instructor in consultation with each participant's supervisor.

**Proposed effective date:** Term: Winter Year: 2018

Current [Graduate Studies Academic Calendar (GSAC) page](https://uwaterloo.ca/graduate-studies-academic-calendar/arts/department-history/doctor-philosophy-phd-history) (include the link to the web page where the changes are to be made):

<table>
<thead>
<tr>
<th>Current Graduate Studies Academic Calendar content:</th>
<th>Proposed Graduate Studies Academic Calendar content:</th>
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<tbody>
<tr>
<td><strong>Fields (areas of research)</strong></td>
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<td>• Additional program information</td>
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</table>

**Admission requirements**

- **Minimum requirements**
  - Students will be admitted only after they have obtained a Master of Arts (MA) degree in which they have received at least an 83% standing. Only students who are graduates of accredited Universities and Colleges are eligible for admission. Since not all applicants can be admitted, close attention is paid to samples of applicants' written work, to applicants' transcripts and past record as a whole, and to their statement of research interests. Applications are considered by the Coordinating Committee of the Tri-University Graduate Program.
  - Students will not be accepted into the program without the agreement of the Coordinating Committee, the local Graduate Committee and the Faculty of Graduate Studies at the university at which they must register. No student will be assigned to a doctoral supervisor without approval from the supervisor.
  - Statement of the applicant's research interests.
- **Application materials**
  - Supplementary information form
  - Transcript(s)
    - From previous institutions.
  - Writing sample
    - Sample of the student's scholarly writing.
- **References**
  - Number of references: 3
  - Type of references: academic

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  - Writing sample
    - Sample of the student's scholarly writing.
- **References**
  - Number of references: 3
  - Type of references:
### Current Graduate Studies Academic Calendar content:

- **English language proficiency (ELP)** (if applicable)

### Degree requirements

**Thesis option:**

- **Graduate Academic Integrity Module** (Graduate AIM)
- **Courses**
  - Each student is required to demonstrate competency in 1 major field and 2 minor areas. In the minor areas, competency is demonstrated by successful completion of 2 area seminars. In the major field, students must successfully complete a major field seminar (HIST 710-719), a written qualifying exam (HIST 704) and oral qualifying exam (HIST 701). All the major field seminars within the following areas of study are offered each year: Canadian history; early modern European history; modern European history; race, imperialism and slavery; Scottish history; and war and society. The Coordinating Committee, in collaboration with the student, will establish the minor field seminars appropriate for that student.
  - The major field is the student’s primary area of concentration; it provides the background and context for thesis research and will, in all likelihood, serve as the area in which graduates apply for academic jobs. The basis of the major field is the major field reading list. Students are examined on their knowledge of their field list through a seminar, a major field written exam and a major field oral qualifying exam. These components of the major field will each be graded separately.
  - The major field reading list will consist of the equivalent of 100 books, approximately half of which will be read in the major field seminar and half by students independently. The major field seminar (HIST 710-719) must be successfully completed in the first year of the student's program. The major field qualifying exams are normally taken at the beginning of the students’ fourth term in the program. In the major field qualifying exams students will be examined on their knowledge of the

### Proposed Graduate Studies Academic Calendar content:

- **academic**

### Degree requirements

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  - The major field reading list will consist of the equivalent of 100 books, approximately half of which will be read in the major field seminar and half by students independently. The major field seminar (HIST 710-728) must be successfully completed in the first year of the student’s program. The major field qualifying exams are normally
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| entire major field reading list. The exam will consist of a written portion (HIST 704) and an oral portion (HIST 701) with a separate grade assigned for each part. The oral portion of the exam will normally be held within two weeks of the successful completion of the written portion. Students may not complete the oral portion if they fail to pass the written, but they must pass the oral to successfully complete the examination process.  
- The minor areas represent the secondary areas of concentration; they are intended to provide students with a supplementary teaching area and a comparative understanding of works in their dissertation research area. These two goals may be combined in each minor area course or the director, in consultation with the student, the thesis advisor and the seminar instructors, may coordinate a program in which one area is primarily geared towards a second teaching area and the other towards developing an understanding of the students’ primary research areas beyond their major field. The reading list for each minor area seminar (HIST 759-771) will consist of the equivalent of 50 books. The minor area seminars are normally completed during the first two terms of the student’s program, however, students may choose to take their minor area seminars in their fourth and fifth terms.  
- Minor field seminar instructors may require students to attend a one-term MA-level historiographical seminar in partial completion of their field requirement. A student who fails to pass either of their minor field seminars will be required to withdraw from the program. The minor field seminar reading list is drawn up by each minor field instructor. The minor field reading lists and outline will be deposited in the student’s file prior to the completion of the field. | taken at the beginning of the students’ fourth term in the program. In the major field qualifying exams students will be examined on their knowledge of the entire major field reading list. The exam will consist of a written portion (HIST 704) and an oral portion (HIST 701) with a separate grade assigned for each part. The oral portion of the exam will normally be held within two weeks of the successful completion of the written portion. Students may not complete the oral portion if they fail to pass the written, but they must pass the oral to successfully complete the examination process.  
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- [Link(s) to courses](#)  
  - **History (HIST) courses**
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<th>Current Graduate Studies Academic Calendar content:</th>
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<tr>
<td>☐ Graduate course search</td>
<td>☐ History (HIST) courses</td>
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<td>☐ Academic Integrity Workshop</td>
<td>☐ Graduate course search</td>
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<tr>
<td>☐ PhD Language Requirement</td>
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<td>o If no specific language is required for the student’s research (as authorized by the student’s Advisory Committee), the second language will be French. The determination of the second language will be made by the student’s Advisory Committee in the first term of the student’s registration in the program. The language exam will be offered every Fall and Winter term and it is expected that a student will successfully complete the test no later than the sixth term following admission into the program.</td>
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<td>o The language exam is intended to evaluate the candidate’s reading knowledge of a second language and is not to be understood as a test of fluency. Use of a dictionary is allowed during the exam. A student who has already fulfilled a language requirement, for example through an equivalent exam previously taken, may have credit given for that work by their Advisory Committee. Completion of an undergraduate course is not in itself considered an equivalent.</td>
<td>o The language exam is intended to evaluate the candidate’s reading knowledge of a second language and is not to be understood as a test of fluency. Use of a dictionary is allowed during the exam. A student who has already fulfilled a language requirement, for example through an equivalent exam previously taken, may have credit given for that work by their Advisory Committee. Completion of an undergraduate course is not in itself considered an equivalent.</td>
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<td>☐ PhD Professional Development Seminar</td>
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<td>o Students must attend the Professional Development Seminar in their first year of the program. The seminar is designed to prepare students for success as a PhD student and for their future careers. A pass/fail grade will be assigned for the seminar.</td>
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<td>o The seminar will consist of 8 sessions covering a range of topic areas, including – the historians’ craft (researching, conferencing, and publishing), careers (teaching and non-teaching work) and keys to success as a graduate student (applying for grants, and success as a teaching assistant). Seminars will rotate across each of the three campuses. Attendance and/or participation in the Tri-University Conference is included in the Professional Development Seminar.</td>
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<td>☐ Graduate Studies Colloquium</td>
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Graduate Studies Colloquium

- The colloquium is a public presentation of a chapter, significant portion, or summary of the student’s thesis. In exceptional circumstances, the Advisory Committee may also approve the presentation of a paper on another topic. The colloquium paper will be presented within three terms of the completion of the thesis proposal. A grade of pass/fail will be assigned for the colloquium.

- The exact scheduling will be determined by the supervisor/advisor in consultation with the student and the Advisory Committee. Students are expected to consult with their Advisory Committee on a suitable topic for the colloquium. An abstract of the colloquium paper must be approved by the Supervisory Committee before the supervisor/advisor can schedule the colloquium defense. The entire committee will be provided with copies of the colloquium paper at a minimum of no less than one week in advance of the presentation. The student will present the paper orally (normally no more than 20 minutes) after which committee members will examine the candidate on their draft chapter and presentation. The colloquium presentation is a public event. Time permitting, guests attending the colloquium will be invited to ask questions following the formal examination. A pass/fail grade will be assigned by the Committee at the end of the examination.

PhD Thesis Proposal

- All doctoral students will present a thesis proposal of no more than 2000 words including citations by the end of the Fall or Winter term (whichever comes first) following the completion of their three fields. The student will be examined orally on the proposal by the Advisory Committee within four weeks of submission of the proposal to the director and a pass/fail grade will be assigned.

PhD Thesis

- Following successful completion of all other requirements, the student must complete, under the supervision of a tri-university doctoral program faculty member, an original research project on an advanced topic. Each student will be required to write and successfully defend a thesis of such cogency.
and originality as will represent a significant contribution to knowledge. The thesis will normally be between 50,000 and 90,000 words in length. The regulations and procedures at the university in which the student is enrolled will govern the thesis format and the thesis examination.

How will students currently registered in the program be impacted by these changes?

These changes will not impact students currently registered in the field.

Departmental approval date (10/28/16):
Reviewed by GSO (for GSO use only) ☐ date (mm/dd/yy):
Faculty approval date (mm/dd/yy): April 20, 2017
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):
Senate approval date (mm/dd/yy) (if applicable):
Graduate Studies
Program Revision Form

Prior to form submission, review the content revision instructions and information regarding major/minor modifications. For questions about the form submission, contact Trevor Clews, Graduate Studies Office.

Faculty: Arts
Program: Master of Arts (MA) in Psychology
Program contact(s) (name): Erik Woody/Denise Shantz
Form completed by: Erik Woody

Description of proposed changes:

Add the field Cognitive Psychology to the Master’s program.

*changes to courses and milestones also require the completion/submission of the SGRC Course/Milestone-New/Revision/Inactivation form.

Is this a Major Modification to the program? Yes

Rationale for changes:

Currently when students apply for graduate studies in Cognitive Psychology, they are only provided the option of PhD. However, this field admits some students to an MA program prior to the PhD program. Thus, such admitted applicants are required to send an email saying that they agree to be admitted to MA program (even though they applied to the PhD program).

This change would reflect the current state of affairs and would avoid the added administrative responsibility of requesting that each applicant who is admitted send confirmation that they agree to be admitted to the MA-level program.

Proposed effective date: Term: Winter Year: 2018

Current Graduate Studies Academic Calendar URL/webpage (include the link to the page where the changes are to be made):

https://uwaterloo.ca/graduate-studies-academic-calendar/arts/department-psychology/master-arts-ma-psychology
Current Graduate Studies Academic Calendar content:
(strikethrough content that is to be deleted)

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<tr>
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<td>• Cognitive Neuroscience</td>
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<td>• Social Psychology</td>
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Proposed Graduate Studies Academic Calendar content:
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<td>• Social Psychology</td>
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</tbody>
</table>

How will students currently registered in the program be impacted by these changes?

N/A

Departmental approval date: March 21, 2017
Reviewed by GSO (for GSO use only): ☒ 04/07/2017
Faculty approval date: April 20, 2017
Senate Graduate & Research Council (SGRC) approval date:  
Senate approval date (if applicable):
Senate Undergraduate Council met on 12 September 2017 considered proposals for changes to three academic plans. Council agreed to forward the following items to Senate for approval. Council recommends these items be included in the regular agenda.

Further details are available: https://uwaterloo.ca/secretariat/committees-and-councils/senate-undergraduate-council

FOR APPROVAL

CHANGES TO ACADEMIC PLANS

Faculty of Science
Materials and Nanosciences

1. **Motion:** To approve changes to the honours materials and nanosciences (joint with chemistry) plan as described effective 1 September 2018.

   (strikeout = deleted text, underline = new text)

   **Advisors:** See Faculty of Science, Academic Advisors

The Honours Materials and Nanosciences program plan (acronym: MNS) is an interdisciplinary plan offered jointly by the Department of Chemistry and the Department of Physics and Astronomy. Both materials science and nanoscience have been very active research areas during the past few decades, and are now having major impact in diverse fields, ranging from manufacturing to materials technology to nanomedicine to renewable energy to information technology. This program academic plan is aimed at students interested in learning about and working in these high-tech fields. This plan, and complements the Nanotechnology Engineering program plan offered through the Faculty of Engineering. It is, however, designed for students who are more motivated by, and interested in, the fundamental building blocks of materials and devices, both at the macroscopic and nanometer scales. This plan has two themes, one associated with inorganic and organic materials, the other with biomaterials. Both regular and co-operative versions of this plan are available.

The Honours Materials and Nanosciences program plan meets admission requirements for graduate programs in Chemistry, and would be particularly suitable for admission into Nanoscience and Nanotechnology graduate programs. It is also intended for students who wish to find employment in industries associated with such fields as alternative energy sources, information technology, emerging materials, and biomedical therapies and diagnostics.

The Honours Materials and Nanosciences plan takes the form of a core of required courses plus appropriate electives. The numbering for the MNS core courses provides relevant information regarding their content. The middle digit indicates the main scientific content of the course: 0 indicates both chemistry and physics, 1 indicates chemistry, 2 indicates physics, and 3 indicates biochemistry. Thirteen electives allow students to strengthen complementary areas of interest.

Continuation in the Honours Materials and Nanosciences program plan requires a cumulative overall average of 60% and a cumulative overall Science average of 60%.

Successful completion of this program requires:

1. 22.0 units that include:

   - 4.5 CHEM units: CHEM 120, CHEM 120L, CHEM 123, CHEM 123L, CHEM 209, CHEM 237, CHEM 237L, CHEM 266, CHEM 266L, CHEM 254, and CHEM 356
4.0 4.5 MNS units: MNS 10 (non-credit course), MNS 101, MNS 102, MNS 201L, MNS 211, MNS 221, MNS 321, MNS 322, and MNS 331L, and MNS 410 or MNS 431

3.5 PHYS units: PHYS 121, PHYS 121L, PHYS 122, PHYS 132L, PHYS 132L, PHYS 232L, PHYS 242, PHYS 280, and PHYS 342

2.75 CHEM units: CHEM 120, CHEM 120L, CHEM 123, CHEM 123L, CHEM 209, CHEM 266L, and CHEM 356

3.0 PHYS units: PHYS 121, PHYS 121L, PHYS 122, PHYS 132L, PHYS 232L, PHYS 242, and PHYS 342

1.5 units of CHEM, MNS, and PHYS courses as follows:
- PHYS 380 or PHYS 461
- CHEM 350 or CHEM 357
- MNS 410 or MNS 431

2.5 MATH units: MATH 114, MATH 127, MATH 128, MATH 227, and MATH 228

6.0-8.75 elective units distributed as follows:
- a minimum of 0.25 unit from CHEM 237L and CHEM 250L
- 0.5 unit from CHEM 233 or CHEM 237 (Refer to Note 1)
- 0.5 unit from CHEM 264 or CHEM 266 (Refer to Note 2)
- 0.5 unit from CHEM 254 or PHYS 358 (Refer to Note 3)
- a minimum of 0.5 unit from PHYS 280 and PHYS 335
- 2.0 Program elective units, 300-level or higher
- 1.0 Program elective unit, 400-level
- 2.0 Program elective units, any level
- 4.0 units of Program electives. (Courses other than those listed under program electives may also qualify as program electives, subject to academic advisor approval)
- 2-0.5 units from any 0.25 or 0.5 unit courses

0.5 SCCOM unit: SCCOM 100

2. Completion of the English Language Proficiency Requirement

Additional Program Requirement
1. Students must enrol in MNS 10 every Fall and Winter term.

Notes
1. Students wishing to take CHEM 233 and CHEM 237L must obtain permission from the instructor of CHEM 237L to override the prerequisite of CHEM 237.
2. Students wishing to take CHEM 264 instead of CHEM 266 must obtain permission from the instructor of CHEM 266L to override the prerequisite of CHEM 266.
3. Students should take CHEM 254 in Year Two Winter or PHYS 358 in Year Three Fall.

Recommended Course Sequence

Year One
Fall
CHEM 120/CHEM 120L Physical and Chemical Properties of Matter/Laboratory
MATH 114 Linear Algebra for Science
MATH 127 Calculus 1 for the Sciences
MNS 10 Materials and Nanosciences Seminar
MNS 101 Materials and Nanosciences in the Modern World
PHYS 121/PHYS 121L Mechanics/Laboratory

Winter
CHEM 123/CHEM 123L Chemical Reactions, Equilibria and Kinetics/Laboratory
MATH 128 Calculus 2 for the Sciences
MNS 10 Materials and Nanosciences Seminar
MNS 102 Techniques for Materials and Nanosciences
PHYS 122/PHYS 132L Waves, Electricity and Magnetism/Laboratory
SCCOM 100 Communication in the Sciences

Year Two

Fall
CHEM 209 Introductory Spectroscopy and Structure
CHEM 266/CHM 266L Basic Organic Chemistry 1/Laboratory
or CHEM 264 Organic Chemistry 1 (Refer to Note 2)
CHEM 266L Basic Organic Chemistry Laboratory
MATH 227 Calculus 3 for Honours Physics
MNS 10 Materials and Nanosciences Seminar
MNS 211 Chemistry and the Solid State
PHYS 232L Measurement Laboratory
One elective (0.5 unit)

Winter
CHEM 237/CHM 237L Introductory Biochemistry/Laboratory
CHEM 254 Thermodynamics
MATH 228 Differential Equations for Physics and Chemistry
MNS 10 Materials and Nanosciences Seminar
MNS 201L Materials and Nanosciences Laboratory
MNS 221 Physics and the Solid State
PHYS 242 Electricity and Magnetism 1
One elective (0.5 unit) – (Refer to Note 3)

Year Three

Fall
CHEM 237 Introductory Biochemistry
or CHEM 233 Fundamentals of Biochemistry (Refer to Note 1)
CHEM 237L Introductory Biochemistry Laboratory
or CHEM 250L Physical Chemistry Laboratory 1
CHEM 356 Introductory Quantum Mechanics
MATH 228 Differential Equations for Physics and Chemistry
MNS 10 Materials and Nanosciences Seminar
MNS 331 Biomaterials
MNS 321 Electrical and Optical Properties of Materials
One Three electives (0.5, 1.5 units) – (Refer to Note 3)

Winter
MNS 10 Materials and Nanosciences Seminar
MNS 322 Polymer Materials
MNS 331 Biomaterials
PHYS 280 Introduction to Biophysics
or PHYS 335 Condensed Matter Physics
Three Two electives (1.5, 2.0 units)

Year Four

Fall
MNS 10 Materials and Nanosciences Seminar
PHYS 342 Electricity and Magnetism 2
PHYS 380 Molecular and Cellular Biophysics
or PHYS 461 Nanophysics
Three Four electives (1.5, 2.0 units)

Winter
MNS 10 Materials and Nanosciences Seminar
CHEM 357 Physical Biochemistry
or CHEM 350 Chemical Kinetics
MNS 410 Special Topics in Solid-State Materials
or MNS 431 Special Topics in Nano-Biomaterials
Three-Four electives (4-5.0 units)

List of Program Electives
BIOL 130 Introductory Cell Biology
BIOL 239 Genetics
BIOL 240 Fundamentals of Microbiology
BIOL 309 Analytical Methods in Molecular Biology
CHEM 212 Structure and Bonding
CHEM 250L Physical Chemistry Laboratory 1
CHEM 267 Basic Organic Chemistry 2
CHEM 310 Transition Metals/Inorganic Materials
CHEM 333 Metabolism 1
CHEM 340 Introduction to Computational Chemistry
CHEM 350 Chemical Kinetics
CHEM 357 Physical Biochemistry
CHEM 400 Special Topics in Chemistry (excluding Special Topics: Polymer properties and polymerization)
CHEM 430 Special Topics in Biochemistry
CHEM 494A Research Project and CHEM 494B Research Project
PHYS 225 Modelling Life Physics
PHYS 236 Computational Physics I
PHYS 256 Geometrical and Physical Optics
PHYS 334 Quantum Physics 2
PHYS 335 Condensed Matter Physics
PHYS 359 Statistical Mechanics
PHYS 360A Modern Physics Laboratory 1
PHYS 360B Modern Physics Laboratory 2
PHYS 364 Mathematical Physics 1
PHYS 365 Mathematical Physics 2
PHYS 380 Molecular and Cellular Biophysics
PHYS 391 Electronics
PHYS 392 Scientific Measurement and Control
PHYS 396 Biophysics of Imaging
PHYS 434 Quantum Physics 3
PHYS 435 Current Topics in Condensed Matter Physics
PHYS 437A Research Project and PHYS 437B Research Project
PHYS 461 Nanophysics
STAT 202 Introduction to Statistics

Note:
Not all of the courses offered in the CHEM 400 series (Special Topics in Chemistry) can be counted towards the Honours Materials and Nanosciences program. Students should consult the Academic Advisor for information about which courses can be counted.

Rationale: These changes are made to provide all students in this plan with greater flexibility in scheduling electives and tailoring the technical content of the program to their interests.

2. Motion: To approve changes to the honours co-operative materials and nanosciences (joint with chemistry) plan as described effective 1 September 2018.

Advisors: See Faculty of Science, Academic Advisors
The Honours Co-operative Materials and Nanosciences program plan (acronym: MNS) is an interdisciplinary program plan offered jointly by the Department of Chemistry and the Department of Physics and Astronomy. Both materials science and nanoscience have been very active research areas during the past few decades, and are now having major impact in diverse fields, ranging from manufacturing to materials technology to nanomedicine to renewable energy to information technology. This academic plan program is aimed at students interested in learning about and working in these high-tech fields, and This plan complements the Nanotechnology Engineering program plan offered through the Faculty of Engineering. It is, however, designed for students who are more motivated by and interested in, the fundamental building blocks of materials and devices, both at macroscopic and nanometer scales. This plan has two themes, one associated with inorganic and organic materials, the other with biomaterials. Both regular and co-operative versions of this plan are available.

The Honours Materials and Nanosciences program academic plan meets admission requirements for graduate programs in Chemistry, and would be particularly suitable for admission into Nanoscience and Nanotechnology graduate programs. It is also intended for students who wish to find employment in industries associated with such fields as alternative energy sources, information technology, emerging materials, and biomedical therapies and diagnostics.

The Honours Co-operative Materials and Nanosciences plan program takes the form of a core of required courses plus appropriate electives. The numbering for the MNS core courses provides relevant information regarding their content. The middle digit indicates the main scientific content of the course: 0 indicates both chemistry and physics, 1 indicates chemistry, 2 indicates physics, and 3 indicates biochemistry. Thirteen electives allow students to strengthen complementary areas of interest.

This program Academic Plan, which offers the Honours Chemistry courses integrated with five four-month work terms, extends over four and two-thirds years. Students work and study in alternate terms starting at the end of the 2A term. There is a double work-term between terms 3B and 4A. For students studying in the co-op format, detailed information on co-op program requirements is located in the Co-operative Education and Career Action section of the calendar and in the Science Faculty work-term report guidelines. Information on WatPD courses is located on Professional Development Program website.

Continuation in the Honours Co-operative Materials and Nanosciences program plan requires a cumulative overall average of 60% and a cumulative overall Science average of 60%.

Successful completion of this program requires:

1. 22.0 units that include:
   a. 4.5 CHEM units: CHEM 120, CHEM 120L, CHEM 123, CHEM 123L, CHEM 209, CHEM 237, CHEM 237L, CHEM 266, CHEM 266L, CHEM 254, and CHEM 356;
   b. 4.0 MNS units: MNS 10 (non-credit course), MNS 101, MNS 102, MNS 201L, MNS 211, MNS 221, MNS 301, MNS 322, and MNS 331, and MNS 410 or MNS 431;
   c. 3.5 PHYS units: PHYS 121, PHYS 121L, PHYS 122, PHYS 132L, PHYS 232L, PHYS 242, PHYS 280, and PHYS 342;
   d. 2.25 CHEM units: CHEM 120, CHEM 120L, CHEM 123, CHEM 123L, CHEM 209, and CHEM 266L;
   e. 3.5 PHYS units: PHYS 121, PHYS 121L, PHYS 122, PHYS 132L, PHYS 232L, PHYS 242, and PHYS 342;
   f. 1.5 units of CHEM, MNS, and PHYS courses as follows:
      - PHYS 380 or PHYS 461;
      - CHEM 350 or CHEM 357;
      - MNS 410 or MNS 431;
   g. 2.0 MATH units: MATH 114, MATH 127, MATH 128, and MATH 227, and MATH 228;
   h. 0.5 AMATH unit: AMATH 250.
6.0-8.75 elective units, distributed as follows:

- 0.25 unit from CHEM 237L and CHEM 250L
- 0.5 unit from CHEM 233 or CHEM 237 (Refer to Note 1)
- 0.5 unit from CHEM 264 or CHEM 266 (Refer to Note 2)
- 0.5 unit from CHEM 254 or PHYS 358 (Refer to Note 3)
- 0.5 unit from CHEM 264 or PHYS 358

1.0 Program unit, 400-level
2.0 Program units, 300-level or higher
2.0 Program units, any level
4.0 units of Program electives (Courses other than those listed under Program electives may also qualify as program electives, subject to approval of the academic advisor)
2.0 Program unit: SCCOM 100

2.0 SCCOM unit: SCCOM 100

2. Completion of the English Language Proficiency Requirement

3.2. Co-operative education requirements that include:

- A minimum of four work terms
- Four WatPD (professional development) courses that must include PD 1, PD 11, and two PD elective courses
- Four work-term reports:
  - One completed as part of PD 11
  - Three completed in required WKRPT courses: WKRPT 200S, WKRPT 300S, and WKRPT 400S

4. A minimum of four work terms, submission of a minimum of four satisfactory work reports and credit in four WatPD courses (PD1, PD11 and two other PD courses).

Additional Program Conditions
1. Students must enrol in MNS 10 every Fall and Winter academic term.

Notes

1. Students wishing to take CHEM 233 and CHEM 237L must obtain permission from the instructor of CHEM 237L to override the prerequisite of CHEM 237.
2. Students wishing to take CHEM 264 instead of CHEM 266 must obtain permission from the instructor of CHEM 266L to override the prerequisite of CHEM 266.
3. Students should take CHEM 254 in Year Two Spring or PHYS 358 in Year Four Fall.

Recommended Course Sequence

Year One
Fall
CHEM 120/CHEM 120L Physical and Chemical Properties of Matter/Laboratory
MATH 114 Linear Algebra for Science
MATH 127 Calculus 1 for Sciences
MNS 10 Materials and Nanosciences Seminar
MNS 101 Materials and Nanoscience in the Modern World
PHYS 121/PHYS 121L Mechanics/Laboratory

Winter
CHEM 123/CHEM 123L Chemical Reactions, Equilibria, and Kinetics/Laboratory
MATH 128 Calculus 2 for Sciences
MNS 10 Materials and Nanosciences Seminar
MNS 102 Techniques for Materials and Nanosciences
PHYS 122/PHYS 132L Waves, Electricity and Magnetism/Laboratory
One elective (0.5 unit)
SCCOM 100 Communication in the Sciences
Year Two

Fall
CHEM 209 Introductory Spectroscopy and Structure
CHEM 266/ CHEM 266L Basic Organic Chemistry 1/ Laboratory
or CHEM 264 Organic Chemistry 1 (Refer to Note 2)
CHEM 266L Basic Organic Chemistry Laboratory
MATH 227 Calculus 3 for Honours Physics
MNS 10 Materials and Nanosciences Seminar
MNS 211 Chemistry and the Solid State
PHYS 232L Measurement Laboratory
One elective (0.5 unit)

Spring
AMATH 250 Introduction to Differential Equations
CHEM 237/ CHEM 237L Introductory Biochemistry/Laboratory
CHEM 254 Thermodynamics
MNS 201L Materials and Nanoscience Laboratory
MNS 221 Physics and the Solid State
PHYS 242 Electricity and Magnetism 1
One elective (0.5 unit) – (Refer to Note 3)

Year Three

Winter
MATH 228 Differential Equations for Physics and Chemistry
CHEM 233 Fundamentals of Biochemistry - (Refer to Note 1)
or CHEM 237 Introductory Biochemistry
CHEM 237L Introductory Biochemistry Laboratory
or CHEM 250L Physical Chemistry Laboratory 1
MNS 10 Materials and Nanosciences Seminar
MNS 322 Polymer Materials
PHYS 280 Introduction to Biophysics
PHYS 234 Quantum Physics 1
One Two electives (0.5 1.0 unit)

Winter
CHEM 350 Chemical Kinetics
or CHEM 357 Physical Biochemistry
MNS 10 Materials and Nanosciences Seminar
MNS 331 Biomaterials
PHYS 280 Introduction to Biophysics
or PHYS 335 Condensed Matter Physics
Four Three electives (2.0 1.5 units)

Year Four

Fall
PHYS 342 Electricity and Magnetism 2
MNS 10 Materials and Nanosciences Seminar
MNS 331 Biomaterials
MNS 321 Electrical and Optical Properties of Materials
PHYS 380 Molecular and Cellular Biophysics
or PHYS 461 Nanophysics
One Three electives (0.5 1.5 units) – (Refer to Note 3)

Winter
MNS 10 Materials and Nanosciences Seminar
MNS 410 Special Topics in Solid-State Materials
or MNS 431 Special Topics in Nano-Biomaterials
Four electives (2.0 units)

List of Program Electives
BIOL 130 Introductory Cell Biology
BIOL 239 Genetics
BIOL 240 Fundamentals of Microbiology
BIOL 309 Analytical Methods in Molecular Biology
CHEM 212 Structure and Bonding
CHEM 250L Physical Chemistry laboratory I
CHEM 267 Basic Organic Chemistry 2
CHEM 310 Transition Metals/Inorganic Materials
CHEM 333 Metabolism 1
CHEM 340 Introduction to Computational Chemistry
CHEM 350 Chemical Kinetics
CHEM 357 Physical Biochemistry
CHEM 400 Special Topics in Chemistry (excluding Special Topics: Polymer properties and polymerization)
CHEM 430 Special Topics in Biochemistry
CHEM 494A Research Project and CHEM 494B Research Project
PHYS 225 Modelling Life Physics
PHYS 236 Computational Physics I
PHYS 256 Geometrical and Physical Optics
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PHYS 359 Statistical Mechanics
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PHYS 461 Nanophysics
STAT 202 Introduction to Statistics

Note:
Not all of the courses offered in the CHEM 400 series (Special Topics in Chemistry) can be counted towards the Honours Materials and Nanosciences program. Students should consult the Academic Advisor for information about which courses can be counted.

Rationale: See rationale for item #1.

Associate Vice-President, Academic
Global Experience Certificate

3. Motion: To approve the removal of the requirement for completion of three (3) online modules, and to remove the $100 withdrawal fee, both as described and effective immediately, and to approve a research, assessment and recommendation process for the certificate to be completed by Fall 2018 to consider revisions to the certificate plan.
(strikeout = deleted text, underline = new text)
Certificate Requirements

To encourage University of Waterloo students to become globally engaged learners, the University offers undergraduate students the opportunity to obtain a Global Experience Certificate (GEC). A student in any term wishing to complete the certificate is required to complete an online Global Experience Certificate Plan outlining how they will complete the following three GEC components:

1. three for-credit courses (1.5 units) – see first bullet below
2. an international experience (IE)
3. cross-cultural volunteer experience (CCVE)

In addition to the three GEC components, students will be required to complete three online modules.

Academic discipline is handled by the Associate Vice-President International or designate in consultation with the Associate Dean for the student's home faculty. A discipline decision is appealable under Policy 72 - Student Appeals provided that grounds for appeal can be established.

A non-refundable $100 withdrawal fee applies for students who cancel their participation in the Global Experience Certificate or fail to complete the GEC components upon graduation.

For more information on the Global Experience Certificate, please visit Waterloo International uwaterloo.ca/international/.

Rationale: In September 2015, Senate approved the addition of the requirement of completing three online modules to achieve the Global Experience Certificate. The subsequent re-organization of Waterloo International did not allow for the timely development and assessment of these modules, and so these modules encountered a significant delay. More recently, the organizational reporting and responsibility for the Global Learning team, including the GEC program, transferred from Waterloo International to the Student Success Office and with the transfer of responsibility it was felt that the plan requires rigorous assessment to ensure that the stated goals and objectives resonate with student needs and align with Waterloo’s strategic objectives prior to committing resources for development and implementation of the modules. Separately, the $100 withdrawal fee for students who begin the GEC but choose to withdraw from the program is very difficult to administer and there is no evidence to suggest that the withdrawal fee positively impacts completion of the certificate.

Given these developments, the calendar description requires amendments as described, and GEC program will continue in its current form until changes are brought forward. A new fee structure (if any) for future iterations of the program will be brought forward as appropriate.

Mario Coniglio
Associate Vice-President, Academic
STRATEGIC PLAN
Progress and Outcomes | Fall 2017 Update

LEARN MORE:
uwaterloo.ca/strategic-plan-action
MESSAGE FROM THE PRESIDENT AND PROVOST

Over the last four years, the University of Waterloo has pursued the implementation of our strategic plan, “A Distinguished Past, A Distinctive Future” with focused determination.

Working closely with Faculties, stakeholders, and the Executive Council, and with engagement from constituencies across campus, we have made key investments, realigned resources, and made bold progress on our eight theme areas. Our leadership teams and Deans have been a key driving force behind the strategic plan to continually ensure that our strategic plan remains a living, vibrant document with robust monitoring and accountability elements.

In this update, you will find evidence of this unwavering commitment to our strategic plan, illustrated through:
• four years of progress and impact measures;
• highlights of some key initiatives implemented by our eight themes;
• a focus on internationalization at Waterloo; and
• updates from each of our six Faculties highlighting their efforts in strategic plan theme areas.

For more in-depth detail about each of our themes, and the progress we have made, you can visit our dashboards at: uwaterloo.ca/strategic-plan.

We are pleased with this progress, but there is still much work to do to fulfill our mission to be one of the top innovation universities in the world. In the next year we will complete the final year of our strategic plan and create a summative report to capture outcomes of the five year process. Between 2018 and 2019, this report, and other evidence, informed and prioritized through broad consultation of our stakeholders, will provide the foundation upon which we build the next cycle of our strategic plan. Our next strategic plan will be ready for launch with an action plan and an integrated accountability framework in 2020. A timeline outlining this work is featured at the end of this report.

As we look towards our fourth and final year of implementing this plan, we reflect with gratitude on the significant contributions of our previous Vice President Academic and Provost Ian Orchard, for his exceptional work in advancing this strategic plan. We also thank our campus community for their continued support and turn our eyes towards the final year of this vital initiative.

Sincerely,

FERIDUN HAMDULLAHPUR
PRESIDENT AND VICE-CHANCELLOR
UNIVERSITY OF WATERLOO

D. GEORGE DIXON
INTERIM VICE-PRESIDENT ACADEMIC & PROVOST
UNIVERSITY OF WATERLOO
This is the University of Waterloo’s fourth annual report on Progress & Outcomes related to the implementation of our Strategic Plan. We have met and exceeded important targets established by our themes, and identified initiatives that will advance our progress. Some of our progress is summarized here.

- **Transformational Research** increased resources and supports to facilitate research at Waterloo. In 2016/17, Waterloo’s total sponsored research exceeded the overall target by $6.8M, a total increase since 2013/14 of 13.7%. Waterloo also increased internal supports to develop research proposals from a broader range of sectors, implement research projects, and facilitate nominations of Waterloo faculty for prestigious research awards and honours. Over four years, Waterloo has secured important major funding support for transdisciplinary research ranging from aging, quantum technologies, and water research to advanced manufacturing, actuarial science, and cyber infrastructure. Waterloo continues to develop and pursue new international research partnerships with elite institutions.

- Advancing our **outstanding academic programming** remained a priority in 2016/17. The number of Waterloo subjects ranked in the top 100 Quacquarelli Symonds (QS) Subject Rankings grew from seven in 2013/14 to 13 in 2016/17. Sixty per cent (59.2%) more graduate students enrolled in professional skills workshops and a new Thesis Fundamentals workshop was developed. Waterloo exceeded the target for the number of online courses available annually in two of three years, with an overall increase of 31.1% from 2013/14 to 2016/17. There was an overall increase of 16.8% in enrolment in fully online courses since 2013/14 and three new fully online programs are now available. Waterloo developed 14 new or restructured programs (four undergraduate and 10 graduate). All Faculties are developing new Strategic Enrolment Management plans.

- Waterloo’s **international** ranking has remained relatively stable since 2013/14 and international research funding fluctuated overall but remained at $17.4M in 2016/17, the same as 2013/14. The proportion of undergraduate and graduate international students has increased steadily since 2013/14 by 4.6 percentage points among undergraduates and 3.6 percentage points among graduate students. The number of international co-op work terms have increased by 32.0% since 2013/14.

- More progress has been made in the area of **vibrant student experience**. Consulting broadly with students, faculty, and staff, the Student Success Office has further developed the mobile student portal to integrate with LEARN and to include access to mental health resources. Between 2013 and 2016 the amount of new student study space available increased by 18.0%. The Student Services Centre and renovations to the Student Life Centre/Physical Activities Complex are both in progress. The President’s Advisory Committee on Student Mental Health is underway with a report due in early 2018.

- Under the **Robust Employer-Employee Relationship** theme, numerous new and ongoing improvements have been made to recruitment and retention processes and procedures since 2013/14. Waterloo has been recognized as one of Canada’s Top 100 Employers.

- Building on our **sound values**, Waterloo continues to support training and policy development activities related to equity, diversity, and inclusion. Annual goals of retrofitting and launching inclusive, single-use washrooms are being met and well received by the Waterloo community.

We have made important progress in 2016/17. Our next report in fall 2018 will provide a comprehensive summary of the outcomes that we have achieved over the five years of our strategic plan and will contribute important evidence for our next strategic plan cycle.

**LEARN MORE:** uwaterloo.ca/strategic-plan-action
**EXPERIENTIAL EDUCATION**

*Progress and Outcomes | Fall 2017 Update*

### OBJECTIVE 1 | Educate outstanding and world-ready graduates whose skills are in high demand globally

#### MEASURES

<table>
<thead>
<tr>
<th></th>
<th>2013/14</th>
<th>2014/15</th>
<th>2015/16</th>
<th>2016/17</th>
<th>WHAT DOES THIS MEAN?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First work-term employment rate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt; Employment rates indicate Waterloo’s effectiveness in providing support in the first work-term application process. First work-term employment is an important indicator of future co-op success.</td>
</tr>
<tr>
<td>Source: Co-operative Education and Career Action (CECA)</td>
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<td></td>
<td>&gt; The proportion of first work-term students who are employed has increased consistently since 2013/14, with a total four year increase of 3.1 percentage points.</td>
</tr>
<tr>
<td><strong>Proportion of co-op graduates who reported skills learned at Waterloo were related to skills required for job at six months after graduation</strong></td>
<td>2011</td>
<td>2012</td>
<td>2013</td>
<td>2014</td>
<td>&gt; Co-op graduates’ perception of the skills they learned at Waterloo, compared to the skills they require for employment, is consistently high, and significantly higher than for non co-op graduates.</td>
</tr>
<tr>
<td>Source: Ontario University Graduate Survey (OUGS)</td>
<td>94.6%</td>
<td>94.8%</td>
<td>95.6%</td>
<td>95.7%</td>
<td>&gt; Besides the co-op work-term experience itself, another way that co-op students learn about and develop, soft skills that are required in the workplace, is through mandatory Waterloo Professional Development (WatPD) courses.</td>
</tr>
<tr>
<td><strong>Co-op graduate employment rate six months after graduation</strong></td>
<td>2011</td>
<td>2012</td>
<td>2013</td>
<td>2014</td>
<td>&gt; Co-op graduate employment rate is one way to understand the relevance of graduates’ education to work opportunities.</td>
</tr>
<tr>
<td>Source: OUGS</td>
<td>91.0%</td>
<td>90.7%</td>
<td>91.7%</td>
<td>88.7%</td>
<td>&gt; A key objective of co-op education is to provide graduates with the experience, skills, and networks necessary to gain employment after graduation. The rate for 2014 non co-op graduates was 83.3% at six months.</td>
</tr>
<tr>
<td><strong>Work-term earnings</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt; In addition to employment skills gained through the co-op program, the Centre for Career Action provides extensive resources for students in resume preparation, interview skill development, and preparing for the work world.</td>
</tr>
<tr>
<td>Source: CECA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt; The third pilot of the Co-op Living Learning Community (LLC) fine-tuned activities and supports for students. Results to date indicate that co-op students who participated in the LLC gained first work-term employment earlier in the recruitment cycle, which can reduce stress in the academic term preceding the work term.</td>
</tr>
</tbody>
</table>

#### WHAT WE DID IN 2016/17

> In fall 2016, more than 20,700 full-time, undergraduate students were enrolled in co-operative education at Waterloo, an increase of 4.9% over 2015/16. Considered as a proportion of total full-time, undergraduate enrolment, co-op enrolment grew from 63.4% in 2013 to 67.1% in 2016.

> Development of Co-op 2.0, the evolution of co-operative education, continued at Waterloo. Consultations with student groups to maximize the value and relevance of new Co-op 2.0 opportunities continued including flexible work terms, co-op specialization in research, first work-term fundamental experiences, and industry/academic partnerships.

> As part of Co-op 2.0, co-op flex terms are being piloted. Any student may opt for a flexible work term to pursue an opportunity that involves humanitarian work, is a single work term with two different employers, or is consistent with that individual’s career goals but may not fulfill normal credit-granting criteria for a work term. Flex work terms will be fully launched in fall 2018.

### OBJECTIVE 2 | Develop an innovative culture of Experiential Education at the University

#### MEASURES

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Overall work-term employment rate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt; Work-term employment rates indicate how effective Waterloo is at ensuring students receive co-op work-term opportunities. A student may complete more than one work term each year. The employment rate reported here captures the percentage of scheduled work terms filled over the course of the entire year.</td>
</tr>
<tr>
<td>Source: CECA</td>
<td>96.6%</td>
<td>97.0%</td>
<td>97.3%</td>
<td>97.7%</td>
<td>&gt; Between 2015/16 and 2016/17, the total number of co-op work terms increased by 2.5%, compared to 6.3% in the prior year.</td>
</tr>
<tr>
<td><strong>Number of co-op work terms</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt; The increasing number of work terms reflects increasing demand for work-related experiential education.</td>
</tr>
<tr>
<td>Source: CECA</td>
<td>16,781</td>
<td>17,628</td>
<td>18,730</td>
<td>19,188</td>
<td>&gt; TARGET: Overall target for work-term employment rate is 95% each year. Over 6,000 students seek co-op employment each term. Maintaining this rate is an ongoing challenge due to significant increases in co-op enrolment and economic volatility.</td>
</tr>
<tr>
<td><strong>Total co-op student earnings (self-reported data)</strong></td>
<td>$191.2M</td>
<td>$206.3M</td>
<td>$225.9M</td>
<td>$249.5M</td>
<td>&gt; Co-op programs offer an opportunity for students to earn income while attending school and to make a contribution to the economy.</td>
</tr>
<tr>
<td>Source: CECA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt; Work-term earnings have increased 25.8% since 2013/14 and 6.5% since 2015/16.</td>
</tr>
<tr>
<td><strong>Numbers have been re-stated for all years as a result of moving to a different system (Job Mine to WaterlooWorks) and improved data integrity practices in 2016.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt; Numbers have been re-stated for all years as a result of moving to a different system (Job Mine to WaterlooWorks) and improved data integrity practices in 2016.</td>
</tr>
</tbody>
</table>
OBJECTIVE 2 (continued) | Develop an innovative culture of Experiential Education at the University

WHAT WE DID IN 2016/17

> A small working group began to work on a model for co-op in graduate programs that is reflective of the knowledge level, research underpinnings, and career ambitions of graduate students.

> The Co-operative and Experiential Education portfolio was introduced at the University in February 2017, under the leadership of the Associate Provost Co-operative and Experiential Education, bringing together Co-op, the Centre for Career Action, EDGE, Waterloo Professional Development (WatPD) and the Waterloo Centre for Advancement of Co-operative Education (CACE). The new structure integrates existing units while aligning reporting structure level and accountability.

OBJECTIVE 3 | Enlarge the resource base of professionally credentialized and/or discipline-relevant employers

<table>
<thead>
<tr>
<th>MEASURES</th>
<th>2013/14</th>
<th>2014/15</th>
<th>2015/16</th>
<th>2016/17</th>
<th>WHAT DOES THIS MEAN?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of active employers — hired at least one student in the previous three years</td>
<td>6,093</td>
<td>6,384</td>
<td>6,706</td>
<td>6,919</td>
<td>&gt; The number of employers who are active (hired at least one student) offers an opportunity to understand the level of employer involvement in the co-op program.</td>
</tr>
<tr>
<td>Number of new employers — hired a student for the first time in the given fiscal year</td>
<td>1,304</td>
<td>1,050</td>
<td>1,562</td>
<td>1,440</td>
<td>&gt; Engaging new employers to hire co-op students is necessary to keep up with enrolment demands, new programs, and changing student employment needs for employers in a variety of disciplines.</td>
</tr>
<tr>
<td>Employer rating of student performance as very good to outstanding</td>
<td>93.1%</td>
<td>93.2%</td>
<td>93.3%</td>
<td>93.5%</td>
<td>&gt; Students who achieve a rating above unsatisfactory receive credit for their work term. Students who fail work terms receive remedial action.</td>
</tr>
</tbody>
</table>

WHAT WE DID IN 2016/17

> New approaches to employer recruitment included organizational changes to distribute business development resources to the five regional teams across Canada (West, Central East, Central West, GTA, East), the addition of two business developers to marketing, and a new market researcher to provide data-driven strategic information to the team. This change facilitates a regional, labour-market driven approach to strategic marketing and job development, and shifts resources to where student employment need is greatest. Strategic plans aligned to specific targets for each regional team will be in place for most regions by end of 2017.

> Marketing outreach continues to identify, cultivate, and manage the strongest number of relevant prospective employer leads from attendance and participation in over 50 industry-based conferences and tradeshows a year. The number of prospective employer inquiries by email, phone, and web has increased over 300% in the past three years.

OBJECTIVE 4 | Achieve a closer integration of research opportunities and co-op work terms

WHAT WE DID IN 2016/17

> Waterloo’s Senate approved a co-op specialization in research as part of its new co-op certificate program. The co-op research certificate recognizes students who choose to work in research-focused positions during at least three work terms and complete the research professional development and capstone requirements. Plans are underway to develop a professional development course in research fundamentals for interested co-op students.

OBJECTIVE 5 | Expand experiential education to include service-based activities and international programs

WHAT WE DID IN 2016/17

> Both flex terms and the EDGE program will incorporate service-based and international activities as ways to fulfill either co-op or EDGE program requirements.

> The EDGE program extends experiential education to service-based activities by allowing students to pair their volunteer experiences with the completion of a professional development course. Students enhance their learning, receive feedback on their performance, and reflect on the role that service-based experiences play in their personal and professional development.

> Philanthropic contributions have provided opportunities for paid co-op work terms at the United Way.

> The Canadian European Union (CANEU) Consortium Partners for Strengthening Transatlantic Student Mobility in Co-operative Education, known as CANEU COOP, is a partnership between the University of Waterloo, the University of Victoria, and two European institutions. It was recognized with an award for Outstanding Program in International Education, by the British Columbia Council for International Education.

> Co-op maintained a steady level of international mobility last year despite the shifting socio-political landscape.
### OBJECTIVE 1 | Enhance student opportunities to participate in entrepreneurial activities

#### WHAT WE DID IN 2016/17

**Student enrolment in both credit and non-credit courses, workshops, and events related to entrepreneurship**

<table>
<thead>
<tr>
<th>2013/14</th>
<th>2014/15</th>
<th>2015/16</th>
<th>2016/17</th>
</tr>
</thead>
<tbody>
<tr>
<td>10,002</td>
<td>12,416</td>
<td>15,694</td>
<td>16,759</td>
</tr>
</tbody>
</table>

**Number of for-credit and non-credit courses, workshops, and events related to entrepreneurship**

<table>
<thead>
<tr>
<th>2013/14</th>
<th>2014/15</th>
<th>2015/16</th>
<th>2016/17</th>
</tr>
</thead>
<tbody>
<tr>
<td>239</td>
<td>291</td>
<td>387</td>
<td>523</td>
</tr>
</tbody>
</table>

**Source:** IAP + Student Entrepreneurship Measures Group

> Engaging more students in all forms of entrepreneurship endeavours is a key predictor of future entrepreneurship success of Waterloo students and alumni, and injects an entrepreneurial spirit across the University.

> Total enrolment in entrepreneurial activities increased by 6.8% in 2016/17 over 2015/16.

> There was an overall increase of 35.1% in the number of for-credit and non-credit courses, workshops, and events focused on entrepreneurship between 2015/16 and 2016/17. Considered by type of for-credit or non-credit activity, the number of for-credit courses increased by 13.5% and non-credit events and workshops increased by 28.1% and 58.0% respectively.

> Waterloo is steadily increasing the number of entrepreneurial activities available to students, making them more accessible, and increasing participation.

### OBJECTIVE 2 | Build relationships and generate opportunities with entrepreneurial communities and agencies

#### WHAT WE DID IN 2016/17

> Increased student access to the World’s Challenge Challenge, an inter-university competition, and the Problem Pitch Competition, a new competition developed with the Problem Lab, to encourage entrepreneurs to focus more deeply on a problem before addressing solutions. More than 150 students from all Faculties took part in the competitions. Regardless of competition outcomes, Velocity works with all participating students.

> The third cohort of the GreenHouse Social Impact Incubator co-operative education program placed 34 first-term co-op students with 27 regional social ventures.

> GreenHouse hosted nearly 30 events and over 800 students participated in these entrepreneurship experiences. Greenhouse also launched a new credit course for its live-in social incubator, and a second course will be added in fall 2017. The majority of students (70%) participating in GreenHouse were from the non-science, technology, engineering, and mathematics (STEM) disciplines. The program also maintained gender-balanced representation among participants.

> Twenty-two engineering students won a total of $60K at the 2017 Norman Esch Entrepreneurship Awards for Capstone Design competition.

> Engineer of the Future Fund awarded $53K in micro-seed funding to Waterloo Engineering students to support entrepreneurial initiatives.

> Program requirements for Conrad Business Entrepreneurship and Technology’s (CBET) entrepreneurship minor program have been refined and three new courses developed for the upcoming year.

> GreenHouse completed a $10M capital expansion to provide new learning and discovery space. The new space will open in fall 2017.

> Waterloo's student club Entrepreneurship Society (EntSoc) is now working with Startup Waterloo to increase awareness and exposure to entrepreneurship, including students not typically engaged in entrepreneurship activities.

> Hosted six ConradConnect Live events to create and support a broader entrepreneurship community at Waterloo. Events were offered to all students, and 417 participated. ConradConnect also hosted workshops on a variety of themes of interest to entrepreneurial students.

### OBJECTIVE 3 | Advance commercialization and other forms of utilization of leading-edge entrepreneurial research and intellectual property

#### WHAT WE DID IN 2016/17

> More than 10,000 people tour Velocity Garage each year. This includes politicians and business leaders, influencers, venture capitalists, university/college leaders, school groups, and community members.

> Velocity secured an additional $327K in Canada Accelerator & Incubator Program (CAIP) funding over three years to help grow hardware/science startups.

> More than 1,000 students participated in the annual Hack the North hackathon, organized by Waterloo students and the Faculty of Engineering.

> The Water Network and the de Gaspé Beaubien Foundation created a new annual AquaHacking Challenge to find solutions for Lake Erie water issues. More than 350 students participated in the Challenge.

> Conrad Master of Business, Entrepreneurship and Technology (MBET) hosted three different international student entrepreneurship programs in summer 2017: Tec de Monterrey/Mexico, University of Santiago/Chile, and University of Strathmore/Kenya.

### MEASURES | 2013/14 | 2014/15 | 2015/16 | 2016/17

#### Investment funding of Waterloo ventures by student type

<table>
<thead>
<tr>
<th>2013/14</th>
<th>2014/15</th>
<th>2015/16</th>
<th>2016/17</th>
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<tbody>
<tr>
<td>$3.9M</td>
<td>$15.7M</td>
<td>$4.4M</td>
<td>$21.0M</td>
</tr>
</tbody>
</table>

**Source:** Entrepreneurship theme

> Investment funding secured for undergraduate and recent alumni entrepreneurial activities is one way to understand the scope and intensity of entrepreneurial activity at Waterloo.

> While the amount of investment funding secured by student-related ventures has fluctuated, there appears to be an overall upward trend in the amount of funding secured.

> Investment funding data is collected from surveys conducted with Waterloo student and alumni companies, one-on-one meetings with Waterloo-based companies, and media coverage. Variations in data reported may result from self-reporting and data gathering discrepancies.
WHAT WE DID IN 2016/17

> Expansion and renovations to Velocity Garage were completed in fall 2016. The new space is 37K sq ft and includes a science lab, assembly space, a workshop, a prototyping lab, co-working space, and meeting rooms. In 2015/16, Velocity housed 114 companies in Velocity Garage and 28 companies in Velocity Science.

> Waterloo Commercialization Office (WatCo) delivered 16 intellectual property (IP) education and awareness workshops, referred to as IP 101, including approximately 100 students participating in Applied Health Sciences’ (AHS) Hack4Health initiative. WatCo also developed and hosted a two-day workshop on IP and commercialization to students in the Natural Sciences and Engineering Research Council (NSERC)-funded Training toward Environmentally Responsible Resource Extraction-Collaborative, Research and Training Experience (TERRE-CREATE) program. The workshops incorporated a case study and work exercises.

> Velocity has added more supports for science and hard-tech companies and is building connections to other ecosystem supports that enable hard-tech innovation (e.g., IndieBio, Biomedical Zone, Office of Research & Ethics, and Hospital Innovation Groups). This has also led to an increase in the number of Masters/PhD student thesis projects being converted into commercially-viable start-ups.

> Velocity Garage launched new “Investor Meetings” to better connect incubator companies with investors. These meetings allow face-to-face interaction with potential investors who provide feedback and are a starting point for important founder/investor relationships.

> Over this past year, WatCo continued to lead Waterloo’s collaboration with the Accelerator Centre (AC). Through the AC JumpStart program, 12 Waterloo alumni-initiated startups received seed investments worth $720K cash and $120K in-kind mentoring.

WHAT DO WE WANT TO ACHIEVE IN 2016/17

OBJECTIVE 3 (Cont’d) | Advance commercialization and other forms of utilization of leading-edge entrepreneurial research and intellectual property

<table>
<thead>
<tr>
<th>MEASURES</th>
<th>2013/14</th>
<th>2014/15</th>
<th>2015/16</th>
<th>2016/17</th>
<th>WHAT DOES THIS MEAN?</th>
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<tbody>
<tr>
<td>Proportion of Velocity-based ventures that are still active after one year</td>
<td></td>
<td></td>
<td></td>
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<td>84.3% 90.7% 87.0% 89.0%</td>
</tr>
<tr>
<td>Source: Velocity</td>
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</table>

> New ventures’ survival rates after one year (the number of ventures that are still active or have been acquired after one year) are an industry standard, and provides an opportunity to understand how Waterloo supports and advances commercialization for University-based ventures.

> Waterloo provides important supports for Waterloo-based ventures. These supports ensure that Waterloo-based ventures are well-positioned to survive at least one year.

> The proportion of Velocity-based ventures that survived one year has remained relatively stable over four years.

WHAT WE DID IN 2016/17

> Worked with Chinese investors to raise $26M in venture capital funds for Waterloo startups co-locating in China.

> WatCo developed a new presentation on Waterloo’s creator-owned Intellectual Property policy and presented it to 300 students.

> GreenHouse is developing an ad hoc research network between campus-linked accelerators (CLAs) to explore learning outcomes supported by entrepreneurship training.

> WatCo continued providing assistance to a number of seed startup companies, including the following examples:

- secured seed funding for the creation of a Hangzhou (China) startup to commercialize an Atomic Force Microscopy (AFM) tip, manufacturing technology developed by Professor Bo Cui;
- licensed additional new technology to KA Imaging Inc. to support them in receiving a $1M Grand Challenges grant for targeting developing world applications;
- provided negotiation support for Wattech Power Inc., developer of a zinc-air flow battery technology and SSIMwave, developer of real-time video analytics software, to secure significant follow-on investment;
- worked with Grand River Hospital to secure a license for software developed by Professor Helen Chen to enable the efficient transferring of patient data into government reporting and billing systems; and
- licensed educational materials developed by AHS’s Murray Alzheimer Research and Education Program (MAREP) to several not-for-profit agencies to use as resources for caregivers.

OBJECTIVE 4 | Make entrepreneurship a key element of the Waterloo brand

<table>
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<tr>
<th>MEASURES</th>
<th>2013/14</th>
<th>2014/15</th>
<th>2015/16</th>
<th>2016/17</th>
<th>WHAT DOES THIS MEAN?</th>
</tr>
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<tbody>
<tr>
<td>Waterloo’s rank in Maclean’s “most innovative university” category</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>#1 #1 #1 #1</td>
</tr>
<tr>
<td>Source: Maclean’s University Ranking</td>
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</table>

> Innovation is an important element of Waterloo’s entrepreneurship brand. Maclean’s “most innovative university” ranking is one way to understand how Waterloo’s brand is perceived nationally.

> Waterloo was ranked #1 in Maclean’s “most innovative university” category for the 25th year in a row.

> While important as an indicator of prestige, this indicator is dependent on the consistency of the survey methodology.

> Venture Capital Pitchbook created a ranking of the top international universities producing venture capital-backed entrepreneurs.

> Venture capital assessment and ranking is one of a very few objective indicators that allow institutional comparisons.

WHAT WE DID IN 2016/17

> Fall 2016 and spring 2017 editions of Waterloo Magazine, with a circulation of more than 190K alumni, contained several stories that promoted Waterloo’s entrepreneurial culture.

> Multiple media mentions in national publications (Globe and Mail, Financial Post and Huffington Post) that link the University of Waterloo to entrepreneurship.

> More than 30 stories published on Waterloo’s homepage celebrating entrepreneurship.

> The Waterloo Innovation Summit in September 2016 brought together some of the world’s top private and public sector leaders to tackle the disruptive and defining trends that are driving innovation and entrepreneurship in Canada and globally.
OBJECTIVE 1 | Be recognized internationally for excellence and innovation in research, scholarship, and education

<table>
<thead>
<tr>
<th>MEASURES</th>
<th>2013/14</th>
<th>2014/15</th>
<th>2015/16</th>
<th>2016/17</th>
<th>WHAT DOES THIS MEAN?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Infosource ranking (comprehensive universities)</td>
<td>#1</td>
<td>#1</td>
<td>#1</td>
<td>#1</td>
<td>&gt; Ranking of research and scholarship at Canadian universities is one way to understand research and innovation excellence. &gt; Waterloo has maintained this top ranking for eight years, which is compelling testimony to the quality and impact of its research.</td>
</tr>
</tbody>
</table>

Source: Research Infosource

WHAT WE DID IN 2016/17

> Appointed an inaugural Awards Officer to work closely with Waterloo faculty to identify, pursue, and facilitate nominations of Waterloo faculty for prestigious research awards and honours. Importantly, in the Maclean's annual ranking awards category, Waterloo has risen from 14th in 2010 to 7th place in 2016.

> Since 2011, Waterloo’s International Research Partnership Grant (IPRG) program has funded 122 projects, with an investment of over $1.6M and leveraged more than $2.4M in matching funds, for a total in excess of $13.3M in new grants awarded to Waterloo researchers.

OBJECTIVE 2 | Enable conditions which support research excellence and impact

WHAT WE DID IN 2016/17

> Continued implementation of the Research Gateway Project. Kuali, a new ethics data system, is scheduled to be launched in February, 2018. The first phase of the Pure Researcher Portal will be launched in the spring of 2018, and Phase 2 is expected to go live in the early fall of 2018.

> Continued development of the Research Metrics Framework to streamline the provision of bibliometrics data for major funding applications and to inform discipline benchmarking processes.

> Hired a new manager to support foundation funding and non-profit public sector partnerships. Results from this new investment include a $125K contract for research on affordable transit, a $3M grant from the Canadian Frailty Network, and fulfillment of in-kind matching requirements for grants from the Canadian Institutes of Health Research (CIHR) and the Social Sciences and Humanities Research Council (SSHRC).

> Technical positions in science, technology, engineering, and mathematics (STEM) established in 2015/16 continue to have a positive impact on facilitating the use of major research equipment and facilities. New project management and accountant positions are now available on a cost-recovery basis for principal investigators (PIs) and their teams to reduce administrative burdens on them.

> The new Role of the PI resource is now available to support PIs understand and meet research project compliance obligations.

> Review of Policy 73, Intellectual Property (IP) Rights, has been initiated.

> Developed and implemented a new version of the web-based form for reporting IP and commercialization disclosures which is easier to complete and resulted in broader use of the form by the professoriate during 2016/17.

> Created a Canada Research Chair Equity Action Plan Steering Committee to ensure Waterloo is an equitable, diverse, and inclusive community for those in the Canada Research Chair (CRC) Program, and the University at large.

OBJECTIVE 3 | Increase interdisciplinary and trans-disciplinary research globally, nationally, and locally

WHAT WE DID IN 2016/17

> Submitted proposals for major funding in support of transdisciplinary research in additive manufacturing, climate change, adaptive robotics and machine intelligence, next generation cryptographic technologies, transformative quantum technologies, and global water futures. Funding was received for additive manufacturing, transformative quantum technologies, and global water futures. These are all areas in which the University demonstrates significant strength.

> Central funding for four University research institutes has been renewed: Institute for Quantum Computing, Waterloo Institute for Nanotechnology, Waterloo Institute for Sustainable Energy, and the Water Institute. The Games Institute, the Centre for Bioengineering and Biotechnology, and the Cybersecurity and Privacy Institute were named as University Centres or Institutes in early 2017.

OBJECTIVE 4 | Strengthen the relationship between research and teaching at the undergraduate level

WHAT WE DID IN 2016/17

> Continued to work with Faculties and Co-operative Education and Career Action (CECA) to enhance opportunities for undergraduate research experience (e.g., co-op specialization in research). Forty per cent of Waterloo first-year students surveyed hope to work with a faculty member on a research project at some point during their undergraduate program.

> New co-op research certificate approved by Senate. Beginning in fall 2018, co-op students who have completed at least three research-focused co-op terms and a professional development and capstone requirement will be able to receive a co-op research certificate in addition to the co-op designation degree.
OBJECTIVE 5 | Build greater awareness, nationally and globally, of Waterloo’s research productivity and impact

WHAT WE DID IN 2016/17

> Proposals for two additional Canada Excellence Research Chairs were submitted in late spring 2017; one in Adaptive Robotics and Machine Intelligence, the other in Next Generation Cryptographic Technologies.

> Preparation for the submission of applications for Canada 150 Research Chairs in new and emerging areas of research was initiated. The submission deadline is September 2017.

OBJECTIVE 6 | Identify and seize opportunities to lead in new/emerging research areas

WHAT WE DID IN 2016/17

> Hired four Research Partnership Managers (three in corporate research, one in non-profit/public sector) to increase the number of research partnerships and attendant funding.

> Initiated a new annual publication, Year in Review, to highlight innovative research accomplishments. This publication will be distributed to Waterloo’s stakeholders including current and potential domestic and international research partners, as well as key government leaders.
UNIVERSITY OF WATERLOO

OUTSTANDING ACADEMIC PROGRAMMING
Progress and Outcomes | Fall 2017 Update

OBJECTIVE 1 | Educate graduates uniquely prepared to address the challenges and opportunities of the 21st century

<table>
<thead>
<tr>
<th>MEASURES</th>
<th>2013/14</th>
<th>2014/15</th>
<th>2015/16</th>
<th>2016/17</th>
<th>WHAT DOES THIS MEAN?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graduate student enrolment in professional and skills workshops</td>
<td>WORKSHOP OFFERED</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>704</td>
<td>900</td>
<td>744</td>
<td>754</td>
<td>&gt; Graduate student workshops offer opportunities for participants to develop a variety of professional skills beyond their academic degrees.</td>
</tr>
<tr>
<td></td>
<td>PARTICIPATION</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>4,752</td>
<td>5,301</td>
<td>6,894</td>
<td>7,567</td>
<td>&gt; Changes in the number of workshops and participants reflects organizational changes in how workshops are offered and new workshops being included.</td>
</tr>
<tr>
<td>Source: Graduate Studies and Postdoctoral Affairs (GSPA)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Undergraduate first-year and senior students’ perception of Waterloo’s contribution to selected skills</td>
<td>SPEAKING CLEARLY AND EFFECTIVELY</td>
<td>WRITING CLEARLY AND EFFECTIVELY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2014</td>
<td>48.3%</td>
<td>2014</td>
<td>54.7%</td>
<td>&gt; National surveys offer an opportunity to understand Waterloo students’ perceptions about their academic and skill development.</td>
</tr>
<tr>
<td></td>
<td>2017</td>
<td>50.4%</td>
<td>2017</td>
<td>57.3%</td>
<td>&gt; Oral and written communications are important skills required by graduates, and will be monitored to understand changes. See the What We Did section for more information.</td>
</tr>
<tr>
<td>Source: National Survey of Student Engagement (NSSE) 2014 and 2017 Q17</td>
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</table>

WHAT WE DID IN 2016/17

> Completed the Strategic Enrolment Management (SEM) pilot project in the Faculty of Arts. A new strategic enrolment manager was hired to develop, refine, and implement plans with all Faculties as part of an institution-wide plan.

> The Writing and Communication Centre (WCC) in partnership with Graduate Studies and Postdoctoral Affairs (GSPA) launched a new Thesis Fundamentals program for graduate students beginning the thesis and dissertation writing process. A three-day pilot academic speaking program for doctoral students was offered in July 2017, and will be delivered on a term basis going forward.

> With funding from eCampusOntario, Waterloo has partnered with Carleton, Ottawa, and Ryerson to determine the need and possible formats for a provincially-available certificate program in online teaching. Recommendations will be submitted in fall 2017.

> The Business at Waterloo Programs report was presented to leadership in January 2017. A key recommendation of the report is to create a Waterloo Business Hub that will serve as a creative collision space for business students and instructors, build synergistic opportunities with experiential education and entrepreneurial activities, and be a key differentiator for unconventional business education at Waterloo.

> The Canadian Professional and Graduate Student Survey (CPGSS) data suggest that Waterloo prepares graduate students for a diversity of careers. Over 40% of respondents felt prepared to enter research (48.3%), non-academic (49.4%) or consulting (44.1%) jobs, while about 20% (19.7%) indicated their readiness for entrepreneurial opportunities.

OBJECTIVE 2 | Enhance Waterloo’s excellence in academic programs

<table>
<thead>
<tr>
<th>MEASURES</th>
<th>2013/14</th>
<th>2014/15</th>
<th>2015/16</th>
<th>2016/17</th>
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<tbody>
<tr>
<td>Subject Rankings</td>
<td>TOP 25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer Science, Math</td>
<td>Computer Science, Math</td>
<td>--</td>
<td>Hospitality &amp; Leisure Management Studies*</td>
<td></td>
</tr>
<tr>
<td>Source: Quacquarelli Symonds (QS) World University Rankings, by Subject</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>TOP 50</td>
<td></td>
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<tr>
<td>--</td>
<td>Geography</td>
<td>Computer Science, Geography, Math</td>
<td>Computer Science, Math</td>
<td></td>
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<tr>
<td>TOP 100</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>*New subject added in 2016/17</td>
<td></td>
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</table>

WHAT WE DID IN 2016/17

> In the 2017/18 QS Subject Rankings, Waterloo ranked in 25 of 46 subjects and was ranked in the top 100 in 13 subjects and top 50 in three subjects.

> The Course Evaluation Project Team completed its three-year investigation of a best model for course evaluation at Waterloo. The report will be discussed at the September 2017 Senate meeting.

> Over the fall term, the Committee on Teaching and Learning Spaces solicited feedback from the campus community on newly constructed and renovated classrooms, and rooms in need of renovation. A “best and worst” classrooms survey and tours with instructors and students were completed in December 2016. Plans for renovating two large classrooms are underway.

OBJECTIVE 3 | Ensure teaching quality of the highest international standard

WHAT WE DID IN 2016/17

> The Centre for Teaching Excellence (CTE) built on existing programs to help instructors enhance their skills and knowledge in assessing student learning and developing courses that align learning outcomes, assessments, and instructional activities.
OBJECTIVE 3 (cont’d) | Ensure teaching quality of the highest international standard

> St. Jerome’s University Professor Steven Bednarksi won the Society for Teaching and Learning in Higher Education’s prestigious Desire2Learn Innovation Award in Teaching and Learning. This is the second year in a row that a University of Waterloo faculty member has won this award.

> CTE’s Fundamentals of University Teaching program was accredited by the national Educational Developers Caucus, part of the Society for Teaching and Learning in Higher Education.

> Engineering Professor Gordon Stubley won the 3M National Teaching Fellowship award — the first for Waterloo since 2010.

> CTE’s annual Teaching and Learning Conference had more than 300 registrants, the largest number yet. Most were from Waterloo including faculty members and graduate students from all six Faculties, and more than 60 academic support unit staff members.

OBJECTIVE 4 | Seek global awareness of Waterloo’s teaching expertise

WHAT WE DID IN 2016/17

> CTE continued to develop communication materials to promote awareness of teaching excellence at Waterloo, including three new CTE teaching stories.

> CTE hired new staff to support external teaching award nominations, including developing resources to facilitate nominations and to help match nominees’ strengths and experiences with external awards.

> Waterloo’s Teaching Fellows Program continues to evolve. In 2016/17 the Faculty of Environment appointed two fellows, and the Faculty of Applied Health Sciences appointed three new fellows.

OBJECTIVE 5 | Expand Waterloo’s footprint in the online learning market and provide leading-edge, technology-enabled learning opportunities

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OBJECTIVE 5 | Expand Waterloo’s footprint in the online learning market and provide leading-edge, technology-enabled learning opportunities

WHAT WE DID IN 2016/17

> Through eCampus Ontario, Waterloo received $330K to develop a new graduate diploma in Climate Risk Management (Faculty of Environment) and almost $400K for four research and innovation projects. Two of these will specifically support projects in the Centre for Extended Learning (CEL).

> Waterloo received $387K for the University’s annual Teaching and Learning Conference, which had more than 300 participants.

> The Canadian Association for University Continuing Education (CAUCE) recognized Waterloo with a 2017 Program Award (non-credit programming, under 48 hours category) for its Opioid Education Partnership online program, developed by the School of Pharmacy in partnership with CEL.

> The first two Online Teaching Awards were awarded to Professors Edwin Ng (teaching) and Doug Cowan (course design), both of Renison University College.

> CEL examined the potential for expanding its course offerings into other markets, with a focus on lifelong learners, alumni, and others, and developing new offerings (such as micro credentials) to expand enrolments.

OBJECTIVE 6 | Expand the appropriate use of technologies to enhance students’ learning experience

WHAT WE DID IN 2016/17

> Through eCampus Ontario, Waterloo received $330K to develop a new graduate diploma in Climate Risk Management (Faculty of Environment) and almost $400K for four research and innovation projects. Two of these will specifically support projects in the Centre for Extended Learning (CEL).

> The Ontario Centres of Excellence funded CEL, the University of Guelph, and Crowdmark to improve the assessment process in online courses. The project addresses how to improve delivery and return of exams to and from remote locations, and streamline the assessment processes for distance and classroom learners. An initial pilot of Crowdmark for a winter 2017 online course final exam was successful. Crowdmark enhanced their platform based on feedback for use in spring 2017.

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> CEL examined the potential for expanding its course offerings into other markets, with a focus on lifelong learners, alumni, and others, and developing new offerings (such as micro credentials) to expand enrolments.

> The use of Maple TA and Piazza has increased since 2015/16.
INTERNATIONALIZATION AND WATERLOO

A commitment to international action is vital to achieving Waterloo’s strategic plan, building on our exceptional research, innovation in experiential education, and entrepreneurial focus. This outline provides a high level overview of Waterloo’s focus on building internationalization to support our institutional goals.

WHAT IS INTERNATIONALIZATION?

“...the intentional process of integrating an international, intercultural or global dimension into the purpose, functions and delivery of post-secondary education, in order to enhance the quality of education and research for all students and staff, and to make a meaningful contribution to society.”

- HANS DE WIT, international educator and higher education administrator

WHY IS IT IMPORTANT?

At Waterloo, de Wit’s perspective of internationalization is taking root. We are motivated by a belief that internationalization is vital in the 21st century to meet the world’s most challenging problems, and to respond to its most profound opportunities. The critical issues of our times — artificial intelligence, climate change, social inclusion, and others — are issues that are characterized by complexity. They need multiple lenses employing, for instance, different disciplines and a variety of theoretical foundations. Moreover, world-changing learning and research requires a commitment to bringing in, connecting with, and welcoming international perspectives.

MOVING FORWARD

Ranked as the 34th most internationalized university in the world, we have accomplished much, but have more work to do.

Internationalization contributes to the successful execution of all parts of Waterloo’s mission, as well as most of its strategic goals and objectives. Moving forward, internationalization will be vigorously pursued through multiple means: internationalization at home, internationalization abroad, and through international research and connections. Through these efforts — as is the Waterloo Way — potential synergies across these will always be top of mind.

INTERNATIONALIZATION AT HOME

What does this mean? Waterloo’s campus community is home to a wealth of global perspectives: international students who study here, international staff and faculty who develop their careers here, and Canadian students with their own diverse international experiences. Active and robust information and communication technologies facilitate how the Waterloo community actively engages with the rest of the world.

Why is it important? Allowing all members of the Waterloo community to reap the benefits of global learning, a campus environment that is simultaneously locally-grounded and internationally-connected, is critical. Waterloo will continue to work to advance global engagement by catalyzing, celebrating, and coordinating international and intercultural perspectives.

Almost
1 IN 5 WATERLOO UNDERGRADUATE STUDENTS are international

2 IN 5 WATERLOO GRADUATE STUDENTS are international

OVER 50 STUDENT-RUN CLUBS with an international focus

Participation in events and activities hosted by the International and Canadian Student Network grew by 43.6% since 2015/16

OVER 50% of Waterloo’s regular full-time faculty received a degree from outside of Canada

Moving forward: Waterloo will continue to be a global leader, integrating international experiences and opportunities to transform Waterloo into a vibrant, global-oriented community. Specific initiatives will include engaging international students in a broad range of on-campus activities, providing leadership opportunities for all students who have international experiences to share, celebrating the global diversity at Waterloo, and connecting to the broader international Waterloo community. Internationalization at home enriches our experiences with international perspectives and opportunities, while supporting our international students and faculty in an environment that celebrates and champions international diversity.
INTERNATIONALIZATION ABROAD

What does this mean? Travelling abroad is an important part of Waterloo’s internationalization agenda. Time spent in other countries inevitably makes individuals think differently as they bring their “home experiences” to bear in new settings. An international and intercultural mixing of ideas is thus unavoidable. “Internationalization abroad” refers to the opportunities for students, staff, and faculty to travel to another country.

Why is it important? International travel can be challenging, exhilarating, and enriching. Academic literature suggests that individuals benefit through increased cultural awareness and understanding, improved employment prospects, and enhanced language skills. Conversations with individuals who have spent time in another country often yield anecdotes of a more personal nature: increased resiliency, more appreciation for diversity, greater understanding of oneself, and a heightened gratefulness for one’s home country. Waterloo will continue to offer multiple and varied opportunities for members to travel abroad.

Moving forward: Waterloo currently provides and facilitates a diverse selection of education, learning, and research, including:

- academic exchanges;
- competitions and contests;
- conferences and meetings;
- cultural events;
- field work;
- internships; and
- work terms.

Expanding these opportunities and making them more accessible, is a key focus of Waterloo’s efforts.
GLOBAL PROMINENCE AND INTERNATIONALIZATION
Progress and Outcomes | Fall 2017 Update

OBJECTIVE 1 | Be recognized internationally for excellence and innovation in education, research, and scholarship

<table>
<thead>
<tr>
<th>MEASURES</th>
<th>2013/14</th>
<th>2014/15</th>
<th>2015/16</th>
<th>2016/17</th>
<th>WHAT DOES THIS MEAN?</th>
</tr>
</thead>
<tbody>
<tr>
<td>International students as a proportion of their respective populations</td>
<td>UNDERGRADUATE</td>
<td></td>
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</tr>
<tr>
<td>Source: Institutional Analysis &amp; Planning (IAP)</td>
<td>13.4% (1,809)</td>
<td>14.8% (4,256)</td>
<td>16.5% (4,797)</td>
<td>18.0% (5,988)</td>
<td>&gt; This measure monitors progress in attracting international students to the University.</td>
</tr>
<tr>
<td></td>
<td>34.9% (1,468)</td>
<td>35.7% (1,493)</td>
<td>37.1% (1,558)</td>
<td>38.5% (1,668)</td>
<td>&gt; The number of Waterloo alumni living outside of Canada increased by 4.7% between 2015/16 and 2016/17. This is consistent with prior years.</td>
</tr>
<tr>
<td>Number of Waterloo alumni living outside of Canada</td>
<td>15,000</td>
<td>15,764</td>
<td>16,377</td>
<td>17,154</td>
<td>&gt; Alumni can be found in 150 countries around the world (outside of Canada). Excluding the United States, the top three countries where alumni live have remained the same over the last four years — China, the United Kingdom, and Australia.</td>
</tr>
<tr>
<td>Source: Office of Advancement</td>
<td></td>
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<tr>
<td>International research funding</td>
<td></td>
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<td></td>
<td>&gt; Research funding awarded by international sponsors contributes to achieving international recognition for excellence and innovation in education, research, and scholarship.</td>
</tr>
<tr>
<td>Source: Office of Research</td>
<td>$17.4M</td>
<td>$20.1M</td>
<td>$19.9M</td>
<td>$17.4M</td>
<td>&gt; Research funding data is variable year-over-year and is not correlated directly with international research activity. As an example, in 2016/17 a multinational corporation changed the administration of a single large ($2.1M) research grant from an international office to a domestic office, resulting in a major change in the amount of research funding received from international sources without any real change to overall research funding.</td>
</tr>
<tr>
<td>World University Ranking results</td>
<td>ARWU</td>
<td></td>
<td></td>
<td></td>
<td>&gt; International university rankings provide one way to interpret Waterloo’s performance in excellence and innovation in education, research, and scholarship in an international context.</td>
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<tr>
<td></td>
<td>151-200</td>
<td>201-300</td>
<td>201-300</td>
<td>201-300</td>
<td>&gt; Ranking results have remained relatively stable in 2015/16 and 2016/17.</td>
</tr>
<tr>
<td></td>
<td>QS</td>
<td></td>
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<td></td>
<td>&gt; Many factors may affect ranking results, including changes in ranking methodologies, the composition of reputational survey participants, as well as university program mix and faculty composition (that is, the mix of early and later career stage researchers). Changes in ranking position are not necessarily the result of the changes in the University’s performance. Waterloo’s relative stability and ability to maintain its position is positive.</td>
</tr>
<tr>
<td></td>
<td>THE</td>
<td></td>
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<td>&gt; University rankings for fall 2017 are now available. Please see the Strategic Plan in Action website at uwaterloo.ca/strategic-plan-action.</td>
</tr>
<tr>
<td>Source: IAP</td>
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</table>

WHAT WE DID IN 2016/17

- Graduate Studies and Postdoctoral Affairs (GSPA) established a Graduate International and Admissions Specialist position, to create a more personalized application experience for applicants to the China Scholarship Council program and the Mexico CONACyT scholarship program. Personalized email communications helped increase the number of applicants from Mexico.
- GSPA hosted a meeting with 16 current Mexican international graduate students to discuss their application experiences to the CONACyT scholarship program at Waterloo, to improve the application process, and to enhance recruitment activities.
- GSPA had a virtual booth at the EDUFindMe virtual graduate fair, where they connected with approximately 400 students from around the world and answered students’ questions about attending Waterloo.
- Waterloo co-hosted a tour of four research intensive universities in southwestern Ontario for international secondary school guidance counsellors. This initiative resulted in an increase in applications from the attending international secondary schools.
- The University of Waterloo was selected as one of nine global destinations eligible to host undergraduate and graduate recipients of the Al Ghurair Science Technology Engineering Math (STEM) Scholars Program. Through this program, dozens of underprivileged Arab League country students will receive financial assistance to pursue their educational and professional goals with the University of Waterloo over the next seven years.
- Thirty-four international secondary school students from 14 countries had a two-week interdisciplinary enrichment opportunity at the annual IDEAS Summer Experience program. Students created solutions to some of the world’s most complex issues and learned from all six Waterloo Institutes. Graduates of the IDEAS Summer Experience program have gone on to become successful academic researchers, entrepreneurs, and innovators.
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- The University of Waterloo won the gold award for the Best International Student Recruitment Brochure in the Creative Award Competition at the 12th Quacquarelli Symonds (QS) — Asia-Pacific Professional Leaders in Education Conference and Exhibition.
- Waterloo developed a substantive partnership with the University of Bordeaux to create new joint research and education programs that are primarily self-financed by the universities.
- The President of the National University of Singapore (ranked 12th by the QS World University Rankings), signed a Memorandum of Understanding for academic and research collaboration with the University of Waterloo following a visit that included discussions of Waterloo’s co-op and cybersecurity programs and tours of the Water Institute, Velocity, and the Institute for Quantum Computing.
- Eleven joint-research projects across several Faculties were funded through the International Research Partnership Grant program, in partnership with several leading Chinese institutions. Funded projects included financial risk analysis, sustainable transport programs, and...
OBJECTIVE 1 (cont’d) | Be recognized internationally for excellence and innovation in education, research, and scholarship

> Facebook’s hardware development division announced a new partnership with the University of Waterloo and 16 other world-class universities (including Harvard and Princeton). It aims to allow swifter collaboration on technology research projects.

> At the World Congress Experience 2017, the Society of Automotive Engineers (SAE) International and General Motors announced that the University of Waterloo is one of eight North American finalists that will compete in the upcoming autonomous vehicle design competition, AutoDrive Challenge.™

> At the 2017 Australia-Canada Economic Leadership Forum, President Hamdullahpur participated in a panel to discuss how institutions of higher education can serve as economic engines.

> President Hamdullahpur travelled to South Korea in March 2017 to speak about the co-operative education model with the Korean National Assembly, participated in the Times Higher Education’s Asia Universities Summit, visited with alumni at an evening reception, and networked with local business leaders at a Canadian embassy event.

OBJECTIVE 2 | Educate globally literate and world-ready graduates

### MEASURES

<table>
<thead>
<tr>
<th>Number of international co-op work terms</th>
<th>2013/14</th>
<th>2014/15</th>
<th>2015/16</th>
<th>2016/17</th>
<th>WHAT DOES THIS MEAN?</th>
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<tr>
<td></td>
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<td></td>
<td>&gt; International co-op work terms are one way that Waterloo students can have an international experience.</td>
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<td></td>
<td>&gt; Since 2013/14, the number of international co-op work terms has increased by 32.0%. This upward trend reflects Co-operative Education and Career Action’s (CECA) focus on increasing the number of international experiential opportunities available for Waterloo students. In particular, CECA is trying to increase the number of work opportunities outside the sciences, technology, engineering, and mathematics (STEM) sector.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of outbound students participating in non co-op international experiential learning programs</th>
<th>2013/14</th>
<th>2014/15</th>
<th>2015/16</th>
<th>2016/17</th>
<th>WHAT DOES THIS MEAN?</th>
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<td></td>
<td>&gt; This measure captures the number of Waterloo students who travel internationally for non co-op learning.</td>
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<td>&gt; Waterloo changed how non co-op international experiential learning programs were identified and counted during the course of the strategic plan. Thus, data across years may not be directly comparable.</td>
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<td></td>
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<td>&gt; Increased vigilance and data integrity measures may be partially responsible for the substantive increase in the numbers reported.</td>
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<td>&gt; Waterloo is building knowledge and awareness of international experiential learning opportunities while also increasing the amount and extent of funding support for them.</td>
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</table>

### Outbound mobility map

This map illustrates the countries where Waterloo undergraduate and graduate students are travelling as part of University-sanctioned international experiences. These include both co-op and non co-op opportunities.

Source: CECA and Student Success Office

### WHAT WE DID IN 2016/17

> Staff from Co-operative Education and Career Action (CECA) discussed international work terms at the Global Internship Conference (GIC), the Co-operative Education and Internship Association (CEIA) conference, and the Canadian Association for Co-operative Education (CAFCE) conference.

> The Beijing Institute of Technology selected Waterloo as a recipient of the Study Abroad Scholarship and the China Scholarship Council Degree Scholarship. Waterloo undergraduate and graduate students across all six Faculties will have the opportunity to apply for and receive scholarships to study at the Beijing Institute of Technology during 2018.

> Waterloo increased the number of International Student Experience Awards to support undergraduate and graduate students who engage in eligible study abroad programs, international co-op work terms, internships, or research experience outside of Canada. Donors were given the opportunity to have their donations matched by the University of Waterloo.

> Six three-person student teams competed in the World’s Challenge Challenge at Waterloo to develop a solution to one of the United Nations’ Sustainable Development Goals. The winning team, the RAPTRS, won $1K towards an international travel experience for each participant and advanced to the first International World’s Challenge Challenge competition in May 2017.

> Waterloo hosted its second Model G20 2016 Conference, the only dedicated G20 conference in Canada. Faculty, staff, and students with an interest in global governance took part in the event, investigated global issues, engaged in specialized discourse, and listened to esteemed keynote speakers.

> Twelve Waterloo students participated in the Explore Southern Africa program, a 25-day international program that gives students a non-Western perspective of poverty, education, and community development through experiential learning and travel. The unique itinerary exposed students to challenging conditions, including a visit to Namibia’s impoverished Katutura Township and Robben Island, the maximum security prison that held Nelson Mandela.
VIBRANT STUDENT EXPERIENCE
Progress and Outcomes | Fall 2017 Update

OBJECTIVE 1 | Deliver excellent student services through an integrated student-focused approach

<table>
<thead>
<tr>
<th>MEASURES</th>
<th>RESULTS</th>
<th>WHAT DOES THIS MEAN?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of graduating students satisfied with concern shown by the University</td>
<td></td>
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<tr>
<td>Source: Canadian University Survey Consortium (CUSC) 2012 and 2015 Q1</td>
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<td></td>
</tr>
<tr>
<td>2012</td>
<td>50.3%</td>
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<tr>
<td>2015</td>
<td>48.1%</td>
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<tr>
<td>Satisfied, Very satisfied</td>
<td>&gt; This indicator provides an understanding of students’ satisfaction with the care and concern demonstrated by members of the University community.</td>
<td></td>
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<tr>
<td>&gt; Graduating students’ perception of concern shown by the University has remained consistent. The difference between 2012 and 2015 is not statistically significant.</td>
<td></td>
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<tr>
<td>&gt; CUSC Graduating Year survey will be implemented again in 2018.</td>
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</tbody>
</table>

| Proportion of first-year and graduating undergraduate students reporting University emphasis on helping manage non-academic responsibilities | | |
| Source: National Survey of Student Engagement (NSSE) 2014 and 2017 Q1 | | |
| 2014 | 31.7% | |
| 2017 | 27.4% | |
| Quite a bit, Very much | > Student perception of University supports is one way to understand how they are experiencing University support services. | |
| > CUSC survey data for perception of concern shown by the University is typically used to assess this measure (shown above); however this survey will not be implemented again until 2018. | |
| > The proportion of first-year and graduating undergraduate students who participated in the survey and reported that the University “quite a bit” and “very much” places an emphasis on helping manage non-academic responsibilities declined by 4.3 percentage points between 2014 and 2017. This difference is statistically significant. | |
| > Student experience data is used on an ongoing basis to help Waterloo leadership provide better supports for students. Some of these efforts are described in the What We Did in 2016/17 section. | |

| Proportion of graduate and undergraduate students reporting University interest in well-being of students | | |
| Source: National College Health Association (NCHA) Survey 2016 Q67 | | |
| 2016 | 73.8% | |
| Agree, Strongly agree | > Student perception about University interest in student well-being is one way to understand the effectiveness of student services. | |
| > Almost three-quarters of undergraduate and graduate students who participated in the survey reported that the University shows an interest in the well-being of students. | |
| > NCHA will be administered again in 2019. | |

WHAT WE DID IN 2016/17

> The Student Success Office (SSO), Graduate Studies and Postdoctoral Affairs (GSPA), and the Registrar’s Office used student and staff feedback to develop the new Student Services Centre, to be launched in 2018. The diagram below outlines the development of this new unit. It will provide many common student services more efficiently through online self-service or a single campus location including automated case management, appointment scheduling, and queuing supports to help students make the most efficient use of their time.

> The Student Portal team successfully launched Waterloo’s mobile student portal in fall 2016. Total mobile users now exceed 10K, based on iOS and Android devices. Students have been engaged throughout the development of this new platform. New features are being added, including integration with LEARN and orientation programming, and the addition of mental health resources.

> In partnership with Institutional Analysis and Planning (IAP), a data analysis project has been initiated to create and use a survey framework incorporating five surveys and questions to better assess and understand the quality of the student experience.

> IAP and SSO are leading an initiative with Faculties and other administrative support units to better understand and build collaborative efforts to address student experience data results from the National Survey on Student Engagement with the ultimate objective to improve student experience.

Improved Student Experience

WINTER 2016

LAUNCH 2018

DEVELOP NEW DEDICATED STUDENT SERVICES CENTRE
STREAMLINE STUDENT SERVICES
ENHANCE TECHNOLOGY SUPPORT
REVITALIZE PHYSICAL SPACE IN NEEDLES HALL

OBJECTIVE 2 | Provide enabling experiences, programs and supports, including student leadership development opportunities, in order to develop student potential

<table>
<thead>
<tr>
<th>MEASURES</th>
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<tbody>
<tr>
<td>Proportion of graduating students reported University’s contribution to leadership skills</td>
<td></td>
<td></td>
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<tr>
<td>Source: CUSC 2012 Q15 and 2015 Q1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>50.6%</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>44.5%*</td>
<td></td>
</tr>
<tr>
<td>Much, Very much</td>
<td>&gt; Students’ perception of development opportunities for leadership skills provides an understanding of satisfaction with enabling opportunities. The ability to compare this data is somewhat limited because the wording of the question changed in 2015 from the University’s contribution to leadership skill development to “ability to lead a group to achieve an objective.”</td>
<td></td>
</tr>
<tr>
<td>&gt; CUSC Graduating Year survey will be implemented again in 2018.</td>
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</table>

*Note: Not comparable to other years due to changes in data collection
OBJECTIVE 2 (cont’d) | Provide enabling experiences, programs and supports, including student leadership development opportunities, in order to develop student potential

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<th>MEASURES</th>
<th>RESULTS</th>
<th>WHAT DOES THIS MEAN?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of first-year and graduating undergraduate students reporting University emphasis on providing social opportunities</td>
<td>2014: 53.5%</td>
<td>&gt; Becoming involved in student life offers an opportunity for students to develop their potential outside of classroom experiences.</td>
</tr>
<tr>
<td></td>
<td>2017: 49.1%</td>
<td>&gt; CUSC data is typically used for this indicator; however CUSC will not be implemented again until 2018. In 2015, 71.6% of CUSC graduating respondents were satisfied with opportunities to be involved in student life.</td>
</tr>
</tbody>
</table>

Source: NSSE 2014 and 2017 Q14

WHAT WE DID IN 2016/17

> The President and leadership, with student and staff stakeholders across campus, established the President’s Advisory Committee on Student Mental Health (PAC-SMH) to address the issue of student mental health within the larger societal context. The PAC-SMH established five supporting panels (Academic, Mental Health Experts, Student Services, Student Experiences and Community Partners) to conduct focused analysis on key topics. The panels will collect and review data and information to advise on the progress of mental health initiatives across the University, and examine root causes of student stress, anxiety, and depression, and how to mitigate them. A final report will be completed in early 2018.

> Over 100 Student Leadership Program workshops were offered in 2016/17 with 468 unique participants. Average attendance at workshops increased by 29.6% between 2015/16 and 2016/17. Since 2013, over 500 students have completed the full program (over 70 in 2016/17) which includes 12 workshops, and received their Student Leadership Program e-certificate.

> The Learning Services team collaborated with over 40 faculty and staff members from across campus. Together they developed 22 projects to support student learning and development impacting over 4,200 students. One partnership was the creation of six five-minute presentations that teach students study skills. These presentations are being integrated into key first-year courses.

OBJECTIVE 3 | Develop strong partnerships within and between academic and non-academic units to enhance the positive student experience

WHAT WE DID IN 2017

> Building on a recommendation from the Campus Wellness Planning Team, the Campus Wellness Coordinating Forum was proposed in December 2015. The purpose of this forum is to inventory existing campus student wellness activities, assess expansion opportunities, and identify gaps in approaches to student wellness. Initial meetings have scoped the breadth of the project. Work on this initiative will continue in 2017/18.

OBJECTIVE 4 | Build a community of communities by providing an environment where students, faculty and staff can connect

<table>
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<tr>
<th>MEASURES</th>
<th>RESULTS</th>
<th>WHAT DOES THIS MEAN?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of graduate and professional students reporting quality of office space</td>
<td>2013: 69.3%</td>
<td>&gt; Graduate student and professional student satisfaction with, and rating of, office space are ways to understand Waterloo’s ability to build appropriate community spaces and environment for all students.</td>
</tr>
<tr>
<td></td>
<td>2016: 70.1%</td>
<td>&gt; It is anticipated that Waterloo’s focus on development of new space, and redevelopment of existing space, will impact this survey data.</td>
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<td></td>
<td>Good, Very good, Excellent</td>
<td>&gt; The next CGPSS survey will be implemented in 2019.</td>
</tr>
<tr>
<td>Proportion of first-year students reporting quality of study space (2016)</td>
<td>2013: 77.4%</td>
<td>&gt; Student satisfaction with, and rating of, study space can help to understand Waterloo’s ability to build appropriate community spaces and environments for students.</td>
</tr>
<tr>
<td></td>
<td>2016: 63.2%</td>
<td>&gt; It is anticipated that Waterloo’s focus on development of new space, and redevelopment of existing space, will have important impact on this survey data.</td>
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<tr>
<td></td>
<td>Good, Excellent</td>
<td>&gt; The next CUSC First-Year survey will be implemented in 2019.</td>
</tr>
</tbody>
</table>

Source: Canadian Graduate and Professional Students Survey (CGPSS) 2016, CUSC 2016

WHAT WE DID IN 2016/17

> Between 2013 and 2016, the amount of new student study space available, increased by 18.0%, based on the Council of Ontario Universities space study.

> The Student Life Centre (SLC)/Physical Activities Complex (PAC) Expansion project is under construction and is projected to open in fall 2018. This 63,000+ square feet building will physically connect the SLC and the PAC and will add student study, social, fitness, dining, and collaboration space. See www.uwaterloo.ca/aps/slcpcac.

> Student space was renovated in three important University buildings. This included:
- tables, chairs, and lounge seating installed for eating and social activities in Hagey Hall;
- lounge seating and fixed study tables and chairs with data and electrical capabilities in Burt Matthews Hall; and
- in the Science Teaching Complex more lounge seating and fixed study tables and chairs with electrical capabilities for students’ use.

OBJECTIVE 5 | Deepen the connections between students and the City of Waterloo community

WHAT WE DID IN 2016/17

> Working together with the City of Waterloo’s Town and Gown Committee, Waterloo conducted a Student Housing Survey. Over 6,600 Waterloo students participated in the survey to better understand Waterloo’s student experiences in the community, expectations for housing, distribution of housing in the community, and student’s sense of belonging in Waterloo. Results show that among Waterloo students who responded to the survey, two-thirds (67.3%) reported that living off-campus improved their sense of belonging to the Waterloo community, and almost nine in 10 (89.6%) reported that their interactions with neighbours have been positive.
The University of Waterloo was selected as one of Canada’s Top 100 Employers and one of Waterloo Area’s Top Employers for 2017. Waterloo was recognized for its pension and benefit offerings, retirement preparation programs, vacation allotment for employees, and onsite amenities, among others.

> As part of a comprehensive technology renewal program, launched and/or selected new employee Human Resources (HR) systems, including:
  - a talent acquisition system, iCIMS, to support the hiring of staff. New functionality supports both external and internal candidates accessing job advertisements;
  - a pension system, Ariel, which provides plan members with an improved myPENSIONinfo portal equipped with a user-friendly interface, the ability to view beneficiary designations and annual pension statements, and a tool to generate estimated pension projections; and
  - a Human Resources Management System, Workday, was selected and is being implemented to address Waterloo’s need for an upgraded Human Resources Management System and payroll system.
> Developed a new onboarding website for managers, which includes detailed instructions for hiring and video tutorials to support manager development.
> Continued to conduct exit surveys with all departing employees, launched an employee transfer survey, and developed a survey for new employees. These surveys help build understanding about why employees choose Waterloo, leave the University, and move between departments.

> Increased participation in the Excellence Canada program. Human Resources, the Library, the Office of the Vice-President, Academic and Provost, and Organizational and Human Development achieved silver certifications in the Excellence, Innovation and Wellness (EIW) program. Moving forward, Waterloo is integrating the EIW Standard at the gold level for the University as a whole, as opposed to certifying each Faculty, office, and service unit individually. The Excellence Canada Advisory Committee has conducted a University-wide survey of employees and focus groups with staff, faculty, and Canadian Union of Public Employees (CUPE) employees to begin to assess the University against the EIW Standard.
> Conducted a compensation review of administrative salaries on the USG scale, along with an independent review of the University’s job evaluation process.
> Conducted a University-wide Human Resources (HR) satisfaction survey to gain a better understanding of employees’ satisfaction with HR services. Survey results establish a baseline upon which to measure its progress moving forward in supporting Waterloo’s goal of becoming a destination of choice for talented and engaged employees.
> Launched a new online presence for accessibility at Waterloo, which includes information about legislation, the University’s accessibility services, and a directory of campus accessibility features including entrances, elevators, washrooms, and parking.
OBJECTIVE 2 | Enable staff to fulfill their potential in a career at the University

### MEASURES

<table>
<thead>
<tr>
<th>Measures</th>
<th>2013/14</th>
<th>2014/15</th>
<th>2015/16</th>
<th>2016/17</th>
<th>WHAT DOES THIS MEAN?</th>
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<tbody>
<tr>
<td>Employee participation in Principles of Inclusivity workshops</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt; The number of employees who have completed at least one of the Principles of Inclusivity workshops provides an indication of how Waterloo is building an inclusive employee community.</td>
</tr>
<tr>
<td>Source: Organizational &amp; Human Development (OHD)</td>
<td>577</td>
<td>287</td>
<td>407</td>
<td>389</td>
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<tr>
<td>Number of managers who participated in leadership training</td>
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<td></td>
<td></td>
<td></td>
<td>&gt; The number of managers who participate in leadership training varies annually. Cumulatively, almost 30% of managers have participated in leadership training as of 2016/17.</td>
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<tr>
<td>Source: OHD</td>
<td>31</td>
<td>49</td>
<td>32</td>
<td>96</td>
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<tr>
<td>Proportion of internal staff hires</td>
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<td>&gt; The proportion of internal hires provides an understanding of employee development.</td>
</tr>
<tr>
<td>Source: HR</td>
<td>45.0%</td>
<td>61.2%</td>
<td>49.0%</td>
<td>48.6%</td>
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</table>

### WHAT WE DID IN 2016/17

> Piloted the first cohort experience of Organizational and Human Development’s (OHD) award-winning Principles of Inclusivity seven-workshop series. The Principles of Inclusivity series has been featured at the College and University Professionals Association (CUPA) Human Resources (HR) annual conference, the Guelph Accessibility Conference, and in a special topic webinar for CUPA-HR. The program has also been nominated for the CUPA-HR Inclusivity Award for 2017.

> Reorganized the HR department to better support strategic priorities and the evolving needs of Waterloo's workforce. Changes include an increased focus on process improvement to support departmental continuous improvement activities, including the pilot of an internal Lean consortium to facilitate continuous improvement activities, and to facilitate greater collaboration across departments.

> Increased support and resources to enable a healthy workplace, including:
  - launched a new Employee and Family Assistance Program (EFAP), which includes 24/7 access to confidential counselling services, a website with extensive health and wellness resources, and onsite workshops for employees;
  - delivered 21 workshops for managers as part of a nation-wide case study project with Mindful Employer Canada, sponsored by Ministry of Labour. This study, which began in 2015/16, will build capacity for positive workplace mental health;
  - supported healthy workplace initiatives through the Staff Excellence Fund, including subsidizing participation in the UW Fitness Program for Staff Association members; and
  - announced plans for a health and wellness day and a workplace accessibility day in 2017/18. These University-wide events will raise awareness of wellness and accessibility services and resources.

> In support of the HeForShe 10X10X10 goals, facilitated discussions with faculty members on the development of an academic leadership framework.

> Continued to provide core development workshops throughout the year for staff. All new staff members are now highly encouraged to take all four core development workshops – Integrity Matters, Exceptional Service, Principles of Leadership, Principles of Inclusivity – within their first 12-18 months at Waterloo.

> Welcomed 1,400 employees to the tenth annual Staff Conference, which included a special anniversary event featuring Margaret Trudeau. New in 2016/17, OHD coordinated a Management Development Day, which was attended by 36% of employees in manager or supervisor roles.

> Developed the concept for a Staff Enhancement Experience - Canada (SEE-Canada) Program to provide staff members with the opportunity to travel and engage in collaborative work with partner institutions within Canada. This program complements Waterloo International’s Staff International Experience Fund, which was launched in 2014.

> Coordinated the second cohort of OHD’s Success through Mentorship program aimed at enhancing employee development through paired relationships. The program has been expanded and further developed. This year’s program has been refined to include additional professional development and networking opportunities.

> Continued to implement the OHD’s leadership training programs to increase leadership capacity across campus through leadership training programs including Leadership Essentials, Leadership Foundations, and Success through Mentorship. To share Waterloo’s approach to leadership development, OHD participated in a panel at the Network for Change and Continuous Improvement (NCCI) conference focused on how higher education institutions are responding to this challenge.
OBJECTIVE 1 | Develop a strong, vibrant and integrated community

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<th>MEASURES</th>
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<th>2015/16</th>
<th>2016/17</th>
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</table>
| Proportion of female undergraduate and graduate students at Waterloo | 44.3% | 44.7% | 45.5% | 46.2% | > Student demographic information supports planning and developing equity initiatives that meet the needs of Waterloo’s increasingly diverse community.  
> The proportion of female undergraduate and graduate students at Waterloo has consistently increased by 1.9 percentage points since 2013/14.  
> This data assists with the development and planning of equity initiatives (see objective 3). |
| Source: Institutional Analysis & Planning (IAP) | | | | | |
| Proportion of students registered with AccessAbility Services | | | | | > Waterloo has a diverse student body which includes students with disabilities.  
> The proportion of students registered with AccessAbility Services fluctuates between 3.8% and 6.1% of the student body. In 2016/17, 3.8% of students registered with the office.  
> Waterloo students register with the Office of AccessAbility, to provide information about their condition and identify their needs. |
| Source: AccessAbility Services | 5.1% | 5.4% | 6.1% | 3.8% | |
| Proportion of first-year students who self-identify as a member of a visible minority or racialized group | | | | | > Waterloo attracts students from diverse backgrounds.  
> A slightly greater proportion of first-year students (2.1 percentage points) identified as a member of a visible minority or a racialized group in 2016 compared to 2013.  
> This data is self-reported through the CUSC survey. |
| Source: Canadian University Survey Consortium (CUSC) 2013 QS2 and 2016 Eth1-13 | 2013 | 61.3% | | | |
| Number of staff members who participated in Staff Integrity Workshop | 90 | 54 | 79 | 137 | > Staff participation in integrity workshops provides one way to understand staff engagement with integrity.  
> Over four years, 360 staff have participated in staff integrity workshops at Waterloo.  
> The “Integrity Matters” workshop is slowly becoming recognized as a valuable session for all staff members. |
| Source: Organizational and Human Development (OHD) | | | | | |
| Number of graduate students who participated in Academic Integrity Module | 2,207 | 2,191 | 2,229 | 2,245 | > The number of students who participate in academic integrity learning opportunities can provide an indication of the extent of student engagement with academic integrity at the University.  
> The Academic Integrity Module workshop is required for all graduate students in their first term at Waterloo. This requirement reinforces the importance of integrity in work, study, and play at Waterloo.  
> TARGET: By 2018, 100% of graduate students will have completed the Graduate Academic Integrity Module (Graduate AIM) within their first term at Waterloo. This target has been achieved. Measures are in place to ensure that all graduate students complete AIM. |
| Source: Office of Academic Integrity | | | | | |

WHAT WE DID IN 2016/17

> Continued to expand Academic Leadership Program to include associate chairs and associate deans in 2016. Plans for an integrated staff and academic leadership programs are underway. Both staff and academic (faculty) leaders will be provided with the same set of foundational development programs, with specialized programming suited to their specific responsibilities to follow.

OBJECTIVE 2 | Deepen and broaden the University’s approach to integrity

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<td>Source: Organizational and Human Development (OHD)</td>
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<tr>
<td>Number of graduate students who participated in Academic Integrity Module</td>
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<td>Source: Office of Academic Integrity</td>
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WHAT WE DID IN 2016/17

> Continued to distribute integrity messaging (posters and digital screens) across campus. Other promotional items (post-it notes) were provided to all incoming undergraduate and graduate students.  
> Partnered with Renison University College and received eCampus grant to develop and pilot a mobile application to introduce students to academic integrity (AI). The goal of the project is to develop an effective way to ensure that all new undergraduate students receive AI training.  
> Continued to distribute integrity messaging (posters and digital screens) across campus. Other promotional items (post-it notes) were provided to all incoming undergraduate and graduate students.
OBJECTIVE 3 | Develop a supportive campus community that proactively articulates, promotes, and effects change to achieve equity for students, faculty, and staff through policies, programs, and practice

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<tr>
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</tr>
</thead>
</table>
| Proportion of full-time, female staff | 66.4% | 65.7% | 66.5% | 66.8% | > The proportion of full-time staff who are female is used as an indicator for gender balance. Note that the data for the proportion of female new hires is reported under the Robust Employer Employee Relationship theme.  
> The proportion of full-time, female staff has remained relatively constant, increasing only slightly by 0.4% since 2013/14.  
> Demographic data informs the development of equity initiatives. |
| Source: Human Resources Management System (HRMS) | | | | | |
| Proportion of full-time, regular female faculty | 28.1% | 29.4% | 29.6% | 29.8% | > For equity to thrive, a supportive campus climate is critical. Efforts are underway to increase awareness and support the promotion of equity campus-wide.  
> The proportion of full-time, regular female faculty in 2016/17 was 29.8%, 0.2 percentage points greater than in 2015/16.  
> The proportion of full-time, regular female faculty is used as an indicator for gender equity among University faculty.  
> TARGET: The HeForShe campaign goal is to achieve 30% female representation in the faculty cohort by 2020. The University will continue its efforts to improve gender balance in the faculty cohort, even after the target has been achieved. |
| Source: HRMS | | | | | |
| Number of participants who completed the Equity, Diversity, and Inclusion sessions | 2,122 | 3,251 | 3,262 | > The number of participants who attend learning and development sessions can be an indicator of the extent of awareness of equity and diversity as well as the potential capacity for promoting equity at Waterloo.  
> In 2016/17, 3,262 students and employees participated in equity, diversity and inclusion related learning and development sessions. |
| Source: Equity Office | | | | | |

WHAT WE DID IN 2016/17

> Developed, piloted, and began implementing equitable recruitment strategy for Canada Research Chairs (CRCs), including successful implementation of a tracking survey to assess diversity of the applicant pool.  
> Policy 42, Prevention and Response to Sexual Violence, was established for students, faculty, and staff, effective January 2017. The policy articulates Waterloo’s commitment to address sexual violence. In the coming year the focus will be on providing education, training, and resources for individuals responsible for implementing the Policy.  
> Continue to develop additional components of the Making Spaces Program to create affirming spaces on campus.  
> Achieved annual goal of retrofitting and launching 29% (more than 60) inclusive, single-use washrooms in of 55 campus buildings. This initiative was well received by students, faculty, and staff. Additional retrofitting of washrooms to meet 50% coverage of 55 campus buildings is planned for the next year.  
> Consultations on the processes associated with Policy 33 on Ethical Behaviour by major resource groups (Human Resources, Health and Safety, Conflict Management and Human Rights Office, and Equity Office) are underway. The Policy drafting committee also delivered a preliminary report to the strategic plan steering committee. The report recommended the development of a centre for neutral advice on reporting breaches of ethical behaviour which will co-ordinate supports for individuals, and provide either references to support informal problem resolution, or to a formal complaint case management office. The committee also identified the need for a robust incident management system for tracking and managing concerns and complaints.
**Fall 2017 Update**

**Setting direction for 2020-2025**

**Environmental Scan for 2020-2025**

**Summative Report 2013-2018**

**Consultations for 2020-2025**

**Develop 2020-2025 Strategic Plan**

**Approve 2020-2025 Strategic Plan**

**Develop 2020-2025 implementation plan**

**Launch 2020-2025 Strategic Plan**
HIGHLIGHTS

Waterloo’s six Faculties are vital partners to achievement in all areas of our Strategic Plan. Strategic Plan initiatives have supported Faculty leadership, particularly in the areas of Transformational Research and Outstanding Academic Programming.
Waterloo’s Faculties reported tremendous success in accessing funding in strategic areas in 2016/17. University-wide efforts facilitated Faculty access to resources that support research. Some of these are outlined below.

- Waterloo research projects have real world impacts. Some of these include:
  - leading one of the world’s largest and most comprehensive longitudinal studies of youth to reduce the future cancer burden in Canada using policies and programs;
  - creating tools for risk screening, care coordination, and patient engagement in decision-making, and implementing a standardized comprehensive geriatric assessment instrument in 10 Canadian hospitals;
  - responding to the Truth and Reconciliation Commission in partnership with the Waterloo Aboriginal Education Centre and Indigenous partners to raise awareness through The Mush Hole Project;
  - building a new facility for automotive research and testing;
  - expanding the Multi-Scale Additive Manufacturing Lab, to build new techniques and approaches for automotive and manufacturing processes;
  - approved testing for Autonomous autonomous vehicle platform on all public roads in Ontario;
  - developing new, sustainable strategies for managing hazardous mine waste; and
  - exploring how bacteriophages can combat colon cancer.

- Waterloo researchers also advanced international research activities to address critical multinational issues including developing public health informatics and institutional capacity for linking climate change and health, building data repositories for polar regions, the study of groundwater pollution in arid regions, and management of agriculture pollutants.

- Three Waterloo researchers were named as fellows to the prestigious Royal Society of Canada: Professors Colin MacLeod (Arts), Jennifer Clapp (Environment), and Tamer Özsu (Math). Another three were named as members of the Royal Society of Canada, College of New Scholars, Artists and Scientists: Professors John Turri (Arts) and Zhongwei Chen and John Yeow (Engineering).

**In 2016/17, Waterloo’s Faculties continued to contribute to outstanding academic programming. Some examples of these academic programming successes are highlighted here.**

- Arts teaching staff are implementing efforts to build English language competency skills across the Faculties of Engineering, Math, Science and Environment.

- New undergraduate and graduate courses and programs developed in 2016/17 included a new course-based master’s program in Recreation and Leisure Studies, a new course in Applied Health Sciences (AHS) for non-AHS students, a new minor in Urban Studies in Environment, two first-year Arts courses in Inquiring and Communication and Information and Analysis, and an online graduate diploma in Climate Risk Management. Senate approved a new undergraduate program in Data Science incorporating computer science and statistics.

- Waterloo’s Faculty of Math partnered with international institutions on a new dual degree doctoral program agreement with the Chinese Academy of Sciences, as well as a pan-African network of centres of excellence for postgraduate training, research, and engagement in mathematical sciences.

- Several Faculties continued to improve online learning opportunities through the development of STEM-aware (sciences, technology, engineering, and math) course development platforms, integration of more interactive learning technology into online courses, and the use of augmented online testing and evaluation software.

**Faculties make important contributions to other areas of the strategic plan. These efforts enrich the University as a whole, and especially, student experiences. Some of these initiatives and activities are described here.**

- New and renovated spaces in several Faculties enhance students’ campus experience including the AHS Expansion Building, Toby Jenkins Applied Health Research building, and the Faculty of Arts’ Hagey Hall Hub.

- All Faculties host or support entrepreneurial initiatives for students. This includes AHS’s Hack4Health 2.0 hosted by the Murray Alzheimer Research and Education Program, Arts’ stART up which provides education and mentorship opportunities, and several funds in Engineering to support Capstone Design competitions and student ventures.

- Several Science and Engineering students won numerous external entrepreneurial competitions with their ventures, including Suncayr, Medella Health, Arylla, and Penta Medical.

- Waterloo students across all Faculties participated in a range of experiential and international experiences. In Arts, the number of undergraduate students participating in international exchanges has doubled since 2012/13. Five students from four different Faculties (Arts, Engineering, Environment, and Science) participated in the Waterloo delegation at COP22, Conference of Parties to the United Nations Framework Convention on Climate Change.

- International competitions offer opportunities for students to engage in problem solving in high pressure situations:
  - Waterloo’s NanoRobotics Group captured first place at the Mobile Microrobotics Challenge at the International Conference for Robotics and Automation;
  - Applied Health Science, Arts, and Science students won the 2017 Hult Prize Regionals in London England; and
  - Math students finished sixth out of 568 institutions at the Putnam competition and 13th in the Association for Computing Machinery International Collegiate Programming Contest.

- Creating a better environment for students means tackling difficult issues. The Faculty of Arts hosted a number of initiatives to help students and others develop critical awareness and action to end sexual assault and harassment on campus and beyond.

**LEARN MORE:** [uwaterloo.ca/strategic-plan-action](http://uwaterloo.ca/strategic-plan-action)
STRATEGIC INITIATIVES:

TRANSFORMATIONAL RESEARCH

› The Faculty of Applied Health and Sciences (AHS) expanded its physical footprint with the opening of two new facilities: the AHS Expansion Building and the Toby Jenkins Applied Health Research Building.

› Professor Scott Leatherdale was awarded $1.6M in funding from Canadian Institutes of Health Research (CIHR) to continue the COMPASS study—the world’s largest and most comprehensive longitudinal study of youth focused on using programs and policies to reduce the future cancer burden in Canada.

› The 2016 Patterns and Trends Report, published by the Propel Centre for Population Health Impact, included a special supplement on cannabis use in Canada. The report found that just as many teenagers use cannabis every day as smoke cigarettes, and there is a strong association between tobacco use and marijuana consumption.

› Professor Paul Stolee is project lead on a $2.6M grant from the Canadian Frailty Network to implement tools for risk screening, care coordination, and patient engagement in decision-making. Other AHS investigators include George Heckman, Jacobi Elliott, Samantha Meyer, and Justine Giosa.

› In another grant from the Canadian Frailty Network, Professors John Hirdes, George Heckman, and Heather Keller received funding to implement the standardized interRAI Acute Care Comprehensive Geriatric Assessment instrument in 10 Canadian hospitals. They will also work with other Canadian partners on a cluster randomized trial of targeted advance care planning in nursing homes.

› Quacquarelli Symonds (QS) ranked the University of Waterloo 13th in the world — and first in Canada — for Hospitality and Leisure Management Studies.

› In September, the Faculty released its first Impact Report, Health in 3D. The 32-page publication highlights research contributions across three different dimensions of health and seven impact areas.

› The Ministry of Health and Long-Term Care appointed Professor John Garcia to two task forces: the Executive Steering Committee for the Smoke-Free Ontario Strategy, and the Standards Implementation Task Force for Modernized Ontario Standards for Public Health Programs and Services.

› Researchers from the Department of Recreation and Leisure Studies received a 2017-18 Social Sciences and Humanities Research Council (SSHRC) Connection Grant entitled “Canada 150: engaging leisure legacies/creating leisure legacies.”
The Partnerships in Dementia Care Alliance (PiDC), led by Professor Sherry Dupuis and collaborators, performed nine shows of their research-based drama Cracked: New Light on Dementia — including one performance in conjunction with the Alzheimer Association International Conference in July. The manuscript for the play was also published in ReView: an anthology of plays committed to social justice.

The Professional Practice Center in Health Systems, led by Professors Ian McKillop and Helen Chen, has completed over $1M in knowledge translation projects delivering IT solutions in settings such as dialysis, transplant, cardiac care, and public health. The process has also created new experiential learning opportunities for graduate students.

The Centre of Research Expertise for the Prevention of Musculoskeletal Disorders (CRE-MSD) was selected by the Ontario Ministry of Labour to lead the redevelopment of provincial guidelines for the prevention of musculoskeletal disorders. The two-year $307K project involves multistakeholder, cross-industry sectors. CRE-MSD is also spearheading a national project to develop a Canadian standard to address issues related to paramedic equipment and emergency ground transport. Developed in collaboration with the Canadian Standard Association (CSA), Frontenac County, the Paramedics Association of Canada (PAC), and other industrial partners, the standard is the first of this kind in Canada. It received over $600K in cash and $500K of in-kind funding from Defense Research and Development Canada (DRDC).

Professor Kelly Skinner and colleagues from three universities received a four-year SSHRC Insight Grant to explore the multiplicity of food and social economies and experiences for Indigenous people living in the provincial north and urban centres in Manitoba and Ontario.

The Canadian Index of Wellbeing (CIW) launched its third national report: How are Canadians Really Doing? The report found that while Canada’s economy has recovered from the 2008 recession, well-being has not. In 2014, household spending on culture, and public health. The process has also created new experiential learning opportunities for graduate students.

School of Public Health and Health Systems (SPHSS) faculty members and graduate students participated in a successful Ontario Coalition Institute Workshop on Global Health in September. The Global Health Group, led by Professor Susan Horton, is currently preparing a proposal for a Global Health Institute based in Applied Health Sciences. This initiative builds on the School’s existing strengths in the field. Current projects include the application of health informatics to enable local innovators to tackle challenges in Mongolia and building institutional capacity in Zambia to address linkages between climate change and health.

Professor Joon Lee was one of four researchers from the province to participate in the Ontario-China Young Scientist Exchange Program.

Three new teaching fellows (one from each academic unit) were appointed to raise the profile of teaching and learning in the Faculty. The fellows are responsible for overseeing the annual Applied Health Sciences Teaching Award, which was awarded to Professors Joe Quadrilatero and Elham Satvat in 2016.

On May 8, the Faculty kicked-off its 50th anniversary year with a special lunch and ceremony, followed by a Hallman lecture from the Hon. Anne McLellan. The lecture, which looked at the implications of legalizing marijuana in Canada, was hosted by the School of Public Health and Health Systems to mark their 40th anniversary. Over 225 people, including faculty, staff, alumni, and members of the general public attended the talk.

The new course-based master’s program in Recreation and Leisure Studies welcomed its first cohort in September 2016.

More than 150 students from other Faculties enrolled in AHS 100, Foundations of a Healthy Lifestyle, over two terms. The new course, a complement to AHS 107 (which is mandatory for all AHS students), promotes the basics of health, wellness, and disease prevention.

With support from the Network for Aging Research (NAR), graduate students hosted the second annual Symposium on Aging Research (SoAR) to initiate trans-departmental collaborations and engage in conversations on aging research. This year, SoAR featured a keynote by NAR researcher John Lewis to open the day.

Over 100 high school students competed in the 9th annual Brain Bee competition hosted by the Department of Kinesiology. The event winner advanced to the Canadian Institutes of Health Research Brain Bee.

In November 2016, the Murray Alzheimer Research and Education Program hosted Hack4Health 2.0. The two-day event generated ideas for practical applications to improve the lives of those living with Alzheimer’s disease or multiple sclerosis. Winning concepts included a low-profile bracelet providing a display of the current state of household devices (windows open, doors unlocked) and a personalized medicated transdermal patch based on specific medication plans.

A team of SPHHS students advanced as finalists in the Canadian Evaluation Society Student Case Competition in Vancouver and competed in the final round.
STRATEGIC INITIATIVES:

TRANSFORMATIONAL RESEARCH

- Distinguished honours, awards, and research chairs awarded to Arts faculty and graduates, include:
  - Professor Jim Walker (history) was named Member of the Order of Canada for his influential scholarship on human rights and the role of Black Canadians in advancing racial equity;
  - John English, distinguished professor emeritus (history), was promoted to Officer of the Order of Canada for his contributions to Canada’s political heritage;
  - Professor Colin MacLeod (psychology) was named a Fellow of the Royal Society of Canada;
  - Professor Heather Douglas was named a Fellow of the American Association for the Advancement of Science (AAAS);
  - Professor John Turri (philosophy) was named a member of the College of New Scholars, Artists and Scientists, Royal Society of Canada, and also a Social Sciences and Humanities Research Council (SSHRC) Tier 2 Canada Research Chair (CRC) in Cognitive Science;
  - Professor Ramona Bobocel (psychology) was named a Fellow of the Canadian Psychological Association;
  - Professor Linda Warley (English) won the 2016 Gabrielle Roy Prize for her co-edited book, Canadian Graphic: Picturing Life Narratives;
  - Gord Pennycook’s (PhD ’16 psychology) lead-authored paper, “On the Reception and Detection of Pseudo-Profound Bullshit,” won an Ig Nobel Prize from Harvard University; and
  - Professor Chris Eliasmith (philosophy) was promoted to Tier 1 Natural Sciences and Engineering Research Council (NSERC) Canada Research Chair (CRC) in Theoretical Neuroscience.

- Ashley Rose Mehlenbacher (English) and Igor Grossmann (psychology) each received an Ontario Early Researcher Award.
- Jessie Thistle MA ’16 history, supervised by Professor Susan Roy, is the first Indigenous student to win both a Trudeau and a Vanier fellowship for his PhD studies.
- Professor Naila Keleta-Mae (theatre and performance) delivered the keynote, addressing race and gender issues in Canada, at the University’s International Women’s Day dinner.
- Faculty and staff members in Arts collaborated with the Waterloo Aboriginal Education Centre, along with numerous Indigenous partners, to present The Mush Hole Project, a multidisciplinary performance at Canada’s oldest former residential school in Brantford, followed by a conference, Integrating Knowledges Summit, held at Waterloo.
- Arts and the Waterloo Aboriginal Education Centre have jointly launched the Indigenous Speaker Series, with two speakers presented in winter 2017.
STRATEGIC INITIATIVES:
OUTSTANDING ACADEMIC PROGRAMMING

› Arts continues to lead the Steering Committee, English Language Competency Initiative (SCELCI), with communications programming successfully implemented by Arts teaching staff and faculty in engineering, math, science, and in-progress in environment.

› Arts First director and co-director are well on the way in preparing the September 2018 launch of required first-year courses (Inquiry and Communication and Information and Analysis), with a website currently focused on recruitment of multidisciplinary teaching faculty.

› A working group of faculty and staff members developed an online quiz and related website to help current and prospective students find their best fit among the Faculty’s undergraduate programs in digital media. The fun and informative quiz has been taken 4,000+ times.

› Arts continues to offer and introduce courses that respond to our times. Examples include the English’s Popular Potter, history’s Digital History, and sociology’s International Migration. Such courses are highly engaging while developing critical insights and understanding of current challenges, popular trends, and future employment competencies.

STRATEGIC INITIATIVES:
EXPERIENTIAL AND ENTREPRENEURIAL

› Emma Vossen, a PhD candidate in English, was one of the five national winners of the SSHRC’s annual Storytellers competition; her entry focused on First Person Scholar, a game studies website founded by Waterloo English graduate students.

› A team of economics students, mentored by Professor Jean-Paul Lam, was among the finalists for the Bank of Canada’s Governor’s Challenge, where teams presented policy recommendations for keeping inflation low and stable.

› A group of Global Governance graduate students presented their research insights and ideas by invitation to Global Affairs Canada.

› A School of Accounting and Finance student and alumnus made up half the team who advanced to the finals of the Hult Prize competition for social justice and enterprise.

› A Global Business and Digital Arts student team had their class project implemented in the real world as the redesigned Stratford Police website and mobile app.

› Andria Bianchi, a PhD candidate in philosophy, won runner-up in the University’s Three Minute Thesis competition for her presentation on ethical considerations for those with dementia and sexual consent.

STRATEGIC INITIATIVES:
TEACHING EXCELLENCE

› Arts faculty members led a number of initiatives to help students and others develop critical awareness and action to end sexual assault and harassment on campus and beyond. These included:
  - the Faculty of Arts hosted a four-hour public Rape Culture teach-a-thon in September 2016 which featured 14 short lectures by professors from many departments, who addressed rape culture from their respective disciplinary perspectives; and
  - Drama and Speech Communication offered three fall courses with the shared theme “arresting rape culture;” the courses resulted in the winter term performance Unconscious Curriculum, an expert panel Gendered Violence on Campus: Institutional Policy and Practice, and an interactive art installation.

› Professor Doreen Fraser’s (philosophy) course, Quantum Mechanics for Everyone that focuses in part on leading research at Waterloo, became a regular course offering for any Waterloo undergraduate.

› Professor Frankie Condon (English) won the Federation of Students Excellence in Undergraduate Teaching Award for 2017.

STRATEGIC INITIATIVES:
VIBRANT STUDENT EXPERIENCE

› The Hagey Hall Hub opened in September 2016, just before Orientation Week. The three-story space represents the achievement of a critical strategic goal to enhance the on-campus experience of Arts students; it offers numerous study and social areas with comfortable seating, a coffee shop, and a bookable project room. The Hub’s official grand opening with donors present took place on February 10, 2017.

› Global Governance Master of Arts (MA) candidate Masroora Haque was a member of the Waterloo delegation at COP22, the Conference of Parties to the United Nations Framework Convention on Climate Change, held in Marrakech; she presented a research paper and contributed to action planning for the Paris Agreement.

› The Arts and Business Student Society initiated and led an entrepreneurship event specifically for Arts students called stARTup; it brought together a panel of five young alumni who are entrepreneurs to speak with current students about the ways in which an Arts education and skillset play a vital part in startup ventures.

› The number of Arts undergraduate students participating in international exchange has doubled over five years: in fall 2011, 33 students spent their academic term studying at an international partner university by fall 2016, 64 students participated in study-abroad experiences.
STRATEGIC INITIATIVES:

TRANFORMATIONAL RESEARCH

› Waterloo was ranked the number one school in Canada and 47th in the world for engineering by the U.S. News’ Global University Subject-area Rankings. The University was ranked 60th in the world for engineering and technology by the 2017 QS World University Rankings by Subject.

› Major research chairs and honours earned by Engineering faculty in 2016/17 include:
   - Professor James Craig was awarded a Tier 2 Canada Research Chair in Hydrologic Modelling and Analysis;
   - Canada Research Chair advancement from Tier 2 to Tier 1 was awarded to Professor Chris Eliasmith, cross-appointed to both engineering and philosophy;
   - Canada Research Chair renewals were awarded to Professors Raafat Mansour (Tier 1 in Micro and Nano Integrated Radio Frequency Systems) and Catherine Rosenberg (Tier 1 in the Future Internet);
   - Industrial Research Chairs were awarded to Professors Kaan Inal, Amir Khajepour, and Safieddin Safavi-Naeini;
   - Professor Sanjeev Bedi was awarded $1M as the Natural Sciences and Engineering Research Council (NSERC) Chair in Immersive Design Engineering Activities (IDEAS);
   - Professors Zhongwei Chen and John Yeow were named Members of the Royal Society of Canada’s College of New Scholars, Artists, and Scientists;
   - Professors Manoj Sachdev and Zhou Wang were inducted as fellows of the Canadian Academy of Engineering; and
   - Professional Engineers Ontario awarded medals in 2016 to Professors John Yeow (Engineering Excellence), Susan Tighe (Research & Development), and Lin Tan (Young Engineer).

› Tri-Council research funding earned by Engineering researchers reached a record level ($22.6M), as did total funding from industry sources ($12.5M).

› External research funding in 2016/17 for Engineering research projects was $64.4M, an increase of about 10% from the previous year.

› Three Engineering professors were awarded NSERC Strategic Partnership Grants totalling $1.7M. Engineering researchers also earned 10 NSERC Research Tools and Instruments awards totalling $1.25M.

› Professors Amir Khajepour and Ehsan Toosykerkani were each awarded $4M from the highly competitive Ontario Research Fund - Research Excellence program.

› The Federal Economic Development Agency for Southern Ontario (FedDev Ontario) awarded Ehsan Toosykerkani $8.9M to expand the Multi-Scale Additive Manufacturing Lab.

› Professor Philip Beesley was awarded $2.5M from the Social Sciences and Humanities Research Council (SSHRC) for his work in living architecture systems.

SWIRVE, AN ENDOSCOPE USING INFRARED LIGHT AND A FIBRE OPTIC CABLE DESIGNED AS A CAPSTONE DESIGN PROJECT BY MICHAEL PHILLIPS, LEFT, AND PHIL COOPER, RECEIVED $50K FROM THE PALIHAPITIYA/LAU VENTURE CREATION FUND AND $10K AT THE 2017 NORMAN ESCH ENTREPRENEURSHIP AWARDS COMPETITION.
Professors Mark Hancock, Pin-Han Ho, Ning Jiang, and Stephen Smith were awarded NSERC Discovery Accelerator Supplements awards in 2016.

Ontario’s Early Researcher Awards were received by Professors Vijay Ganesh, Mark Hancock, Hyung-Sool Lee, and Stephen Smith.

The Green and Intelligent Automotive (GAIA) Research Facility for automotive research and testing officially opened in September 2016.

STRATEGIC INITIATIVES:

EXPERIENTIAL EDUCATION

In the past year, Waterloo Engineering students completed a record 8,435 co-op work terms, achieving a 98.4% employment rate. The proportion of work terms filled outside of Canada increased again in 2016, reaching almost 17.9%.

The Alexa Fund Fellowship, supported by Amazon, was launched to provide support for Waterloo Engineering students who are exploring new ways to apply a voice-activated virtual assistant system.

The University of Waterloo NanoRobotics Group, comprised of nanotechnology and software engineering students, captured first place in the Mobile Microrobotics Challenge at the International Conference for Robotics and Automation.

ENTREPRENEURIAL

$60K was awarded at the fourth annual Norman Esch Entrepreneurship Awards for Capstone Design competition for Engineering students. The Esch Foundation committed over $1M in renewed funding to support Enterprise Co-op awards, the Bridging Entrepreneurs to Students program, Master of Business, Entrepreneurship, and Technology scholarships, and Capstone Design awards.

Almost $53K in micro-seed funding was awarded to entrepreneurial Engineering students through the Engineer of the Future Fund.

Waterloo Engineering helped facilitate $400K in funding for three student and faculty-founded companies; Acerta, Elucid, and Knote. The program also offered students access to mentorship from faculty and Silicon Valley entrepreneurs and businesses.

The Palihapitiya/Lau Venture Creation Fund awarded $100K to help Capstone Design projects SWIRVE and VivaSpire become startups.

Medella Health, co-founded by a nanotechnology engineering student, captured an international runner-up award in the 2016 James Dyson Award competition. The smart contact lens that monitors glucose levels was the third project with its genesis in Capstone Design to win a top prize in three years.

Matthew Bailey, Aaron Grant, and Stephen Lake, mechatronics engineering alumni who founded Thalmic Labs in their graduating years, were named to the prestigious 2017 Forbes 30 Under 30 list.

STRATEGIC INITIATIVES:

ACADEMIC PROGRAMMING AND TEACHING EXCELLENCE

As part of an ongoing process of improvement that reflects student and faculty input, many Engineering programs revised their curricula.

Total undergraduate enrolment and the enrolment of women in the Faculty of Engineering again reached all-time highs in 2016 with 7,865 students, of whom more than a quarter — 27% — were women. The proportion of women in the first-year class reached 31% for the first time, up from 22% in 2013.

Of the new first-year students registered in the Faculty of Engineering in fall 2016, 86% had incoming high school averages of 90% or higher and 39% had averages of at least 95%. In both cases, this was a slight increase over fall 2015.

Over 12,300 applications to Engineering programs were received for fall 2017, an increase of about 6% over the previous year. Engineering was unfortunately unable to make offers to over 3,000 students who applied with high school averages of 90% or higher.

For the 2016 calendar year, Engineering awarded 1,209 undergraduate degrees and 643 graduate degrees.

Teaching and profession awards earned in 2016/17 include:

- Professor Sherman Shen was named a University Professor, the University of Waterloo’s highest academic honour;
- Professors Sanjeev Bedi and Dan Davison both received University of Waterloo Distinguished Teacher Awards;
- Professor Gordon Stubley was awarded a 3M National Teaching Fellowship;
- Engineering Graduate Studies established the Faculty of Engineering Award of Excellence in Graduate Supervision. The inaugural recipients were Professors Catherine Burns, Ali Elkamel, Carl Haas, and Susan Tighe;
- Mohammed Nassar, electrical and computer engineering doctoral candidate, was awarded an Amit & Meena Chakma Awards for Exceptional Teaching by a Student; and
- Associate Dean, Outreach, Mary Wells, received the Support of Women in the Engineering Profession Award from Engineers Canada and accepted an NSERC Science Promotion award for her leadership of the Ontario Network of Women in Engineering.
STRATEGIC INITIATIVES:

TRANSFORMATIVE RESEARCH

› In recognition of the significant impact of her career research in environmental politics and her outstanding contributions to the understanding of global food policy and security, School of Environment, Resources, and Sustainability Professor Jennifer Clapp received Canada’s highest academic honour, being named to the Royal Society of Canada.

› The Polar Data repository became the 100th member of the International Council for Science World Data System and was named Canada’s National Antarctic Data Centre.

› Geography and Environmental Management Professors Merrin McCrae and Claude Dugany joined researchers from the Water Institute, the University of Saskatchewan, and other universities on the Global Water Futures initiative, the largest university-led water research program ever funded by the Canada First Research Excellence Fund.

› For his outstanding contribution to the field of ecology, School of Environment, Resources, and Sustainability Professor, Andrew Trant was awarded the prestigious William Skinner Cooper Award. Trant’s recent study found that 13,000 years of repeated human occupation by coastal First Nations enhanced temperate rainforest productivity.

› The Intact Centre for Climate Adaptation forged several partnerships and created programs to enhance knowledge mobilization, including the Home Flood Protection Program with the City of Burlington, and a report of best practices for making new residential communities flood-resilient with Standards Council Canada.

› School of Environment, Enterprise, and Development Professor Amelia Clarke gave international presentations at the United Nations Habitat III in Quito, Ecuador and the International Conference on Sustainable Development conference in New York City on the important role of partnerships in achieving the Sustainable Development Goals.

› Environment welcomed Banting Fellow Olivier Roy-Baillargeon, who joined the School of Planning to study transit adjacent communities with Pierre Filion.

› Two Environment professors were granted Ontario Early Researcher Awards: Knowledge Integration’s John McClevey to study the development of free/libre open source software in massive inter-organizational collaboration networks, and geography’s Derek Robinson who will use drones to better understand the impacts of climate, technology, and policy on Ontario farming.
› Professor Sean Geobey of the School of Environment, Enterprise, and Development, and his graduate students partnered with the City of Kitchener through the Smart Region Initiative to pilot a participatory budget experiment.

› In recognition of his pioneering research on tourism and climate change, Distinguished Professor Emeritus Geoffrey Wall was awarded the United Nations World Tourism Organization Ulysses Award for Excellence in the Creation and Dissemination of Knowledge in Tourism.

› Helping Canadians to prepare, respond to, and measure a changing climate, Shawna Peddle, director of the Partners for Action Research Network, was a featured presenter at the 2016 Livable Cities Forum.

› Widely respected lawyer and the newest faculty member to join the School of Environment, Enterprise, and Development, Marie-Claire Cordonier Segger was awarded the 2016 Justica Regonorum Fundamentum award for exemplary, outstanding achievement and professional activities carried out in the field of protection of human rights.

› School of Planning professor Leia Minaker received a Career Development Award from the Canadian Cancer Society Research Institute for her work on lifestyle behaviours that prevent cancer in Canadian youth.

STRATEGIC INITIATIVES:

OUTSTANDING ACADEMIC PROGRAMMING

› The Faculty of Environment broke all previous attendance records welcoming world-renowned economist and development expert, Jeffrey Sachs, as keynote for the 2017 TD Walter Bean Lecture in the Environment.

› The Faculty of Environment hosted the largest Canadian Association of Geographer’s — Ontario Division conference in the organization’s history.

› A testament to the quality of their education, three female Environment alumni were named to Corporate Knights Top 30 Under 30 for Sustainability: Morgan Book, Tahnee Prior, and Dana Decent.

› The School of Planning announced a new minor in Urban Studies.

› Challenging students to see sustainability through a different lens, School of Environment, Resources and Sustainability professor Rob de Loë offered the first-ever Photography for Sustainability course.

› The Department of Geography and Environmental Management was awarded $330K from eCampus Ontario to create an online graduate diploma in Climate Risk Management.

STRATEGIC INITIATIVES:

EXPERIENTIAL EDUCATION | VIBRANT STUDENT EXPERIENCE

› The first cohort of young pilots trained under Sunwing Airlines’ intensive cadet program — Cameron Fuchs, Spencer Leckie, Siobhan O’Hanlon, and Chelsea Anne Edwards — were hired upon graduation as First Officers. The successful cadet program was renewed for another year.

› For the third year in a row, faculty and staff from the Faculty of Environment led a student delegation to the Conference of Parties (COP) climate change conference. The 2017 team attending COP22 in Marrakech, Morocco included five students from four different Faculties across campus.

› Five School of Planning students were selected to travel to Japan as part of a nine day Japan Friendship Ties Program called ‘Kakehashi’. The students visited the Earthquake Disaster Reconstruction site, met with students studying planning in Japan, and learned about the infrastructure and politics involved in the planning of a city the size of Tokyo.

› The Faculty launched its Leadership Breakfast Series which provides an opportunity for current student leaders to meet, learn from, and network with, established alumni over waffles and coffee.

› Alumni, students, donors, and the campus community came together to celebrate female entrepreneurship at the screening of Dream, Girl; a documentary co-produced by alumnus Komal Minhas.

› The TD Friends of the Environment Foundation donated seed funding for the Waterloo Urban Forest Revitalization Project to turn a “hidden gem” campus woodlot into a vibrant living laboratory for the campus and broader community.

› Parlaying his passion for sustainable urban food systems, fourth-year planning student Michael Wideman founded Eggplantr. He joined St. Paul’s Greenhouse, placed second in the Jack Rosen Memorial Awards, won a Velocity $5K final, and has recently been accepted into Velocity Garage.

› The Faculty of Environment hosted its inaugural Awards Banquet to thank donors and recognize hard working student scholarship recipients.

› The 2017 Faculty of Environment holiday video was named one of the season’s Best University Holiday videos by Higher Education Marketing and College Web Editor.
STRATEGIC INITIATIVES:

TRANSFORMATIONAL RESEARCH

› The University of Waterloo is recognized as a world leader in mathematics and computer science. In 2016/17, the QS World University Rankings by Subject ranked mathematics at Waterloo 34th and computer science and information systems 31st. The Times Higher Education World University Rankings by Subject ranked Waterloo 23rd in the world for computer science.

› Faculty of Mathematics researchers earned $6.7M in funding from the Natural Sciences and Engineering Research Council (NSERC) in 2016/17, including a record high of $5.7M in Discovery Grants. NSERC funding to the Faculty increased by 13% since 2012/13.

› Professors Jo Atlee and Nancy Day are part of the Autonomoose autonomous vehicle platform project, an interdisciplinary research project that received government approval in November 2016 to test their autonomous vehicle platform innovations on all public roads in Ontario.

› Mathematics faculty continued to receive prestigious national and international awards, including:
  - Professor Raouf Boutaba was awarded a French National Institute for Computer Science and Applied Mathematics International Chair for 2017-2021;
  - Professor Ihab Ilyas now holds the Thomson Reuters-funded Research Chair in Data Cleaning from Theory to Practice;
  - Professor Tamer Özsu was named a Fellow of the Royal Society of Canada in 2016;
  - Professor Karen Yeats received a 2016 Humboldt Research Fellowship;
  - Professor Jo Atlee was named an Association for Computing Machinery Distinguished Member;
  - Distinguished Professor Emeritus John Brzozowski and Professor Ian Munro were recognized with Canadian Association of Computer Science 2016 Lifetime Achievement Awards;
  - Professor Lap Chi Lau won the CS-Can/Info-Can Outstanding Young Computer Science Researcher Award;
  - Professor Thomas Coleman was named a Fellow of the Society for Industrial and Applied Mathematics; and
  - Professor Stefan Steiner received the Brumbaugh Award from the American Society for Quality.
STRATEGIC INITIATIVES:

OUTSTANDING ACADEMIC PROGRAMMING

› A new Mathematics undergraduate program in data science, a discipline requiring substantive tools from computer science and statistics, has been approved by Senate.

› The Bachelor of Mathematics in Financial Analysis and Risk Management program (Finance Specialization) has been recognized by the Chartered Financial Analyst Institute.

› The Faculty of Mathematics has made significant progress toward its strategic goal to increase online learning opportunities. Enrolments in online courses have increased by 87% since 2012/2013. In 2016/17, over 3,200 students enrolled in 44 online sections of 29 courses.

› Building on its partnership with Maplesoft to build high school online courses on the Möbius platform, Waterloo has entered a new partnership to use Möbius to support teaching math at all levels. Möbius uses technology that keeps students actively engaged through interactive applications, visualizations, and immediate feedback.

› Mathematics has introduced and piloted the use of Crowdmark to provide digital support for marking final examinations, tests, and assignments. Integrated with Waterloo’s learning management system LEARN, Crowdmark makes marking faster, provides more immediate feedback for students, and includes quality controls. In less than two years, four million pages of assessments have been marked with Crowdmark.

› Mathematics is incorporating more interactive learning technology, including Piazza, a STEM-aware (science, technology, engineering, and math) online collaborative question and answer platform. In fall 2016, there were more than four million views of Q&A threads on Piazza by students in Faculty of Mathematics courses.

› Teaching Fellow Professor Brian Forrest has been recognized with two external teaching awards in recognition of his outstanding teaching and innovation in the classroom and online: the Mathematical Association of America’s Clarence Stephens Distinguished Teaching Award and the Fields Institute Margaret Sinclair Memorial Award.

› Professor David McKinnon won a 2017 University of Waterloo Distinguished Teacher Award.

› Sessional instructor Michelle Ashburner won the Federation of Students Teaching Award.

› 2016/17 marked record undergraduate and graduate enrolment, which have increased by 16% and 13% respectively over 2012/13. The percentage of women enrolled also reached new highs in 2016/17, with women comprising 35% of undergraduates and 29% of graduate students.

The Faculty of Mathematics’ exceptional academic program quality is reflected in increasing demand by outstanding prospective students. The Faculty received over 14,700 applications for fall 2016 undergraduate admission, an increase of 62% since 2012.

STRATEGIC INITIATIVES:

VIBRANT STUDENT EXPERIENCE

› A new institutional partnership with Thompson Reuters includes access to the Eikon financial analysis system for the Finance Lab, providing students with enhanced opportunities to apply financial theory to practice.

› The Waterloo Black team — Andy Huang, Antonio Molina Lovett, and Jacob Jackson, with coach Troy Vasiga — placed 13th in the 2016 Association for Computing Machinery International Collegiate Programming Contest.

› Gabin Urbancic was awarded the 2016 Daniel G. Wright Undergraduate Scholarship by the Canadian Meteorological and Oceanographic Society.

› A record number of students participated in this year’s Small c Math Contest organized by Professor J. P. Pretti.

› Waterloo finished sixth out of 568 institutions (behind Carnegie Mellon, Princeton, Harvard, MIT, and Stanford) at the Putnam competition, with 26 students among the top 501 individual competitors. Waterloo team members were Daniel Spivak, Anzo Zhao Yang Teh, and Antonio Molina Lovett, coached by Professor Stephen New.

› Colin Behenna was named Top Academic Canadian Interuniversity Sport All-Canadian. Colin is an exceptional varsity hockey player who is also a strong mathematics and business student.

STRATEGIC INITIATIVES:

GLOBAL OUTLOOK

› The READI (Risk Management, Economic Sustainability and Actuarial Science Development in Indonesia) initiative is gaining momentum. An agreement has been signed with the Universitas Prasetiya Mulya to help create an actuarial science co-operative education program there. Sun Life also donated $500K to establish a Fellowship in International Actuarial Science, awarded to Professor Ken Seng Tan.

› The Faculty of Mathematics and the Chinese Academy of Sciences have signed a new dual degree doctoral program agreement.

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STRATEGIC INITIATIVES:
TRANSFORMATIONAL RESEARCH

› Canada Excellence Research Chairs Philippe Van Cappellen and David Cory received more than $90M in funding from the Canada First Research Excellence Fund for water and quantum research.

› Chemist Linda Nazar developed a safe, high-capacity zinc-ion battery that costs half the price of current lithium-ion batteries, yet lasts twice as long.

› Physicist Thomas Jennewein was the first to transmit a quantum key securely from a source on the ground to a receiver on an aircraft.

› The School of Optometry and Vision Science opened a Brain Injury Clinic in fall 2016 and provides comprehensive care, assessment, and rehabilitation to all brain injury patients.

› Optometrist and vision science doctoral student Emmanuel Alabi won the 2017 University of Waterloo Three Minute Thesis Competition. He is the third Science student to win the university level competition in five years.

› Astrophysicist Mike Hudson captured the first composite image of a dark matter bridge that connects galaxies together.

› An interdisciplinary team of biologists and earth scientists discovered Boreal Shield lakes are similar to oceans from the Archean Eon, a period more than 2.5 billion years ago.

› Waterloo Science research has been featured by numerous international, national and regional media outlets including the New Scientist, Motherboard, WIRED Magazine, Forbes, Newsweek, The Guardian, Macleans, Globe & Mail, Quirks & Quarks, CBC, and CTV.

› Several Science faculty received prestigious awards and honours this year:
  - chemist Linda Nazar was appointed University Professor for her career achievements in solid state materials and advanced battery research;
  - earth sciences Professor Emeritus John Cherry was the first Canadian to receive the prestigious Lee Kuan Yew Water Prize; and
  - chemist Marcel Nooijen was elected into the International Academy of Quantum Molecular Sciences (IAQMS) for his work in theoretical chemistry.
STRATEGIC INITIATIVES:
RESEARCH PARTNERSHIPS
› Earth scientist David Blowes is leading a $5.5M five-year initiative under Toward Environmentally Responsible Resource Extraction Network (TERRE-NET) to develop sustainable strategies for managing hazardous mine waste.
› Waterloo scientists partnered with the International Development Research Centre and six international research collaborations through the Water Joint Programming Initiative to tackle Legacies of Agriculture Pollutants (LEAP) on a global scale.
› Qatar and United Arab Emirates partnered with Waterloo earth scientists to study groundwater pollution in arid regions.
› Chemist Juewen Liu partnered with the Ontario Ministry of Environment and Climate Change to develop DNA-based sensors to detect pathogens and contaminants in water.

STRATEGIC INITIATIVES:
ACADEMIC PROGRAMS
› Through a partnership with Conestoga College, Honours Biology and Biomedical Sciences students are able to earn a one-year Biotechnology Technician Diploma during their third year of undergraduate study.
› School of Pharmacy partnered with the Centre for Family Medicine Academic Health Team on the Health Sciences campus to offer the first primary care pharmacy residency in Canada that is not based in a hospital.
› Waterloo partnered with Maplesoft to enrich Sciences, Technology, Engineering, and Mathematics (STEM) education. Chemistry will be using Möbius in their first-year courses in fall 2017.

STRATEGIC INITIATIVES:
EXPERIENTIAL LEARNING AND TEACHING EXCELLENCE
› School of Pharmacy partnered with the McMaster University School of Medicine to develop TransEd, a free online educational module to assist health care students in learning how to deliver high-quality care to transgender patients.
› Professor Michael Beazely and Lecturer Richard Epp each received the 2017 Excellence in Science Teaching Award.
› Biologist Josh Neufeld used a variety of teaching strategies to make his new online Fundamentals of Microbiology course more interactive and personal for students.
› The School of Pharmacy is piloting the use of ExamSoft for online examinations, which allows instructors to enrich test questions with videos and other unique elements.

STRATEGIC INITIATIVES:
COMMUNITY OUTREACH AND GLOBAL ENGAGEMENT
› Pharmacy Professor Kelly Grindrod and graduate students partnered with local organizations to deliver e-health workshops to improve health literacy in seniors.
› The School of Pharmacy hosted a public lecture to discuss opioid uses and misuse in the Waterloo Region.
› The School of Pharmacy received the Best Community Outreach Initiative from the Canadian Council for the Advancement of Education (CCAE) for educating parents, first-responders and health care professionals about opioids and the value of naloxone for harm reduction.
› In April, the School of Optometry and Vision Science partnered with the Canadian Paralympic Committee to offer out-of-competition classification services for national para-sport athletes from across Canada.