

University of Waterloo
SENATE
Notice of Meeting

Date: Monday 19 November 2018

Time: 3:30 p.m.

Place: Needles Hall, room 3407

	OPEN SESSION	Action
3:30	<p><u>Consent Agenda</u> Motion: To approve or receive for information by consent items 1-5 below.</p> <ol style="list-style-type: none"> 1. Minutes of the 15 October 2018 Meeting 2. Reports from Committees and Councils <ol style="list-style-type: none"> a. Graduate & Research Council b. Undergraduate Council 3. Report of the President <ol style="list-style-type: none"> a. Recognition and Commendation 4. Reports from the Faculties 5. Committee Appointments 	<p>Decision</p> <p>Information Decision/Information</p> <p>Information</p> <p>Information</p> <p>Decision</p>
3:35	<p><u>Regular Agenda</u> 6. Business Arising from the Minutes</p>	Information
3:40	7. Research Presentation – Sarah Burch, Associate Professor, Canada Research Chair in Sustainability Governance and Innovation	Information
3:55	8. Reports from Committees and Councils	Decision
4:05	<ol style="list-style-type: none"> a. Graduate & Research Council b. Joint Report – Graduate & Research and Undergraduate Councils 	Decision
4:15	c. University Committee on Student Appeals	Information
4:25	9. Report of the President	Information
4:45	10. Q&A Period with the President	Information
4:55	11. Report of the Vice-President, Academic & Provost	Information
5:05	12. Report of the Vice-President, University Research	Information
5:10	13. Other Business	
	CONFIDENTIAL SESSION	
5:15	14. Minutes of the 15 October 2018 Meeting	Decision
5:20	15. Business Arising from the Minutes	
5:25	16. Report from Committee <ol style="list-style-type: none"> a. Nominating Committee for Honorary Degrees 	Decision
5:35	17. Other Business	

29 October 2018
 KJJ/ees

Karen Jack
 University Secretary

University of Waterloo
SENATE
Minutes of the 15 October 2018 Meeting

Present: Bilal Akhtar**, Jean Andrey, Michael Balogh, Sandra Banks, Lisa Bauer-Leahy, Katherine Bergman**, Kankar Bhattacharya, Anne Bordeleau, Carmen Bruni, Kofi Campbell, Claudio Canizares**, Jeff Casello, Brian Cepuran**, David Clausi, Tara Collington, Mario Coniglio, Simon Courtenay, Shannon Dea, Peter Deadman, Charmaine Dean, Mathieu Doucet, Tia Driver, Fraser Easton, Paul Fieguth, George Freeman, Matthew Gerrits, Mark Giesbrecht, Robert Gorbet, Julia Goyal, Kelly Grindrod, Feridun Hamdullahpur (chair), Craig Hardiman, Dennis Huber, Karen Jack (secretary), Spiro Karigiannis, Alysia Kolentsis, Robert Lemieux, Kesen Ma, Tyler Marques, Mungo Marsden, Ian Milligan, Katie Misener, Rick Myers, Cathy Newell Kelly, Erin O'Connell, Daniel O'Connor, Linda Ogechi Iheme**, Douglas Peers, William Pristanski**, James Rush, Max Salman**, Mark Seasons, Hannah Sesink, Marcus Shantz, James Skidmore, Paul Stolee, Pearl Sullivan, Susan Tighe, Hamid Tizhoosh, Bryan Tolson, Stephen Watt, Ross Willard, Dan Wolczuk, Richard Wu, En-Hui Yang

Guests: Bruce Campbell, Aldo Caputo, Pam Charbonneau, Rick Eastep, Donna Ellis, Matthew Grant, Ross Johnston, Andrea Kelman, Jennifer Kieffer, Nick Manning, Norah McRae, Diana Parry, Andrea Prier, Chris Read, Ian Rowlands, Daniela Seskar-Hencic, Allan Starr, Emily Schroeder, Cristina Vanin, Rebecca Wickens

Absent: Dominic Barton*, Chris Bauch, Steven Bednarski*, Fred Chereski*, Joan Coutu*, Eric Croiset*, David Edwards, Marlene Epp*, Wendy Fletcher, Cindy Forbes*, Shikha Gandhi, John Haddock*, Thorsten Heins*, Marios Ioannidis, Craig Janes*, Martin Karsten*, Scott Kline*, Teferi Mergo, Grant Mitchell, Barb Moffatt*, Neil Randall*, Naima Samuel*, Beth Sandore Namachchivaya*, Joanne Shoveller*, Richard Staines, Tomson Tran, Maya Venters*

*regrets

**joined by telephone

OPEN SESSION

The chair reminded members that the report associated with item 9.b., Joint Report – Graduate & Research and Undergraduate Councils was distributed by email and the list of graduands for October convocation ceremonies were provided via SharePoint.

Consent Agenda

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

O'Connor and Dea.

1. MINUTES OF THE 17 SEPTEMBER 2018 MEETING

Senate approved the minutes of the meeting.

2. REPORTS FROM COMMITTEES AND COUNCILS

Graduate & Research Council. Senate heard the following motions

Undergraduate Council

Academic Plan Inactivations

Faculty of Science, Science and Aviation (Geomatics Option)

Motion: That Senate approve the inactivation of the Geomatics Option, effective 1 September 2019.

Faculty of Science, Honours Physics (Applied Physics Specialization)

Motion: That Senate approve the inactivation of Honours Physics (Applied Physics Specialization), effective 1 September 2019.

Faculty of Science, Honours Co-operative Physics (Applied Physics Specialization)

Motion: That Senate approve the inactivation of Honours Co-operative Physics (Applied Physics Specialization), effective 1 September 2019.

3. REPORT OF THE PRESIDENT

Recognition and Commendation. Senate received the report for information.

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

University Research Chairs. Senate received the reports for information.

5. REPORTS FROM THE FACULTIES

Senate received the reports for information.

6. COMMITTEE APPOINTMENTS

Senate approved the following appointments:

- **University Committee on Student Appeals:**
 - Saudia Rahamat, replacing Maya Venters, as the undergraduate student representative from the Faculty of Arts, term to 30 April 2019.

The question was called, and the motion carried unanimously.

Regular Agenda

7. BUSINESS ARISING FROM THE MINUTES

Fair Workplaces Act Update, Jim Rush updated Senate re: work undertaken to date, including: seeking legal advice, recognition that with the change in government a review of the legislation is occurring, work being done and to come with the employee relations committees.

8. TEACHING PRESENTATION

Mario Coniglio introduced Aldo Caputo, director of the Centre for Extended Learning who provided an update on current activities at the centre, and events marking its 50th anniversary. Caputo advised re: initiatives relating to the University's strategic plan; how progress is measured; data points of interest; Waterloo's impact on online learning; what the centre is hearing from students and instructors; coming initiatives. In discussion: experiential learning in the online instruction realm; the value of both undergraduate and graduate online experiences.

9. REPORTS FROM COMMITTEES AND COUNCILS

Graduate & Research Council

Program Change, Faculty of Arts

Senate heard a motion to approve renaming the MA in Sociology and MA in Sociology (Co-op) to MA in Social and Legal Studies and MA in Social and Legal Studies (Co-op), effective Winter 2019.

Casello and Easton. Carried unanimously.

Joint Report – Graduate & Research and Undergraduate Council

Coniglio presented on the fall break pilot, describing past decisions, goals, and evaluation of the pilot undertaken over the last three years. He advised re: consultations which have occurred, the difficulties with the current format of the fall break, the various principles and constraints in the fall term, what is proposed and the results of the recent undergraduate student referendum, and advice from the graduate student association.

Senate heard a motion to approve a three-year pilot starting in 2019 of a four-day fall reading week following Thanksgiving Monday, and to evaluate this initiative over the three-year period.

Rush and Wu.

In discussion: other scenarios contemplated; the impact on orientation timing; student wellness considerations; how accommodations are handled; whether a break ought to be added to the spring term; resources for those students who stay on campus; support from the Federation of Students for the motion.

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

10. REPORT OF THE PRESIDENT

Updates.

Hamdullahpur spoke to a variety of matters, including: Dr. Donna Strickland's recent Nobel Prize in Physics; the University's work on the government's mandate to implement a freedom of speech policy; the indigenization strategy; rankings.

Strategic Plan 2013-2018 – Final Progress and Outcomes Report

The president spoke to the final progress and outcomes report and highlighted notable items, including: specific outcomes and changes in various areas since 2013; activities relating to the student experience; performance indicators; lessons learned; next steps as the University bridges to its 2020 framework and plan; consultation activities.

11. Q&A PERIOD WITH THE PRESIDENT

In response to a question, Hamdullahpur advised that while Dr. Strickland has not presented to Senate in the past, movement is underway to bring her to a future Senate meeting.

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

Degrees, Diplomas and Certificates. Senate heard a motion to approve the lists of candidates for degrees, diplomas and certificates as recommended by the Faculty councils and the associate vice-president, graduate studies and postdoctoral affairs, and to authorize the chair (on behalf of Senate and report at its subsequent meeting) based on the recommendation of the registrar or, (in the case of graduate students) the associate vice-president, graduate studies and postdoctoral affairs, to add to or change the lists of candidates for degrees, diplomas and certificates, provided that the chair report back to Senate to advise of any such additions or changes.

Rush and Freeman. Carried unanimously.

13. REPORT OF THE VICE-PRESIDENT, UNIVERSITY RESEARCH

Senate received the report for information.

14. OTHER BUSINESS

There was no other business.

Senate convened in confidential session.

18 October 2018

Karen Jack
University Secretary

CONFIDENTIAL SESSION

The confidential minutes have been removed.

University of Waterloo
SENATE GRADUATE & RESEARCH COUNCIL
Report to Senate
19 November 2018

Senate Graduate & Research Council met on 1 October 2018 and agreed to forward the following items to Senate for information as part of the consent agenda.

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

FOR INFORMATION

CURRICULAR SUBMISSIONS

On behalf of Senate, council approved new courses, course revisions, and minor program revisions for the Faculties of Environment (environment resources and sustainability, geography and environmental management, planning) and Mathematics (computational mathematics, statistics and actuarial science).

GRADUATE AWARDS

On behalf of Senate, council approved the Applied Health Sciences Domestic Graduate Scholarship (operating), John Christopher Toushan Graduate Scholarship in Mental Health Research (trust), and Huawei Graduate Scholarships in AI (operating).

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

Charmaine Dean
Vice President, University Research

University of Waterloo
SENATE UNDERGRADUATE COUNCIL
Report to Senate
19 November 2018

Senate Undergraduate Council met on 9 October 2018 and agreed to forward the following items to Senate. Council recommends that these items be included for information or approval, as noted, in the consent agenda.

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

FOR APPROVAL

INACTIVATION OF ACADEMIC PLANS

Faculty of Mathematics

1. Applied Mathematics

Motion: That Senate approve the inactivation of the Applied Mathematics/Earth Option plan, effective 1 September 2019.

Rationale: This plan was started in 1 September 2008 and so far only four students have graduated from this option. Currently, there are no students enrolled in the plan.

FACULTY REGULATION CHANGES

Faculty of Applied Health Sciences

2. Numeric Grading Requirement

Motion: That Senate approve the addition of a 50% numeric grading requirement for Faculty of Applied Health Sciences' undergraduate plans as described below, effective 1 September 2019.

Rationale: To be consistent with the Faculties of Arts and Environment, Applied Health Sciences is adding a requirement for the number of courses counted towards plan requirements that must have numeric grading.

Faculty of Applied Health Sciences

3. Communication Requirement

Motion: That Senate approve the following revisions to the "Communication Requirement" section of the Faculty of Applied Health Sciences' Undergraduate Studies Academic Calendar, effective 1 September 2019.

Text with revisions inline (strikeout = deleted text; bold = new text):

Communication Requirement

Students, including transfer students entering the Faculty of Applied Health Sciences, should fulfil the Communication Requirement (formerly, the English Language Proficiency Requirement) by the end of their 3A term. The Faculty of Applied Health Sciences has developed a communication course that is

required for all degree programs. Successful completion of AHS 107 fulfils the Communication Requirement.

Notes

1. Students enrolled in the Faculty of Applied Health Sciences before September 2017 should consult the English Language Proficiency Requirement described in the Calendar of their entry year.
2. Successful completion of the Communication Requirement ~~will result in a communication milestone on the student's record.~~ **will be recorded on a student's transcript as completion of the Undergraduate Communication Requirement.**
3. Students transferring to another faculty should note that additional courses may be required to satisfy the other faculty's Communication Requirement.

Students transferring into the Faculty of Applied Health Sciences who have completed their Communication Requirement in another faculty will be eligible to have it count for their Applied Health Sciences' Communication Requirement.

Rationale: The wording has been revised to clarify that a student's transcript will indicate that they have completed the Undergraduate Communication Requirement.

Faculty of Applied Health Sciences

4. Dean's Honours List

Motion: That Senate approve the following revisions to the "Dean's Honours List" section of the Faculty of Applied Health Sciences' Undergraduate Studies Academic Calendar, effective 1 September 2019.

Text with revisions inline (strikeout = deleted text; bold = new text):

Term Dean's Honours List

To recognize outstanding academic achievement, the Faculty of Applied Health Sciences has established the Term Dean's Honours List.

To be included on the Dean's Honours List at the end of each academic term, the student must:

- Be registered in at least 2.0 units per term.
- Achieve a minimum ~~cumulative overall~~ term average of 80.0%.

The designation "Term Dean's Honours List" will appear on the student's transcript.

Students will not be eligible for consideration of Term Dean's Honours List status if they have any failing grade in that term, or any DNW, INC, NCR, NMR, UR.

Graduating Dean's Honours List

Graduating students with a minimum cumulative overall average of 80.0% and a major average of 80.0% ~~and no failing grades including DNW or FTC,~~ will have the designation "Graduating Dean's Honours List" appear on their graduation diploma.

Rationale: The revision to the Term Dean's Honours List clarifies that the minimum term average is required. The revision to the Graduating Dean's Honours List creates inclusive criteria for all students.

Faculty of Applied Health Sciences

5. Co-op Requirements

Motion: That Senate approve the following revisions to the "Co-op Requirements" section of the Faculty of Applied Health Sciences' Undergraduate Studies Academic Calendar, effective 1 September 2019.

Text with revisions inline (strikeout = deleted text; bold = new text):

In order to be eligible to receive a co-op designation at the time of graduation, students in the Faculty of Applied Health Sciences (AHS) are required to successfully complete:

- a minimum of four work terms,
- a minimum of four professional development (PD) online courses, and
- a minimum of four work-term reports.

Students are given five work-term opportunities in which to complete these requirements throughout the normal academic/work-term sequence.

Work Terms

Information, from interviews to credit completion, is available through Co-operative Education.

Professional Development (PD) Courses

PD courses are intended to enhance the student's professional development and assist in integrating their academic and work-term experiences. Co-op students in AHS are required to successfully complete four PD courses. Each PD course is worth 0.5 unit and may not be substituted for regular academic course credit. With the exception of PD 1, students are expected to take the courses while on their co-op work terms. The schedule for completing the PD courses is as follows:

- PD 1: Career Fundamentals, must be taken before the first work term.
- PD 12: Reflection and Learning in the Workplace, must be completed during the first work term.
- Two additional PD courses of the student's choice should be completed during subsequent work terms.

Further information is available through the Professional Development Program.

Work-Term Reports

Students must successfully complete a minimum of four work-term reports **based on four approved and credited work terms**. ~~PD 12: Reflection and Learning in the Workplace, completed in the first work term, is meant to help prepare students for the completion of their work term reports in subsequent work terms. It will appear as Work term Report 1 in the milestone section of the official transcript.~~

Work-term reports are normally completed according to the following schedule:

- **The successful completion of PD12: Reflection and Learning in the Workplace, will count for credit as the first work-term report. PD12 is normally completed during the first work term, and it is meant to help prepare students for the completion of their work-term reports in subsequent work terms.**
- Applied Health Sciences Work-term Report 2 is normally completed by the end of the second work term.
- Applied Health Sciences Work-term Report 3 is normally completed by the end of the third work term.
- Applied Health Sciences Work-term Report 4 is normally completed by the end of the fourth work term.

Work-term reports must be submitted to the Faculty of Applied Health Sciences through Waterloo LEARN, no later than the sixth day of classes in the academic term following the co-op work term for which the work-term report was prepared. Information regarding work-report guidelines is available through the Faculty of Applied Health Sciences' website, Co-op Procedures.

Notes

1. The co-operative system of study is only open to full-time students.
2. The co-operative system of study is not open to students seeking to complete a second degree.

Rationale: Proposed wording clarifies current practice and ensures consistency in Applied Health Sciences.

[A section of this document has been removed.]

Faculty of Environment

10. Examinations, Petitions and Grievances, and Academic Standing

Motion: That Senate approve the following revisions to the “Examinations, Petitions and Grievances, and Academic Standing” section of the Faculty of Environment Undergraduate Studies Academic Calendar, effective 1 September 2019.

Text with revisions inline (strikeout = deleted text; bold = new text):

Calendar 19/20: <http://ugradcalendar.uwaterloo.ca/page/ENV-Exams-Petitions-and-Appeals-Academic-Standing>

Current page title: Examinations, Petitions and Grievances, and Academic Standing

Proposed new page title: **Petitions and Grievances, Academic Standing, and Dean’s Honours List**

The following regulations govern the practices of the Faculty of Environment. concerning academic standing, and final and make-up examinations. **All undergraduate students are also responsible for**

following the [University Policies, Guidelines, and Academic Regulations](#) section of this Calendar, including those related to [assignments, tests, and final exams](#).

Final Examinations

~~A student who misses a final examination, except for a properly certified reason, shall have no make-up examination privileges.~~

~~A student may be eligible for make-up examinations or other accommodations, as decided between the student and the instructor, when an exam is missed due to documented extenuating circumstances. If a student fails to write a final examination for medical reasons, a completed University of Waterloo Verification of Illness form or a Medical Doctor's certificate covering the same information requested on the illness form, including the precise period of illness, must be provided to the instructor within 48 hours of the examination date. In addition, the student must have satisfied all course work requirements prior to the exam.~~

~~Further academic regulations related to Assignments, Tests, and Final Exams are maintained by the University.~~

Academic Standing

5. A student who is given a Failed standing at the end of their second term (1B) of study normally will be required to successfully complete the [Foundation Term](#). A student maintains the option to withdraw for two academic terms.

6. A student who continues in their studies after either a successful [Foundation Term](#) or an absence of two consecutive academic terms **after a failed standing**, will have their record cleared; that is, grades achieved in all previous terms will not be included in the calculation of cumulative averages. Calculation of cumulative averages will begin with the Foundation Term or upon readmission after their two consecutive term absence.

Courses taken prior to the Foundation Term or readmission will remain on the student's official academic record. Cleared courses with grades 50% and above will contribute to the total credits required up to the maximum allowance as stated in the Faculty of Environment [Overview of Plans](#) section of this Calendar.

Students are allowed to have only one Foundation Term or Failed standing on their transcript while in their Faculty of Environment (ENV) program. Students not achieving their program averages for a second time will be unable to continue in their ENV program.

Rationales:

- Proposed title change: New title better reflects page content once Final Examinations text is removed.
- Removal of Final Examinations text: This text is covered in the general section of the calendar so repetition is not required.
- Changes to note 6: Clarification of the two-term-away rule for clearing of academic record.

Faculty of Environment

11. Internal and External Transfer Credits

Motion: That Senate approve the following revisions to the "Internal and External Transfer Credits" section of the Faculty of Environment Undergraduate Studies Academic Calendar, effective 1 September 2019.

Text with revisions inline (strikeout = deleted text; bold = new text):

19/20 Calendar: <http://ugradcalendar.uwaterloo.ca/page/ENV-Transfer-Credits-Laurier-Courses>

Internal and External Transfer Credits

Any course taken at the University of Waterloo for which credit is granted, but where the grade is not included in the student's cumulative **major and overall** averages, will be considered an internal transfer credit. Students are encouraged to meet with their [undergraduate advisor\(s\)](#) for further guidance on what constitutes an internal transfer credit.

Any course taken at an accredited post-secondary institution, except Wilfrid Laurier University (see information below), will be considered for external transfer credit and, if approved, may be counted towards degree requirements. External transfer credits can be acquired through studies completed prior to admission to the University of Waterloo, through a University of Waterloo approved [international exchange](#) agreement, or through courses taken on Letter of Permission (see information below). **External transfer credits are not included in the student's cumulative major and overall averages.**

For courses to be considered for external transfer credit, a grade of 60% or better is normally required.

Rationale: Clarify that transfer credits (internal or external) do not affect cumulative major and overall averages.

Faculty of Environment

12. Overview of Plans, Sub-Plans, Course Enrollment, and Grading

Motion: That Senate approve the following revisions to the “Overview of Plans, Sub-Plans, Course Enrollment, and Grading” section of the Faculty of Environment Undergraduate Studies Academic Calendar, effective 1 September 2019.

Text with revisions inline (strikeout = deleted text; bold = new text):

19/20 calendar: <http://ugradcalendar.uwaterloo.ca/page/ENV-Plans-SubPlans-Course-Enrolment-Grading>

Current page name: Overview of Plans, Sub-Plans, Course Enrollment, and Grading

New proposed page name: **Faculty of Environment General Academic Information**

Degree Requirements Common to all Faculty of Environment Academic Plans

Legend

¹ Cumulative major average requirement for all co-op plans except for the School of Planning

² Cumulative major average requirement for the School of Planning co-op plan

Requirement	Honours Bachelor of Knowledge Integration (BKI)	Honours Bachelor of Environmental Studies (BES)	Honours Bachelor of Environmental Studies (BES), Co-op	General (3 year) Bachelor of Environmental Studies (BES)
Minimum Academic Units	20.5	20.0	20.0	15.0
Minimum Work Terms	0	0	4	0
Minimum Professional Development (PD) Courses	0	0	4	0
Minimum Work-term Reports	0	0	4	0
Minimum Cumulative Overall Average	65%	65%	65%	60%
Minimum Cumulative Major Average	75%	70%	70% ¹ 75% ²	65%
English Skills	All Bachelor of Environmental Studies and Bachelor of Knowledge Integration candidates must satisfy the English Language Communication Requirement as determined for their program before the end of Year 2.			

A ~~maximum~~ **minimum** of **13.5 units at or above the 200-level** ~~6.5 first-year units (100-level courses) will be counted towards a~~ **are required for a** Bachelor of Knowledge Integration (BKI) and a Bachelor of Environmental Studies (BES), except for Planning which ~~requires only allows a maximum minimum~~ of ~~5.0 first-year (100-level)~~ **15.0 units at or above the 200-level**. Normally, a lecture course has a unit weight of 0.5.

Determination of level and term of study will follow the progression as set out by the [University](#).

An undergraduate officer may approve a maximum of 3.25 academic units per academic term if exceptional circumstances can be demonstrated. Students wishing to take 3.5 or more units in a term must file a [Petition for Exception to Academic Regulations](#). Refer to your academic plan section in this Calendar for more information on course load restrictions.

For other requirements, see the [Overview of Co-op Plans](#) ~~or~~ **and** your Department/School section of this Calendar.

Transfer Credit Allowance and Requirements for Calculation of Plan Averages

Transfer credits, whether internal or external, are not used in plan cumulative major and overall average calculations. Each academic plan requires a minimum number of courses which must be included in the calculation of the cumulative overall and major averages:

- Bachelor of Environmental Studies Honours: 10.0 units, of which 5.0 units must qualify for inclusion in the calculation of the major average.
- Bachelor of Knowledge Integration: 10.5 units, of which 5.5 units must qualify for inclusion in the calculation of the major average.
- Bachelor of Environmental Studies Three-Year General: 7.5 units, of which 3.0 units must qualify for inclusion in the calculation of the major average.

These requirements may affect the total number of transfer credits assigned. ~~As noted in the [About the Faculty](#) section, transfer credits whether internal or external, are not used in plan cumulative major and overall average calculations.~~

Students are advised to refer to ~~departmental or Faculty~~ **their Department/School** sections in this Calendar, or contact their academic advisors, for detailed transfer credit regulations ~~or and~~ to determine cumulative **major and** overall ~~and major~~ average requirements for ~~specific~~ **their plans or intended plan**.

Notes

The School of Planning may grant a maximum of 5.0 units at time of admission from an external accredited post-secondary institution. Geography and Aviation maximum transfer credit allowance includes flight training requirements.

Information Pertaining to Courses, Enrolment, and Grades

The [Calendar of Events and Academic Deadlines section](#) is updated each academic year and provides important academic dates specific to each term. It is important that students refer to this section and speak with their advisor when considering course changes or withdrawals to ensure they have an understanding of any potential academic or financial consequences.

Important information concerning grade definitions and University level processes are noted in the [Grades](#) and in the [University Policies, Guidelines, and Academic Regulations](#) section of this Calendar.

1. An Aegrotat (AEG) grade, credit granted due to illness or extenuating circumstances, may be awarded in extraordinary circumstances or when a prolonged recovery from illness is expected. Students must submit a ~~petition~~ [Petition for Exception to Academic Regulations](#) accompanied by official documentation to be considered for an AEG grade. Students are normally required to have successfully completed half the course requirement and demonstrated understanding of the course content to the extent that the instructor is satisfied that the student should receive credit for the course, even though a numerical grade could not be set.
2. The grade of In Progress (IP) may be assigned to the first half of what is essentially a year course which is listed as two courses (e.g., GEOG 490A and GEOG 490B). The grade indicates that the course is in progress and that when completed, a final grade will be assigned to both the A and B halves of the course (usually the same grade). When the second or B half of such a course is dropped a [Petition for Exception to Academic Regulations](#) must be filed to have the first or A half dropped.
3. Students may request to register for Audit status (AUD) in a course taught on campus if the Faculty of the course allows Audits. Students interested in an Audit must consult with the course instructor at the beginning of the course to ascertain what conditions are attached to the granting of an AUD. Audits must be approved by the course instructor and the student's academic plan advisor during the two week add period. Failure to satisfy the conditions of an Audit will result in the course receiving a grade of WD.

Additional course information:

1. On-campus students may take online courses through the [Centre for Extended Learning](#).
2. Some courses which are listed under separate labels or numbers have overlapping content. Only one of these courses may be taken for credit. These are designated with notes after the course description which would indicate one of the following:
 - the courses are cross-listed;
 - the courses are listed as antirequisite;
 - credit will be granted only for one of a pair of courses; or
 - a course was formerly designated with a different number and/or label.Students should consult their academic plan advisor if unsure about eligibility to take a course.
3. **Extra fees may be required to cover course costs not included in tuition, such as field trip expenses. Notes on extra fees are included in the [course descriptions](#). Upon request departments will supply a breakdown of course fees.**
4. **The listed sequence of courses within your plan is subject to change based on term of course offering. Consultation with your plan advisor is recommended.**
5. **Co-op students require permission of their undergraduate advisor and employer to enrol in more than one course (0.5 academic course unit) while on a work term.**
6. Graduate courses may be counted towards an undergraduate degree in the Faculty of Environment. Students must speak with their academic plan advisor to approve enrolment in a graduate course. Normally, graduate courses counted towards an undergraduate degree cannot be used to satisfy graduate degree requirements.

Counting Courses

Students may count a course towards a maximum of two academic credentials. Normally the first would be towards the bachelor degree being granted, as either a core or elective course, and then again towards a second academic credential (joint honours, concurrent degree, diploma, ~~specialization~~, minor, or option).

The School of Planning considers a specialization to be a second academic credential, to which the double counting rule applies.

Rationale: Renaming page better reflects section content. Rationale for all changes by section are:

- *Degree Requirements Common to all Faculty of Environment Academic Plans:* Rewording better clarifies the rules regarding the number of courses at the 200-level or higher that are required for BES and BKI degrees.
- *Transfer Credit Allowance and Requirements for Calculation of Plan Averages* changes mirror changes to the Transfer Credit, Laurier Course page (see revision 1).
- *Additional Course Information:* Moving common text from academic plan note sections to a general section that is pertinent to all ENV students. This removes repetitive text and adds consistency to our section of the calendar.
- *Counting Courses:* GEM and KI no longer wish to have their specializations included in the double count rule. This is consistent with the other faculties' count rules for specializations.

Planning is currently going through a curriculum review, and has requested the double count rule remain for their specializations pending the outcome of the review.

The final note listed within each academic plan will direct students to Faculty of Environment General Academic Information calendar page. See revision 3 (below).

Faculty of Environment

13. Notes for ENV Academic Plans

Motion: That Senate approve the following revisions to the notes for ENV academic plans in the Faculty of Environment Undergraduate Studies Academic Calendar, effective 1 September 2019.

Text with revisions inline (strikeout = deleted text; bold = new text):

Environment and Business Notes

<http://ugradcalendar.uwaterloo.ca/page/ENV-Honours-Environment-and-Business-Co-op-and-Reg>

Notes

1. Minimum Required ~~Courses~~ **Units**
Total: 20 units. Environment and Business: 15.5 units. Environment and Business students may not take [ERS 370](#) for credit towards the Environment and Business degree.
2. Average Requirements
Students must maintain an overall cumulative average of 65% and a cumulative **major average of 70% for** core courses ~~average of 70%~~. All required courses must be passed.
3. ~~Honours Co-operative Plan~~ **Co-op Requirements**
Co-op plan requirement details are stated in the Faculty of Environment, Academic Plans, [Overview of Co-op Plans](#) section of the calendar.
~~Students are expected to follow the [academic/work sequence](#) noted in the Co-operative Education and Career Action section of this calendar.~~
4. **Per term Course Load Allowance**
No more than five courses (2.5 units) may be taken in a term without the approval of the **School of Environment Enterprise and Development associate director, undergraduate studies**. Normally, approval for a sixth course will be considered only if the cumulative Environment and Business average is 78% or higher. ~~A student may take up to one course during a co-op work term.~~ Environment and Business students are not permitted to fast-track.
5. ~~Students must ensure they have acquired the prerequisite courses for [ENBUS 300](#) and [ENBUS 400](#) level theme courses. Students in the regular Honours plan must take at least one of [ENBUS 307](#), [ENBUS 308](#), or [ENBUS 309](#).~~
6. ~~Course Sequencing~~
~~The sequence of courses is subject to change based on course offerings, consultation with program advisor is recommended.~~
5. Transfer Students
Transfer applicants with a post-secondary background may be considered for admission to either of the Bachelor of Environmental Studies (Environment and Business) plans. Interested students will be considered for admission based on space available and university academic performance. Transfer into the Honours Co-op plan may also be based on an interview and work experience related to Environment and Business. In order to meet the appropriate degree requirements, specifically the proper sequence of courses and co-op terms (if applicable), transfer applicants will normally be required to begin Environment and Business studies at the first year (1A) level.

Applicants should be aware that transfer credit may not be granted for courses completed in other University of Waterloo programs or at other universities/colleges.

6. General Information applicable to all Environment plans

The [Faculty of Environment General Academic Information](#) section of this Calendar contains information, regulations, and requirements pertaining to undergraduate studies within the Faculty. It is students' responsibility to familiarize themselves with the content of this section.

A number of Faculty of Environment options, minors, and diplomas are available. A list along with requirements are outlined under [Faculty of Environment Academic Plans](#).

7. ~~Restriction on Number of First Year Courses~~

~~A student must take at least 13.5 course units above the 100 level.~~

ERS Notes

<http://ugradcalendar.uwaterloo.ca/page/ENV-Env-Res-Sus-Env-Res-Stud-Hons-Reg-Co-op>

Year One

[ERS 100](#) Foundations: Environment, Resources and Sustainability

[ERS 101](#)¹ Approaches: Environment, Resources and Sustainability

[ERS 102](#) Sustainability and the Really Long View

[ENVS 178](#) Environmental Applications of Data Management and Statistics

[ENVS 195](#) Introduction to Environmental Studies

[ENVS 200](#) Field Ecology

plus electives for a total of five units (see note **4 1**)

Year Two

[ERS 201](#) Environmental Policy, Politics and Governance

[ERS 202](#) Natural Resources Ecology

[ERS 215](#) Environmental and Sustainability Assessment 1

plus electives for a total of five units (see note **4 1**)

Year Three

[ERS 300](#) Social Ecological Systems Analysis

[ERS 301](#) Sustainability Thought, Practice and Prospects

plus electives for a total of five units (see note **4 1**)

Year Four

[ERS 400](#) Social-Ecological Approaches to Sustainability

[ERS 401](#) Sustainability Science and its Critiques

One of the following two options:

Option one:

[ERS 402](#) Senior Honours Seminar

One additional ERS course (0.50 unit) at or above [300-level](#)

Option two:

[ERS 403A/ERS 403B](#) Senior Honours Thesis

plus electives for a total of five units (see note **4 1**)

Notes

1. Minimum Required Units
Total: 20 units. Required: 7.5 units. Core Electives: 3.5 units (~~see note 4~~). Electives: 9 units.
Core Electives: an additional 3.5 units of ERS and/or ENVS labelled courses are required. Of these 3.5 units, 2.5 units must be labelled ERS.
Fourth-Year Core: Students in Year Four will normally enrol in [ERS 402](#) Senior Honours Seminar (0.5 unit/winter term), plus one additional ERS 300- or 400-level course for a total of 1.0 unit. [ERS 403A/ERS 403B](#) Senior Honours Thesis, upon approval can replace this requirement.
2. Average Requirements
Students in Environment, Resources and Sustainability Honours regular and co-op plans must maintain an overall cumulative average of at least 65% and a major cumulative average (all ERS and ENVS labelled courses) of at least 70%. All required courses must be passed.
3. ~~Co-operative Plan~~ Requirements
Co-op plan requirement details are stated in the Faculty of Environment, Academic Plans, [Overview of Co-op Plans](#) section of the Calendar.
~~Students are expected to follow the [academic/work sequence](#) noted in the Co-operative Education and Career Action section of this Calendar.~~
4. **Per Term Course Load Allowance**
No more than **five courses** (2.5 units) may be taken in a term without school approval.
5. ~~Core Electives~~
~~In addition to the listed required courses, an additional 3.5 units of ERS and/or ENVS labelled courses are required. Of these 3.5 units, 2.5 units must be labelled ERS.~~
6. ~~Fourth Year Core~~
~~Students in Year Four will normally enrol in [ERS 402](#) Senior Honours Seminar (0.5 unit/Winter term), plus one additional ERS 300- or 400 level course for a total of 1.0 unit. [ERS 403A/ERS 403B](#) Senior Honours Thesis, upon approval can replace this requirement.~~
7. ~~Restriction on number of First Year Courses~~
~~A student must have at least 13.5 units (27 courses) above the 100 level.~~
8. ~~Double Counting~~
~~A course can be used to satisfy requirements for a maximum of two credentials. Double counting of courses applies as follows: once for the School of Environment, Resources, and Sustainability (SERS) plan and once for a joint honours or concurrent degree, option, minor, diploma, or specialization. There is no limit on the number of courses that may be double counted unless otherwise stated.~~
9. ~~Joint Honours Degree~~
~~Many Honours plans may be combined with SERS. However, before embarking on a Joint Honours plan, it is highly recommended that students consult with the associate director/chair of both programs. Students must meet the requirements of both plans as stated in the Calendar, and they should be aware that combining some Honours plans may require more than the normal number of academic terms to complete. Admission to a Joint Honours plan will not be approved prior to Year Two of studies.~~
~~A Joint Honours degree with SERS is available to all University of Waterloo students.~~
5. Transfer Students
Students wishing to transfer to Environment, Resources and Sustainability may receive credit for courses previously completed. Students should meet with the undergraduate associate director to determine transferable courses and course selections for first year. See [Requirements for Calculation of Plan Averages](#) section of this Calendar for more information.

Notes for Co-op Students

6. Transfer from ERS Co-op to ERS Regular
Students will be permitted to transfer from Co-op to the Regular Honours academic plan if all requirements of the Co-op academic plan have been met up to the time of transfer.

7. General Information Applicable to all Environment Plans

The [Faculty of Environment General Academic Information](#) section of this Calendar contains information, regulations, and requirements pertaining to undergraduate studies within the Faculty. It is students' responsibility to familiarize themselves with the content of this section.

A number of Faculty of Environment options, minors, and diplomas are available. A list along with requirements are outlined under [Faculty of Environment Academic Plans](#).

GEM 3-year General Notes

<http://ugradcalendar.uwaterloo.ca/page/ENV-Geography-Environmental-Management-3-Yr-Gen>

Notes

1. Minimum Required Units

Total: 15.0 units. Geography (GEOG): 6.5 units. English: 0.5 unit. All [Environmental Studies \(ENVS\) courses](#) are included in the cumulative major average (see note 3 2) but may not be counted in meeting the minimum required Geography (GEOG) courses.

2. Average Requirements

Students must maintain an overall cumulative average of 60% and a ~~Major~~ cumulative average of 65%. All required courses must be passed.

3. **Per Term Course Load Allowance**

No more than **five courses** (2.5 units) may be taken in a term without the approval of the associate chair (undergraduate studies). Normally, approval for a sixth 0.5 unit will be considered only if the cumulative Geography and Environmental Management average is 78% or higher.

~~4. Restriction on number of First Year Courses~~

~~For a three year General degree, a student must have at least 8.5 units at or above the 200 level.~~

~~5. Materials and Costs~~

~~For some courses, extra fees may be required to cover field expenses/travel costs. Statements on extra costs, where required, will be found with the [course descriptions](#).~~

4. General Information Applicable to all Environment Plans

The [Faculty of Environment General Academic Information](#) section of this Calendar contains information, regulations, and requirements pertaining to undergraduate studies within the Faculty. It is students' responsibility to familiarize themselves with the content of this section.

A number of Faculty of Environment options, minors, and diplomas are available. A list along with requirements are outlined under [Faculty of Environment Academic Plans](#).

GEM Honours Notes

<http://ugradcalendar.uwaterloo.ca/page/ENV-Geography-Environmental-Management-4-Yr-Honour>

Year Three

[GEOG 391](#) Field Research

[GEOG 392](#) International Field Research*

Nine courses (4.5 units) to fulfil degree requirements (see note 2 1 below)

Students are strongly encouraged to take courses in one of the following [specializations](#): Climate Change and Environment, Earth Systems Science, Economy and Society, or Geomatics.

Year Four

10 Courses (5.0 units) to fulfil degree requirements (see note 2 1 below)

Note: Co-op students, see note 7 3 below

Notes

1. Minimum Required Units

Total: 20.0 units. Geography: 11.0 units; English: 0.5 unit. All courses for which 1.0 unit is awarded will count as the equivalent of two courses. Only 1.5 units designated Environmental Studies (ENVS) may be counted as Geography units but all units designated ENVS are included in the cumulative major average (see note 2 4).

Year Three and Year Four Requirements

Minimum of 4.5 units of GEOG-labelled courses:

- 1.0 unit at or above 200-level
- 1.0 unit at or above 300-level
- 2.5 units at 400-level

5.0 units of additional courses to meet degree requirements (~~see note 1~~)

2. Average Requirements

Students in the Honours academic plans must maintain an overall cumulative average of 65% and a ~~major~~ cumulative average of 70%. All required courses must be passed.

3. ~~Honours Co-operative Academic Plan~~ **Requirements**

Co-op plan requirement details are stated in the Faculty of Environment, Academic Plans, [Overview of Co-op Plans](#) section of this Calendar.

~~Students are expected to follow the [academic/work sequence](#) noted in the Co-operative Education & Career Action section of this Calendar.~~

~~Enrolment in Honours Geography and Environmental Management Co-op~~

Students are admitted to the co-op academic plan in first year based on secondary school grades. Interested students enrolled in first year regular Geography and Environmental Management at the University of Waterloo may be considered for admission to any remaining co-op positions at the end of first year based on university academic performance, an interview, and work experience related to Geography. The Honours Geography and Environmental Management co-op plan has the same academic requirements as the Honours regular plan.

4. **Per Term Course Load Allowance**

No more than **five courses** (2.5 units) may be taken in a term without the approval of the Associate Chair (Undergraduate Studies). Normally, approval for a sixth 0.5 unit will be considered only if the cumulative Geography and Environmental Management average is 78% or higher.

5. ~~Materials and Costs~~

~~For some courses, extra fees may be required to cover field expenses/travel costs. Statements on extra costs, where required, will be found with the [course descriptions](#).~~

5. Independent Study

Up to three independent study [GEOG 475](#) courses may be taken.

5. ~~Restriction on number of First Year Courses~~

~~For a Four Year Honours degree a student must have a least 13.5 units at or above the 200 level.~~

6. ~~Double Counting~~

~~A course can be used to satisfy requirements for a maximum of two credentials. Double counting of courses applies as follows: once for the plan and once for a joint honours or concurrent degree, option, minor, diploma, or specialization. There is no limit on the number of courses that may be double counted unless otherwise stated.~~

~~7. Fourth Year Geography Course Restrictions~~

~~Fourth year courses are normally restricted to third and fourth year honours students.~~

6. General Information Applicable to all Environment Plans

The [Faculty of Environment General Academic Information](#) section of this Calendar contains information, regulations, and requirements pertaining to undergraduate studies within the Faculty. It is students' responsibility to familiarize themselves with the content of this section.

A number of Faculty of Environment options, minors, and diplomas are available. A list along with requirements are outlined under [Faculty of Environment Academic Plans](#).

*see attachment 3 regarding this change

GEM Joint Honours Notes

<http://ugradcalendar.uwaterloo.ca/page/ENV-Joint-Honours-Geography-and-Environmental-Mgmt>

<http://ugradcalendar.uwaterloo.ca/page/ENV-Joint-Honours-Geography-and-Environmental-Mgmt>

Notes

~~1. Admission to Joint Honours academic plans~~

~~Admission to a Joint Honours plan will occur no earlier than Year Two.~~

1. Minimum Required Courses Units

Total: 9.0 units. GEOG: 8.0 units. ENVS: 1.0 units

If scheduling difficulties arise in meeting required courses contact the [Geography and Environmental Management associate chair \(undergraduate studies\)](#) for possible substitute courses.

2. Average Requirements

Students must achieve a cumulative average of 70% in Geography (GEOG) and Environmental Studies (ENVS) courses. All required courses must be passed.

3. Home Department Course Equivalents Courses

Courses in the home department equivalent to [ENVS 178](#); [ENVS 278](#); [GEOG 293](#) or [GEOG 294](#); and [GEOG 490A/GEOG 490B](#) must be approved by the [Geography and Environmental Management associate chair \(Undergraduate Studies\)](#).

4. General Information Applicable to all Environment Plans

The [Faculty of Environment General Academic Information](#) section of this Calendar contains information, regulations, and requirements pertaining to undergraduate studies within the Faculty. It is students' responsibility to familiarize themselves with the content of this section.

A number of Faculty of Environment options, minors, and diplomas are available. A list along with requirements are outlined under [Faculty of Environment Academic Plans](#).

Geography and Aviation Notes

<http://ugradcalendar.uwaterloo.ca/page/ENV-Honours-Geography-and-Aviation-Regular>

Notes

1. Minimum Required Units

Total: 20.0 units. ~~University of Waterloo~~ Required Courses: 12.5 units. Major Core Courses GEOG/ENVS/AVIA: 11.5 units. Elective Courses: 2.5 units. Professional Pilot Program Courses: 5.0 units.

All Geography (GEOG), Environmental Studies (ENVS), and Aviation (AVIA) units (see note 4 2) are included in the cumulative major average.

2. Average Requirements

Students in an Honours academic plan must maintain an overall cumulative average of at least 65% and a major cumulative average of at least 70%. ~~See note 1: Minimum Required Units, for major courses for your plan.~~

AVIA 101, 102, 203, 204, 205, 306, 307, and 408 are Professional Pilot Program Courses and are not used in average calculations. Grading is Credit ~~Granted~~ (CR) or No Credit ~~Granted~~, Failure Recorded (NCR).

All required courses must be passed.

3. **Per Term Course Load Allowance**

No more than **five courses** (2.75 units) may be taken in a term without departmental approval and overall average of 78%.

4. Independent Study

~~Geography and Aviation Honours:~~ Up to three independent study [GEOG 475/AVIA 475](#) courses may be taken.

5. Maintaining ~~Academic~~ **Aviation Status**

In order to continue in the Aviation plan, students must maintain the University of Waterloo academic standards (described ~~above~~ **below**) as well as achieve the flight component benchmarks set by WWFC for each semester. Students are expected to maintain passing grades (70%) in all WWFC flight components. Students may be allowed to achieve this by using a "competency-based" approach, so long as they achieve the established benchmarks on time.

6. Aviation Costs

All costs associated with the Professional Pilot Program Courses are paid directly to the Waterloo-Wellington Flight Centre (WWFC).

5. ~~Materials and Costs~~

~~For some courses, extra fees may be required to cover field expenses/travel costs. Statements on extra costs, where required, will be found with the [course descriptions](#).~~

7. Transfer Credit ~~for~~ Flight Training

Transfer consideration of previous flight training or Professional Pilot Program Courses will be at the discretion of the Waterloo-Wellington Flight Centre and **not** determined by the University of Waterloo.

Students can be granted advanced credits up to and including a Private Pilot Licence. Program hours will be granted up to licence sign off and the remaining hours will be logged as career, not program hours. Students are not accepted past the Private Pilot Licence or if they have acquired a Night Rating. Students entering the program with a Private Licence will be required to attend WWFC's Flight Management Basic Courses as a review. Students who apply with the flight qualifications that meet the standards set by WWFC are eligible for the BES degree upon successful completion of the plan curriculum and transfer of credit for the flight courses.

1. ~~Restriction on number of First Year Courses~~

~~A student must have at least 13.5 units at or above the 200 level.~~

2. ~~Double Counting~~

~~A course can be used to satisfy requirements for a maximum of two credentials. Double counting of courses applies as follows: once for the plan and once for a joint honours or concurrent degree, option, minor, diploma, or specialization. There is no limit on the number of courses that may be double counted unless otherwise stated.~~

~~Courses double counted to satisfy Geography and Aviation Honours academic plan requirements, as well as a Department of Geography and Environmental Management specialization, cannot be applied to any other option, minor, or diploma.~~

~~3. Options/Minors/Diplomas/Specializations~~

~~For more information on options, minors, diplomas, or specializations that are available, please visit the [Faculty of Environment Academic Plans](#) or departmental section of this Calendar.~~

~~4. Fourth Year Geography Course Restrictions~~

~~Fourth year courses are normally restricted to third and fourth year Honours students.~~

8. General Information Applicable to all Environment Plans

The [Faculty of Environment General Academic Information](#) section of this Calendar contains information, regulations, and requirements pertaining to undergraduate studies within the Faculty. It is students' responsibility to familiarize themselves with the content of this section.

A number of Faculty of Environment options, minors, and diplomas are available. A list along with requirements are outlined under [Faculty of Environment Academic Plans](#).

Geomatics Notes

<http://ugradcalendar.uwaterloo.ca/page/ENV-Honours-Geomatics-Regular-and-Co-op>

Co-op students, see note ~~5~~ **3** below

Notes

1. Minimum Required Units

Total: 20.0 units. Geomatics Plan: ~~13.0~~ **13.5** units (9.5 GEOG, 2.0 CS, 1.0 ENVS, **0.5 ENGL/EMLS**, 0.5 MATH). All courses for which 1.0 unit- are awarded will count as the equivalent of two courses. All units designated Geography (GEOG) and Environmental Studies (ENVS) are included in the cumulative major average. All Computer Science (CS) and Mathematics (MATH) courses are included in the cumulative overall average (see note ~~3~~ **2**).

2. Average Requirements

Students in the Geomatics Honours academic plans must maintain an overall cumulative average of at least 65%, a Computer Science and Math cumulative average of at least 60%, and a major cumulative average of at least 70%. All required courses must be passed.

~~3. Honours Co-operative Academic Plan Requirements~~

Co-op plan requirement details are stated in the Faculty of Environment, Academic Plans, [Overview of Co-op Plans](#) section of this Calendar.

~~Students are expected to follow the [academic/work sequence](#) noted in the Co-operative Education & Career Action section of this Calendar.~~

Students are admitted to the co-op academic plan in first year based on secondary school grades. Interested students enrolled in first-year regular Geomatics at the University of Waterloo may be considered for admission to any remaining co-op positions at the end of first year based on university academic performance, an interview, and work experience related to Geomatics. The Honours Geomatics co-op plan has the same course requirements as the Honours regular plan.

4. Per Term Course Load Allowance

No more than **five courses** (2.5 units) may be taken in a term without the approval of the associate chair (undergraduate studies). Normally, approval for a sixth 0.5 unit will be considered only if the cumulative ~~Geomatics~~ **major** average is 78% or higher.

~~5. Materials and Costs~~

~~For some courses, extra fees may be required to cover field expenses/travel costs. Statements on extra costs, where required, will be found with the [course descriptions](#).~~

~~6. Enrolment in Honours Geomatics Co-op~~

5. **Transfer Courses Students**

It is possible for non-Geomatics students to apply for admission to Year Two. Advanced standing may be obtained through the transfer of courses/units from other academic plans and institutions. Normally, advanced standing will not be granted to transfer students beyond the Year-One level (10 courses/5.0 units).

~~6. Restriction on Number of First Year Courses~~

~~For a four year Honours degree a student must have at least 13.5 units at or above the 200 level.~~

~~7. Double Counting Courses~~

~~Students may double count courses, i.e., once for the Geomatics plan and one additional count for a joint honours or concurrent degree, specialization, minor, option, or diploma unless otherwise stated.~~

6. **General Information for all Environment Plans**

The [Faculty of Environment General Academic Information](#) section of this Calendar contains information, regulations, and requirements pertaining to undergraduate studies within the Faculty. It is students' responsibility to familiarize themselves with the content of this section.

A number of Faculty of Environment options, minors, and diplomas are available. A list along with requirements are outlined under [Faculty of Environment Academic Plans](#).

Geomatics Joint Honours Notes

<http://ugradcalendar.uwaterloo.ca/page/ENV-Bachelor-Env-Stds-Joint-Honours-Geomatics>

Notes

~~1. Admission to Joint Honours academic plans~~

~~Admission to a Joint Honours plan will occur no earlier than Year Two.~~

1. **Minimum Required Courses Units**

The total number of units required is 8.5.

2. **Average Requirements**

Students must achieve a cumulative average of 70% in Geography (GEOG) and Environmental Studies (ENVS) courses and a 60% in Computer Science (CS) and Math (MATH) courses.

3. **Home Department Course Equivalents**

Other courses from your home plan, equivalent to required CS, MATH, or ENVS courses, may substitute for the Joint Geomatics plan. Students must meet with the Geomatics plan advisor to review.

4. **General Information Applicable to all Environment Plans**

The [Faculty of Environment General Academic Information](#) section of this Calendar contains information, regulations, and requirements pertaining to undergraduate studies within the Faculty. It is students' responsibility to familiarize themselves with the content of this section.

A number of Faculty of Environment options, minors, and diplomas are available. A list along with requirements are outlined under [Faculty of Environment Academic Plans](#).

International Development Notes

<http://ugradcalendar.uwaterloo.ca/group/ENV-International-Development>

Notes

1. Minimum Required Units
Total: 20 units.
2. Average Requirements
Students in the International Development Honours regular academic plan must maintain an overall cumulative average of at least 65% and a major cumulative average of at least 70%. The major cumulative average will include all required courses and all [INDEV-labelled](#) courses taken over and above the listed requirements. All required courses must be passed.
3. **Per Term Course Load Allowance**
No more than **five courses** (2.5 units) may be taken in a term without departmental approval.
- ~~4. Materials and Costs
For [INDEV 401](#) and [INDEV 402](#), extra fees will be required to cover travel and subsistence costs related to international placement work. Statements on extra costs, where required, will be found in the [Field Placement Guidelines](#).~~
- ~~5. Restriction on number of First Year Courses
A student must have at least 13.5 units above the 100 level.~~
- ~~6. Double Counting
A course can be used to satisfy requirements for a maximum of two credentials. Double counting of courses applies as follows: once for the plan and once for a joint honours or concurrent degree, option, minor, diploma, or specialization. There is no limit on the number of courses that may be double counted unless otherwise stated.~~
- ~~7. Concurrent, Joint Honours, and Minor Plans
International Development (INDEV) does not offer a Concurrent or Joint Honours plan for the Practice Specialization to students in other departments. However, INDEV students can participate in Concurrent and Joint Honours degrees offered by other departments. INDEV students pursuing a joint or concurrent degree are responsible for meeting all INDEV degree requirements as outlined in the calendar for their year of entry into the plan.
An [International Development minor](#) is available to students in other departments. INDEV students can participate in minors and options offered by other departments. Satisfying minor and option requirements may require more than the normal number of academic terms. Available minors and options are listed under the respective faculty and department sections in this calendar.~~
4. Transfer Students
Transfer applicants with post-secondary background may be considered for admission to the Bachelor of Environmental Studies (BES) International Development program. [Transfer students](#) will only be admitted for fall term.
5. Language Requirement
Students pursuing field placements in French- or Spanish-speaking countries are required to develop or demonstrate at least intermediate-level French or Spanish by fourth year. Students with little or no **French or Spanish** ~~or French~~ are advised to begin language preparation in first year. Students pursuing field placements in English-speaking countries will receive training in one of the local languages as part of their in-country orientation.
6. Field Placement Guidelines
To be eligible for field placement, INDEV students must meet the following academic requirements:
 - Maintain good academic standing which is defined as a minimum 70% cumulative major average and a minimum 65% cumulative overall average (**see note 2**). A student must be in good academic standing after their 3B term in order to be eligible to continue into the 4A pre-departure term and participate in the International Field Placement;
 - Successfully complete all required core academic coursework up to and including core courses taken in the 3B term.Students must pass a medical exam and be deemed medically fit for placement by their family

doctor(s) or other qualified medical practitioners in accordance with requirements of the placement provider. Normally, this exam will take place in the term prior to pre-departure. Students must meet all other requirements as determined by the placement provider. Medical documentation or facsimiles will not be retained by the University of Waterloo.

Field placement costs are the responsibility of the student and are subject to change without notice. Refunds must be negotiated directly with the placement provider and are subject to their rules and regulations (~~see note 4~~).

Students will not be allowed to take more than a 1.5 unit course load per term (INDEV 401 fall; INDEV 402 winter), while on field placement, without approval by the director of the International Development program.

7. General Information Applicable to all Environment Plans

The [Faculty of Environment General Academic Information](#) section of this Calendar contains information, regulations, and requirements pertaining to undergraduate studies within the Faculty. It is students' responsibility to familiarize themselves with the content of this section.

A number of Faculty of Environment options, minors, and diplomas are available. A list along with requirements are outlined under [Faculty of Environment Academic Plans](#).

Knowledge Integration Notes

<http://ugradcalendar.uwaterloo.ca/page/ENV-Honours-Knowledge-Integration-Requirements-1>

Year Four

[INTEG 10](#) Knowledge Integration Seminar (0.0 units)

[INTEG 420A](#) Senior Research Project A (Research and Planning) (see note ~~7-4~~)

[INTEG 420B](#) Senior Research Project B (Writing and Presentation) (**1.0 unit**)*

Eight electives[†] (4.0 units)

Total of 5.0 units

Notes

1. Minimum Required Units

Total: 20.5 units, of which up to 1.0 may be lab units.

2. Average Requirements

Students in the Knowledge Integration Honours regular academic plan must maintain an overall cumulative average (all courses) of at least 65% and a major cumulative average of at least 75%. The major cumulative average includes all INTEG-labelled courses, [PHIL 145](#), [SPCOM 223](#), and all courses taken towards the KI breadth requirements. All required courses must be passed.

3. **Per Term Course Load Allowance**

No more than **five courses** (2.75 units) may be taken in a term without approval of the ~~KI undergraduate officer~~ **associate chair, undergraduate studies, Knowledge Integration**; students seeking such approval must generally have an overall average of 80%.

~~4. Materials and Costs~~

~~For some courses, extra fees may be required to cover field expenses/travel costs. Statements on extra costs, where required, will be found with the course descriptions.~~

~~5. Restriction on number of First Year Courses~~

~~A student must have at least 13.5 units at the 200 level or above.~~

~~6. Double Counting~~

~~A course can be used to satisfy requirements for a maximum of two credentials. Double counting of courses applies as follows: once for the plan and once for a joint honours or concurrent degree, option, minor, diploma, or specialization. There is no limit on the number of courses that may be double counted unless otherwise stated.~~

4. Senior Research Project

Students completing a joint or concurrent degree that includes an equivalent senior research project may request that the associate chair undergraduate approve the associated courses as equivalent to INTEG 420A and INTEG 420B. Note that there may be additional requirements involved in such an arrangement, which is required to be formally organized in advance of taking the equivalent course sequence.

5. General Information Applicable to all Environment Plans

The [Faculty of Environment General Academic Information](#) section of this Calendar contains information, regulations, and requirements pertaining to undergraduate studies within the Faculty. It is students' responsibility to familiarize themselves with the content of this section.

A number of Faculty of Environment options, minors, and diplomas are available. A list along with requirements are outlined under [Faculty of Environment Academic Plans](#).

*for details regarding the addition of the unit weight of 1.0, see attachment 5.

Planning Notes

<http://ugradcalendar.uwaterloo.ca/group/ENV-School-of-Planning>

<http://ugradcalendar.uwaterloo.ca/page/ENV-Honours-Co-operative-Planning>

Year Two

Required Courses (3.5 units)

[PLAN 203](#) Transportation Planning and Analysis

[PLAN 210](#) Urban Planning Design and the Environment

[PLAN 233](#) People and Plans

[PLAN 261](#) Urban and Metropolitan Planning and Development

[PLAN 281](#) Introduction to Geographic Information Systems (GIS)

[ENVS 200](#) Field Ecology

[ENVS 278](#) Applied Statistics for Environmental Research

Year Two Elective Courses (1.5 units)

Students must complete any three elective courses (1.5 units) at the 100- or 200-level.

Note: See ~~note 4 below~~ **Faculty of Environment General Academic section of this Calendar** regarding 100-level course restrictions before selecting elective courses.

Notes

1. ~~Minimum Required Courses~~ **Units**
Total: 20.0 units. Planning core: 13.0 units; electives: 7.0 units
2. **Average Requirements**
Students must obtain a cumulative overall average (all courses) of 65% and 75% in their major average (all PLAN and all ENV5 courses). All courses must be passed.
If a student does not meet the required average(s), a conditional standing may be granted at the discretion of the School, which permits a student to proceed to a subsequent term on a conditional basis. Should the student be permitted to continue on the basis of "conditional" due to average and/or course standing, and if, subsequently, the required averages are not met this second time (term) or course deficiencies not cleared, withdrawal from Planning may be required.
3. ~~Honours Co-operative Plan~~ **Requirements**
Co-op plan requirement details are stated in the Faculty of Environment, Academic Plans, [Overview of Co-op Plans](#) section of this Calendar.
~~Students are expected to follow the~~ [academic/work sequence](#) ~~noted in the Co-operative Education & Career Action section of this Calendar.~~
Planning students are strongly encouraged to participate in at least one out-of-province work placement.
4. **Per Term Course Load Allowance**
~~No more than~~ **Students are expected to carry a minimum load of five courses (2.5 units) in each may be taken in a term.** ~~Students interested in taking a higher course load require~~ **without** approval from the **Planning** undergraduate advisor. ~~A student may take up to one course during a co-op work term.~~ Planning students are not allowed to fast-track to complete the program earlier, since graduating on a work term is not permitted.
5. **School of Planning Specializations**
Planning students have the option of adding ~~a~~ **up to two** specializations to their plan in third year. **In the School of Planning, a course that is required for both the Bachelor of Environmental Studies and a specialization is considered a double count.**
For specialization requirements, please refer to the [School of Planning Specialization](#) section of this Calendar.
6. ~~Double Counting~~
~~A course can be used to satisfy requirements for a maximum of two credentials. There will be no triple counting of any course for any academic credit in the Faculty of Environment. Double counting of courses applies as follows: once for the plan and once for any option, minor, diploma, or specialization. There is no limit on the number of courses that may be double counted, unless otherwise stated.~~
7. ~~First Year Courses~~
~~No more than 10 courses (5.0 units) at the 100 level will be counted toward the 40 courses (20.0 units) required to graduate.~~
6. **Transfer Students**
Transfer applicants with post-secondary background may be considered for admission to the Planning program. In order to meet the appropriate degree requirements for this program, specifically the proper sequence of courses and co-op terms, transfer students will be required to begin their studies at the first year (1A) level. Applicants should be aware that transfer credit may not be granted for courses completed in other University of Waterloo programs or at other universities/colleges. Transfer students will only be admitted in the fall term.
7. **Planning Program Undergraduate Manual**
A number of important guidelines and regulations are available online ~~on~~ ~~in~~ the [School's Planning Program Undergraduate Manual](#) **School of Planning undergraduate program web**

page. Areas covered include: admission, academic standing, certificates, co-op, courses, Oxford Brookes field trip, leave-of-absence, senior honours essay, teaching assistants, etc.

~~8. Diplomas, Options, and Minors~~

~~A number of diplomas, options, and minors are available to Planning students. For more information, please refer to the [Academic Plan section](#) of this Calendar.~~

~~9. Concurrent Degrees, Joint Honours, and Minors~~

~~The School does not offer a concurrent, joint honours, or minor plans to the students in other departments. However, Planning students can participate in joint honours, minors, or options offered by other departments. Students choosing minors should refer to the regulations of those departments. Satisfying minor or joint honour requirements may demand more than the normal number of academic terms. See other faculty and department sections in this Calendar regarding available minors.~~

~~8. Oxford Brookes Field Trip~~

~~[PLAN 480](#) Theory and Practice of Planning in the United Kingdom: This elective course is offered to fourth year Planning students and is conducted at Oxford Brookes University, Oxford, England. Since much planning theory and practice in Canada draws on U.K. roots, PLAN 480 has been developed to give students a first hand experience of planning in the U.K. Topics covered in seminars and field trips include (but are not limited to) Garden Cities and New Towns, housing, transportation, heritage, and waterfront redevelopment. Waterloo students also work on specific projects comparing North American and U.K. planning practice. During free time, the students have the opportunity for travel in the U.K. and Europe and there is an opportunity to remain in the U.K. following the Oxford course for further travel.~~

8. General Information Applicable to all Environment Plans

The [Faculty of Environment General Academic Information](#) section of this Calendar contains information, regulations, and requirements pertaining to undergraduate studies within the Faculty. It is students' responsibility to familiarize themselves with the content of this section.

A number of Faculty of Environment options, minors, and diplomas are available. A list along with requirements are outlined under [Faculty of Environment Academic Plans](#).

~~9. The School reserves the right to make changes to the curriculum as necessary.~~

Rationale: Notes common to all ENV academic plans have been removed from individual plan course notes and added to the Overview of Plans, Sub-Plans, Course Enrollment and Grading. The final note for each plan directs the student to this section (to be renamed Faculty of Environment General Academic Information) for rules common to all plans.

Note 5 for Environment and Business is being removed as this regulation does not reflect current practices.

Note 8 for the School of Planning is being removed as this information is located on the School of Planning undergraduate webpage (see note 7).

Faculty of Mathematics

14. Degree Requirements – List 1

Motion: That Senate approve the following revisions to the List 1 requirements as described below, effective 1 September 2019.

Text with revisions inline (strikeout = deleted text; bold = new text):

[...]

List I: First Course

The first course must be chosen from one of the following:

EMLS 101R Oral Communication for Academic Purposes

EMLS 102R Clear Communication in English Writing

EMLS 129R/ENGL 129R Written Academic English

ENGL 109 Introduction to Academic Writing

SPCOM 100 Interpersonal Communication

SPCOM 223 Public Speaking

~~This~~ **The first communication course should be taken on campus** and must be completed with a ~~mark~~ grade of at least 60% prior to enrolling in a 2A term. Except for some students in the Double Degree plans, students are expected to enrol in one of these courses in their first term of study in the Faculty of Mathematics.

[...]

Rationale: Arts has asked Mathematics to enrol its 1A students in on campus sections since it is easier for to assign teaching. This is also beneficial for the students in that they have more opportunities to meet students in a classroom setting.

Faculty of Mathematics

15. Degree Requirements – List 2

Motion: That Senate approve the following revisions to the List 2 requirements as described below, effective 1 September 2019.

Text with revisions inline (strikeout = deleted text; bold = new text):

[...]

List I: First Course

The first course must be chosen from one of the following:

EMLS 101R Oral Communications for Academic Purposes

EMLS 102R Clear Communication in English Writing

EMLS 129R/ENGL 129R Written Academic English

ENGL 109 Introduction to Academic Writing

SPCOM 100 Interpersonal Communication

SPCOM 223 Public Speaking

This course must be completed with a grade of at least 60% prior to enrolling in a 2A term. Except for some students in the Double Degree plans, students are expected to enrol in one of these courses in their first term of study in the Faculty of Mathematics.

List II: Second Course

The second course must be chosen from one of the following:

~~Any other course listed in the First Course list~~

Any additional course from List I

EMLS 103R Effective English Pronunciation

EMLS 104R Reading and Listening for Academic Purposes

EMLS 110R Communicating in Canadian Academic Contexts

ENGL 108B Global English Literatures

ENGL 108D Digital Lives

ENGL 119 Communications in Mathematics & Computer Science
ENGL 208B Science Fiction
ENGL 209 Advanced Academic Writing
ENGL 210E Genres of Technical Communication
14 Math Faculty Council Report to Senate Undergrad Council – October 2018
ENGL 210F Genres of Business Communication
ENGL 378/MTHEL 300 Professional Communications in Statistics and Actuarial Science
SPCOM 225 Interviewing
SPCOM 227 Leadership
SPCOM 228 Public Communication
[...]

Rationale: The additional phrase “The second course must be chosen from one of the following:” would bring the format of List II in line with that of List I. It is hoped that the second change will add clarity; students seem unaware of the option to choose a second course from List I.

Faculty of Mathematics

16. Bachelor of Computer Science and Bachelor of Mathematics Plan Combinations

Motion: That Senate approve the following revisions to the Bachelor of Computer Science and Bachelor of Mathematics Plan Combinations restrictions as described below, effective 1 September 2019.

Text with revisions inline (strikeout = deleted text; bold = new text):

~~Students pursuing a Bachelor of Computer Science (BCS) or Bachelor of Mathematics (BMath) degree may enrol in up to three academic plans, subject to the limitations below. These rules also apply to the set of plans that appear on a student’s diploma and convocation program, and they apply to the student’s transcript as well, with the exception that notes may be added to the transcript to reflect successful completion of plans beyond the third one.~~

Note

The rules in this section do not apply to students seeking a Bachelor of Computing and Financial Management (BCFM), Bachelor of Science (BSc), or Bachelor of Software Engineering (BSE) degree. The list of eligible joint honours plans for Software Engineering students is available in the Software Engineering section of this Calendar.
[...]

Rationale: The intent is to remove the restriction that a math student can only enroll in up to three academic plans. Systems has confirmed that they will be able to restrict students from double counting courses in academic advisement beginning September 1, 2019. This change is effective for students whose requirement term is fall 2019.

FOR INFORMATION

ACADEMIC PROGRAM REVIEW REPORT

Final Assessment Report – Business Administration and Computer Science

Following discussion, Council approved the final assessment report for Business Administration and Computer Science on behalf of Senate. See Attachment #1.

REGISTRAR'S OFFICE

New Definitions and Guidelines for Curricular Submissions.

New definitions and guidelines were developed by the Common Language Working Group, which was co-chaired by the Quality Assurance Office and the Office of the Registrar and included faculty and staff from across campus with involvement in curricular development processes. The definitions will appear in the Undergraduate Calendar's glossary of terms, and the guidelines will serve as a resource to Council and those submitting materials to Council. Please see Attachment #2 for the definitions, guidelines and background.

MINOR PLAN & CURRICULAR MODIFICATIONS

Council approved the following on behalf of Senate:

- minor plan changes for: applied health sciences (health informatics option, pre-clinical specialization, four-year general recreation and leisure studies, honours recreation and leisure studies); arts (bachelor of accounting and financial management (co-op), four-year general economics, honours economics, honours mathematical economics, three-year general English language and literature, four-year general English – literature, four-year general English – literature and rhetoric, four-year general English – rhetoric, media and professional communication, honours English – literature, honours English – literature and rhetoric, honours English – rhetoric, media and professional communication, three-year general history, four-year general history, honours history, specializations in history); engineering (architectural engineering, civil engineering, environmental engineering, geological engineering, electrical & computer engineering, mechanical and mechatronics engineering); environment (environment and business, geography and environmental management honours, geomatics honours, knowledge integration honours, business option, environmental assessment, earth systems science specialization, GEM, international development minor, knowledge integration minor, urban studies minor); mathematics (applied mathematics engineering specializations, honours applied mathematics, Math/ITM); software engineering.
- new courses for: arts (School of Accounting and Finance, anthropology, dean of arts, classical studies); engineering (Conrad School of Entrepreneurship & Business, electrical & computer engineering); environment (dean of environment, School of Environment, Resources & Sustainability, geography & environmental management, School of Environment, Enterprise & Development, interdisciplinary studies); science (aviation, optometry).
- course changes for: applied health sciences (applied health sciences, School of Public Health and Health Systems, kinesiology, recreation and leisure studies); arts (School of Accounting and Finance, dean of arts, music, economics, management, English language and literature, history, philosophy, religious studies); engineering (architectural engineering, civil engineering, environmental engineering, geological engineering, electrical & computer engineering); environment (dean of environment, School of Environment, Resources & Sustainability, geography & environmental management, School of Environment, Enterprise & Development, international development, social entrepreneurship); mathematics (applied mathematics, dean of mathematics, pure mathematics, statistics & actuarial science); science (biology, chemistry, optometry).
- course inactivations for: applied health sciences (kinesiology); engineering (civil engineering); environment (knowledge integration, School of Environment, Enterprise & Development); science (optometry).

/rmw

Mario Coniglio
Associate Vice-President, Academic



Final Assessment Report

Business Administration and Computer Science Double Degree (BBA/BCS)

August 2018

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 Business Administration and Computer Science Double Degree Program (BBA/BCS) delivered by the David R. Cheriton School of Computer Science at the University of Waterloo and the Lazaridis School of Business and Economics at Wilfrid Laurier University. A truncated self-study was submitted to the Associate Vice-President, Academic on September 7, 2017. Both Laurier and Waterloo independently completed Self-Study Reports for their programs in 2013, but did not include a review of the Double Degree program. Hence, this report focused on the unique characteristics of the BBA/BCS program. The self-study presented the program description, an analytical assessment of this program, including the data collected from an alumni survey and the standard data package, which was prepared by the Office of Institutional Analysis & Planning (IAP).

The review was conducted solely from Waterloo's perspective, and thus, with permission of the Quality Council, the site visit was completed by internal reviewers. Two arm's-length internal reviewers were selected by the Associate Vice-President, Academic: Dr. Paul Fieguth, Professor and Chair, Systems Design Engineering, and Dr. Johanna Wandel, Associate Professor, Geography and Environmental Management.

Reviewers appraised the self-study documentation and conducted a site visit to the University on November 29, 2017. The visit included interviews with the Associate Vice-President, Academic; Dean of Mathematics; Director of the Cheriton School of Computer Science (UW); Director, Undergraduate Business Programs (Laurier); Director, Undergraduate Studies (CS), as well as faculty members, staff and current undergraduate students from both institutions.

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



Program characteristics:

This Double Degree program, begun in 2010, enables students to complete two undergraduate degrees: a Bachelor of Computer Science (BCS) from Waterloo's David R. Cheriton School of Computer Science, and a Bachelor of Business Administration (BBA) from Laurier's Lazaridis School of Business and Economics.

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

Strengths

- Students receive two excellent degrees and are well-prepared for careers that exist at the intersection of the two degrees.
- The demand for the program is strong with a large number of applications from high quality students.
- A noteworthy success has been its admission of female students: the UW-based classes admitted in the past three years both had notably more women than those of previous years. In particular, the UW-based classes first enrolled in 2015 and 2016 had 30.4% and 32.1% women, respectively; those for the non-double-degree UW cohort in Computer science had 25% women in both of those years.

Challenges

- Administration: Coordination of the program across the two schools requires frequent communication. While relations have been good, different priorities exist at both institutions, and of course, each institution has its own policies.
 - Scheduling: there is currently very little coordination between the scheduling systems of the two schools to ensure that course and exam schedules are conflict-free for the students in the BBA/BCS program.
 - A foreseeable challenge would be a significant curriculum change to one of the schools, which could disrupt the delicate course equilibrium that now exists: we currently work very hard to ensure that required courses are equally split between the two universities.
- Student imbalances. When the program was created, the goal was to have an equal number of UW-based students and WLU-based students. Since its inception, there have been more UW-based students, though WLU is catching up. In general, Waterloo has been more attractive to students because of the superior co-op opportunities and the ability of students to remain in a co-op program if they switch to a single degree BCS.

This imbalance increased the pressure to admit more WLU-based students, which in turn led to differences in admission standards, as is discussed in the next section. However, even if the number of students admitted were identical, an imbalance would result from different retention rates.



There is an agreement to transfer funds between the two schools to compensate for the tuition and grant from the ministry when the programs are imbalanced. The formula employed is designed to make the universities have no preference where students are registered, but since the transfer occurs at the Faculty level, there has been internal UW pressure to keep balance – the money comes into the university at the top, but the transfer out happens from the Faculty of Mathematics.

Weaknesses

- **Admissions:** Because each school admits students to the program, there have been discrepancies between the two admissions policies. Standards enforced by WLU were weaker than those at UW for the first few years of the program, resulting in poor outcomes for the weaker students: in particular, a larger fraction of the students who left the program for academic performance reasons in that period were based at WLU.

In the past few years, there has been an effort made to standardize admissions across the two universities, but stubborn differences have persisted. For example, it was recently discovered that Waterloo adjusts admission scores for students that repeat high school mathematics courses, whereas Laurier was not making this adjustment. The two institutions are working together each year to align processes and resolve discrepancies as issues are identified. For example, there is now some coordination in marketing and communications although there still are substantial differences in how the two universities represent the program to prospective students. Given the flagship nature of the BCS for Waterloo, it is essential that only the highest-quality students be admitted to the double degree program, especially as CS at Waterloo limits transfer opportunities from other Waterloo programs.

- **Co-op:** As noted, UW-based students can only participate in the Waterloo co-op system and vice-versa for WLU-based students. In general, Waterloo has stronger co-op opportunities in CS and Laurier has stronger opportunities in business and finance. This has been a source of frustration for students who want to pursue co-op postings in both areas.
- **Retention:** Each year, many students leave the program, typically switching to a single degree at UW or at WLU. Students often switch because they have lost interest in one of the degrees and/or they desire more electives and flexibility. According to our advisors, because students know they can switch after they have been admitted, they often apply to the double degree program half-heartedly with a much stronger inclination toward one of the degrees.

Advisors also report that UW-based students are more likely to switch to a single BCS, often frustrated with the delayed CS content and co-op stream inflexibility. WLU-based



students are more likely to switch to a single BBA, often because they find the math and CS content overwhelming.

It is not clear that this is a problem that is easily solved: students who discover that their interests are more narrow are not really making a bad decision, and students who find one of their two degree programs too challenging are similarly making a smart decision to switch to a single-degree program. Still, the program has notably poorer retention than might be expected considering the strength of the admitted students.

- Delayed CS content. Students in the BBA/BCS program take their CS courses notably later in their program than students in the single-degree BCS program. This is because the BBA program is a cohort-based program with students taking mandatory courses in specific terms. The schedule has 16 BUS and ECON courses scheduled in the first three years. These require a total of 7 prerequisites from the Math core, meaning that 17 courses in the first 2 years, and 23 in the first 3 years, are pre-set, and are not CS courses, leaving little room.

Since the normal course load for a student is five courses per term, this leaves room for only 3 CS courses in their first two years and a total of just 6 CS courses in their first three years. The BCS degree has 2 first year courses and 5 second year courses, so a BBA/BCS student may not be able to complete their second year of CS courses until their fourth year of the program. This is unsatisfactory for many students, and so they often “overload” (take six courses per term) or take courses while on co-op.

There is an opportunity to develop a solution that accommodates the cohort-based system of the BBA, but introduces CS content in a timelier manner. Similar to the model of co-op streams, students could select between two course sequences (*e.g.*, in their first year). The first sequence would be the existing schedule, where the first three years of the program are synchronized with the first three years of business courses. The alternative stream would stretch the first three years of the business courses over four years. The alternative stream could still have business courses scheduled during specific terms to facilitate planning and scheduling at Laurier, but be flexible enough for students to alter their co-op sequence if desired. Waterloo has begun to discuss this possibility with colleagues at Laurier.

Summary of key findings from the reviewers:

The BCS at Waterloo and BBA at WLU occupy similar positions on their respective campuses: both attract top-tier students, and the double degree students represent approximately 10% of the total students in their respective BCS and BBA degrees. The WLU BBA program is nationally known and recognized; the UW BCS program has international recognition. While the reviewers



were very impressed with the program, recommended areas to monitor include student retention including differential retention rates between UW and WLU, marketing the business angle more explicitly at Waterloo, and tracking the steadily growing number of alumni.

Program response to reviewer recommendations:

1. **Formalize the agreement between the UW BCS and WLU BBA degree programs via a double degree Terms of Reference, with associated Program Committee. Ensure that students are represented on the program committee.**

Response

Program representatives have met with counterparts at WLU, and intend to establish a single committee for both the BMath and BCS double degree programs (since the BBA degree the students are receiving is the same one for both); WLU prefers that this committee be a single point of contact for petitions, operations and curriculum matters. UW will follow up with WLU colleagues and with the Math/Business unit at Waterloo to formalize terms of reference for this committee. It is the WLU preference not to make a formal agreement for the double-degree programs, to keep the process nimble.

2. **Enhance program marketing on the UW side to better capitalize on the business opportunities and WLU's position relative to other business programs.**

Response

A few years ago, both universities developed a one-page recruiting flyer for the BBA/BCS program, highlighting advantages of both universities, but this wasn't a priority for WLU to keep up. UW will incorporate the WLU logo and information in promotional materials in the upcoming cycle, and re-engage WLU's marketing group.

3. **More deliberate program advising, including dedicated program advisors at WLU, and greater involvement of program advisors in connecting students for mentoring/mentee opportunities.**

Response

It is anticipated that this may come out of the operating committee. In particular, at WLU, currently the Associate Dean participates in the petitions conversations for double-degree students. With a single program committee, it will instead include a single advisor who will be up to speed on all regulations for students in the double-degree programs.

4. **In careful collaboration with WLU, develop an alternate optional course sequence to provide earlier CS content. In so doing, care should be taken to preserve the cohort-building aspects of the current program. Maintenance and enhancement of cohort**



building could be achieved through dedicated offerings or sections of upper year CS courses at UW.

Response

WLU colleagues are willing to discuss this in the new program committee, but did not appear particularly enthusiastic. In particular, they have not made this kind of change for their own BBA/BCompSci double degree program with the WLU Computing and Physics department. It's clear that the right forum, though, will be the program committee.

With respect to the BBA/BCS students having common upper-year sections, this is probably infeasible since they take courses such as CS 490 or 492 in the term of their choice at UW, sometimes as early as third year. That said, the program doesn't believe this objective is particularly necessary: many students in 490 and 492 are double-degree students, and given that the courses are also electives, students that aren't from the double-degree program are likely to still share a lot of the same interests as the double-degree students.

While the recommendation suggests common sections for upper-year courses, the program will also move to having common first-year sections for the incoming class in Fall 2018.

5. **Conduct exit surveys or interviews with all students who leave the double degree program before graduation. There is a need to identify both why students leave the program and their destination.**

Response

CS is in the process of developing an exit survey for students who leave our programs in general, originating with our Women in CS group. The program will incorporate students who leave the double-degree program into that general program for all students who leave CS.

Recommendations that were not selected for implementation:

6. **More coordinated communication between the two home bases during the admissions and offer acceptance period.**

Response



Turning over lists of admitted students turns out to be largely impractical, because of the short time frame for the final round of acceptances. While it is legal for the two institutions to exchange lists of applicants and acceptances (verified by Waterloo's Privacy Officer), WLU would be making final acceptances basically at the same time as UW. There is an attempt to harmonize admissions standards, and WLU is intending to start incorporating more factors outside marks into admissions (such as penalizing repeated courses and incorporating extracurricular activities) in upcoming cycles, so that may help with keeping standards similar.

7. **Continue and explore expansion of the co-op exchange, particularly for WLU-based students, even if this leads to more co-op fees. Ideally, expand the opportunity to two terms per student.**

Response

The truth is that this exchange program isn't working. There are essentially no students from UW who are going to WLU, and the WLU-based students who have come to UW have not all done as well in the matching process as have the UW-based students, which means that UW staff are expending a lot of effort on students who aren't paying UW fees.

There's no evidence that better marketing from WLU will convince UW students to go there for a co-op exchange, and there's zero willingness on WLU's behalf to allow WLU-based students to pay fees to a different university for co-op services (and, truly, not much willingness at UW either). UW Cooperative and Experiential Education staff, have indicated to the program that they don't anticipate renewing the co-op exchange.

8. **Enhance alumni engagement for all double degree graduates regardless of home base.**

Response

Because CS graduates several hundred students per year and Math graduates over a thousand, and there is only one alumni affairs officer in Mathematics, double degree students are incorporated into the general alumni engagement program. That said, Math's alumni affairs officer confirms that graduates from both home schools are engaged with the alumni relations program. However, due to the newness of the program, there has not been a lot of alumni relations work done with BBA/BCS graduates.



Implementation Plan:

	Recommendations	Proposed Actions	Responsibility for Leading and Resourcing (if applicable) the Actions	Timeline for addressing double degree Recommendations
1.	Formalize the agreement between the UW BCS and WLU BBA degree programs via a double degree Terms of Reference, with associated Program Committee. Ensure that students are represented on the program committee.	UW program representatives have begun discussions with WLU regarding petitions/operations/ curriculum committee for both the Math and CS double-degree programs.	Dan Brown and Ilham Akhundov from UW; Shelley McGill from WLU	Fall 2018
2.	Enhance program marketing on the UW side to better capitalize on the Business opportunities and WLU's position relative to other Business programs.	This will be implemented in our marketing materials for F18.	Monique Bevan (CS) and other marketing staff	Fall 2018
3.	More deliberate program advising, including dedicated program advisors at WLU, and greater involvement of program advisors in connecting students for mentoring/mentee opportunities (UW already has this)	This is being suggested to WLU counterparts; perhaps this will result from the new program committee for double degrees.	This is a WLU-specific recommendation; we can only offer advice to our colleagues at WLU via the new program committee for double degrees.	N/A



4.	In careful collaboration with WLU, develop an alternate optional course sequence to provide earlier CS content. In so doing, care should be taken to preserve the cohort-building aspects of the current program. Maintenance and enhancement of cohort building could be achieved through dedicated offerings or sections of upper year CS courses at UW (to allow CS courses to come earlier).	This will be negotiated in the new program committee; it is, however, largely a WLU issue.	Program committee members.	Fall 2019
5.	Enhance alumni engagement for all double degree graduates regardless of home base	An exit survey for all students who leave CS is currently being developed; this will in particular be given to those who leave the double-degree program.	Women in CS committee, CS undergrad office	Fall 2018

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: 2020-2021
Date

Signatures of Approval:

Chair/Director

Date


27 Jul 18

AFIW Administrative Dean/Head (For AFIW programs only)

Date

Faculty Dean

Date


Harris Crigler

August 21, 2018

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

Date

Associate Vice President, Graduate Studies and Postdoctoral Affairs
(For graduate and augmented programs)

Date

Office of the Registrar

Memorandum

To: Senate Undergraduate Council
From: University Registrar, on behalf of Common Language Working Group (CLWG)
Date: August 24, 2018
Re: New definitions and guidelines for future curricular submissions

Effective date: September 1, 2019

Motion: To revise existing academic curriculum definitions and determine guidelines for curriculum development. Any future new curriculum should follow the proposed guidelines. Existing curriculum will be grand-fathered, however, should adopt the proposed guidelines when next revised.

Definitions will appear in the Undergraduate Calendar's **glossary of terms**; guidelines will be made available in a Senate Undergraduate Council resource document.

Definitions:

Term	Proposed definition (to be adopted)	Current Calendar definition (to be retired)
Academic plan	A defined set of requirements that leads to a particular credential.	A set of courses, a number of which may be mandatory and of a specialized nature, leading toward a particular degree, option, or minor.
Academic program	A defined set of requirements (honours or general, regular or co-operative) common to a particular degree.	See academic plan
Certificate	A defined set of requirements (which may include any combination of non-academic experiential components and academic courses), that allows a student to acquire skills or experience in a specific area.	Not applicable
Credential	An earned degree, major, specialization, minor, option, diploma, or certificate appearing on a student's transcript.	A degree, diploma, or certificate.
Degree	A qualification awarded to a student by the post-secondary educational institution. Types of degrees available: Bachelor's/Baccalaureate, Professional Doctoral, Master's/Magisteriate, Doctoral.	Not applicable

Term	Proposed definition (to be adopted)	Current Calendar definition (to be retired)
Diploma	A defined set of academic courses that allows a student to acquire skills or knowledge in a specific area.	Not applicable
Entry program	An admission point of entry. Students may apply directly into an academic program from which they will graduate, or they may apply into an academic program where they will be required to select a major.	Not applicable
Honours program	<i>Eliminate definition (Honours/General definitions can be defined by each faculty due to lack of commonality)</i>	An honours undergraduate program usually leads to a Bachelor's degree. Honours programs are more demanding than general programs, both with regard to content and the number of required courses.
Major	An academic plan that is the primary area of study in a student's baccalaureate degree.	The area(s) of academic emphasis selected in either an honours or a general plan. Details of course and average requirements are given in this Calendar .
Minor	An academic plan that is a secondary area of study and that provides breadth to a student's baccalaureate degree. Minors offered by faculties are normally available to all students.	A group of approved courses taken by a student in an honours plan or a four-year or three-year general plan in a subject outside the "major" area. Details of course and average requirements are given in the faculty sections of this Calendar .
Option	An academic plan that provides depth to a student's baccalaureate degree and typically requires fewer courses than a minor. Options are only available to students within their home faculty.	An option is a specified selection of courses that provides a secondary emphasis in an academic plan. The secondary emphasis is meant to provide depth, beyond the primary discipline of the plan. The secondary emphasis may be in another subject area or in a career-oriented area. An option typically stipulates fewer courses than a minor. Details of course and average requirements are given in faculty sections of this Calendar .
Specialization	An academic plan that offers an area of concentration and provides depth to a student's primary area of study. Specializations are only available to students within their primary area of study.	A specialization is a specified selection of courses that provides a primary emphasis in an academic plan. The specialization is meant to provide additional depth into some aspect of the primary discipline. A specialization typically stipulates fewer courses than a minor. Details of course and average requirement are given in the faculty sections of this Calendar .

Proposed curriculum development guidelines:

Guideline	Specialization	Minor	Option	Diploma	Certificate*
Student audience (does not override mutually exclusive plans):	All students within a major	All students across campus	All students within the Faculty	All students across campus, including non-/post-degree	All students across campus
Requirements:	n/a	n/a	n/a	May only include academic components	Should include an experiential component and the option of one or more academic courses
Range of courses:	Not definable	8-10 courses (normally 4.0-5.0 units)	6-8 courses (normally 3.0-4.0 units)	4-7 courses (normally 2.0-3.5 units)	3 courses (normally 1.5 units) or less
Average:	May have distinct average requirement	Has a distinct average requirement	Has a distinct average requirement	Has a distinct average requirement	May have a distinct average requirement
Listed:	Transcript and parchment	Transcript and parchment	Transcript and parchment	On transcript and own distinct parchment	On transcript and own distinct parchment
Title (UG Calendar & parchment):	<i>major XXX – YYY</i> Specialization	XXX Minor	XXX Option	Diploma in XXX	Certificate in XXX

*Note: The certificate definition does not include participation-style certificates printed by departments/units and which do not appear in the Undergraduate Calendar.

Rationale and background:

The proposed definitions and guidelines are a culmination of the work of the Common Language Working Group during the 2017-18 academic year. The CLWG was co-chaired by the Quality Assurance Office and the Office of the Registrar. Members, who were invited to participate either due to their existing roles and/or their historical knowledge of campus, represented a wide section of campus, and included both staff and faculty members.

The proposed definitions and guidelines were created to promote understanding, clarity, and consistency in academic curricular terminology used on campus and to provide direction for future curriculum development motions.

The proposed definitions and guidelines were formulated with consideration given to:

- Existing practice
- Student's experience with the terms

- What terms were used interchangeably on campus
- What terms have more than one meaning on campus (e.g., diploma – program vs piece of parchment), where confusion could arise
- What students see during the application funnel (including marketing materials, application centre)
- What students see in Quest (currently and/or will soon)
- Engineering's accreditation body and process
- Ministry guidelines and definitions
- How terminology is understood by employers or other post-secondary institutions

**University of Waterloo
SENATE
Report of the President
19 November 2018**

FOR INFORMATION

Recognition and Commendation

The University of Waterloo has awarded six first-year students with **HeForShe IMPACT scholarships** in the fields of science, technology, engineering or mathematics. The scholarships are part of the University's commitment to encourage more young minds to pursue careers in STEM, an area where those who identify as women or non-binary groups are currently underrepresented. Waterloo is the only Canadian university taking part in the UN Women's HeForShe IMPACT 10x10x10 initiative to achieve gender parity. This year's recipients are:

- **Adrianna D'Sa**, chemistry
- **Isemi Ekundayo**, computer engineering
- **Lindsay Toffolo**, computer science
- **Megan Lai**, mechatronic engineering
- **Sally Zhou**, computer science
- **Sarah Moser**, mathematical physics

(adapted from *Waterloo Stories*, 25 September 2018)

University of Waterloo Professor **Donna Strickland** is one of three scientists to win this year's **Nobel Prize in Physics** for her work to develop short and intense laser pulses that have many industrial and medical applications. Strickland is the first woman to win the Nobel Prize in physics in 55 years, the first Canadian woman to do so, and the first University of Waterloo faculty member to win a Nobel Prize while affiliated with the University. Strickland shares the award with American Arthur Ashkin of Bell Laboratories and French physicist Gérard Mourou of École Polytechnique, Palaiseau, and the University of Michigan. Strickland and Mourou split one half of the prize share "for their method of generating high-intensity, ultra-short optical pulses," according to the Nobel committee. "I got the Nobel Prize for my very first paper, and it was my PhD thesis," says Strickland. "It was great to have had the opportunity to work with one of the pioneers of ultrafast lasers, Gérard Mourou. It was a small community back then. It was a new, burgeoning field. I got to be part of that. It was very exciting." Strickland joined the University of Waterloo in 1997. She is a past winner of the Alfred P. Sloan Research Fellowship.

(adapted from the *Daily Bulletin*, 2 October 2018)

Eight research collaborations between the University of Waterloo and institutions around the world will receive \$350,000 in funding to collaborate on projects ranging from quantum experiments and gravitational physics to living architecture. Funded by Waterloo (up to \$20,000 per project based on equal cash contributions from partners), the projects will involve more than 75 researchers at Waterloo and colleagues in Korea, Singapore, Hong Kong, France, Austria, Germany, and the Netherlands. **International Research Partnerships Grants** are internal seed grants meant to further Waterloo researchers' global collaborations with leading research institutions. Since 2011, 134 projects have been funded totaling \$1.9 million that garnered \$2.9 million in matching cash contributions and subsequently generated over \$18 million in new grants awarded to Waterloo researchers. These projects have also resulted in 58 new innovations, four patents and five startups. Newly funded collaborations include:

- **Philip Beesley** (School of Architecture) is partnering with Delft University of Technology to host a student workshop led by Professor Beesley at Delft's Science Centre.

- **Catherine Burns** (Centre for Bioengineering and Biotechnology) is partnering with the Université de Technologie de Compiègne and Sorbonne University to further support the BIOMEDInnov project, a summer school exchange program between the two universities in biomedical engineering.
- **Richard Culham** (engineering) is partnering with the National University of Singapore (NUS) and its Biomedical Institute for Global Health Research and Technology (BIHEART)
- **Pin-Han Ho** (electrical and computer engineering) is partnering with the Korea Advanced Institute of Science and Technology and Kyungpook National University.
- **Robert Lemieux** (science) is partnering with Hong Kong Polytechnic University to host a combined Biomedical Research and Innovation Partnership workshop.
- **Robert Mann** (physics and astronomy) is partnering with the University of Vienna to focus on developing novel experiments that test the quantum nature of gravitational force.
- **Sushanta Mitra** (Waterloo Institute for Nanotechnology) is partnering with the University of Duisburg-Essen to host a workshop at the Centre for Nanointegration University of Duisburg-Essen in Germany.
- **Adam Tsen** (chemistry) is partnering with Pohang University of Science and Technology, Korea, on wafer-scale 2d magnetic heterostructures for next-generation spintronic devices.

(adapted from the *Daily Bulletin*, 11 October 2018)

University of Waterloo
REPORT OF THE DEAN OF APPLIED HEALTH SCIENCES TO SENATE

November 19, 2018

FOR INFORMATION

A. APPOINTMENTS

Change in Appointment

VIGNA, Christopher, conversion from Definite Term Lecturer to Continuing Lecturer, Department of Kinesiology, effective January 1, 2019.

Adjunct Appointments

Graduate Supervision

BANYAI, Maria, Professor, Department of Recreation and Leisure Studies, October 5, 2018 – June 30, 2020.

Graduate Supervision and Research

CORBETT, Kitty, Definite Term Professor (retired), School of Public Health and Health Systems, September 15, 2018 – August 31, 2022.

Research

REID-MUSSON, Emily, Assistant Professor, School of Public Health and Health Systems, September 15, 2018 – June 30, 2021.

Adjunct Reappointments

Research

GOOYERS, Chad, Assistant Professor, Department of Recreation and Leisure Studies, January 1, 2019 – December 31, 2020.

SPAGNUOLO, Paul, Associate Professor, School of Public Health and Health Systems, January 1, 2019 – December 31, 2021.

Graduate Supervision and Research

CRIZZLE, Alex, Assistant Professor, School of Public Health and Health Systems, January 1, 2019 – December 31, 2020.

McMILLAN, Colleen, Associate Professor, School of Public Health and Health Systems, September 1, 2018 – August 31, 2019.

Research Associate

ROBERTSON, Andrew, Department of Kinesiology, October 1, 2018 – September 30, 2019.

Cross Re-appointments

BEAZELY, Michael, Associate Professor, School of Pharmacy to School of Public Health and Health Systems, Faculty of Applied Health Sciences, September 1, 2018 – April 30, 2021.

Special Appointments

Undergraduate Instruction

BISHOP-WILLIAMS, Kate, Lecturer, School of Public Health and Health Systems, January 1, 2019 – April 30, 2019.

FERRO, Annalise, Lecturer, School of Public Health and Health Systems, January 1, 2019 – April 30, 2019.

GHEORGHIU, Cristina, Lecturer, School of Public Health and Health Systems, January 1, 2019 – April 30, 2019.

Undergraduate and Graduate Instruction

MacNEIL, Margaret, Lecturer, School of Public Health and Health Systems, January 1, 2019 – April 30, 2019.

TONG, Catherine, Lecturer, School of Public Health and Health Systems, January 1, 2019 – April 30, 2019.

Other

MORROW, Teri-Lyn, Graduate Research Assistant, School of Public Health and Health Systems, October 1, 2018 – May 31, 2019.

Postdoctoral Appointments

BUBLITZ, Frederico, School of Public Health and Health Systems, January 1, 2019 – December 31, 2020.

CLEWORTH, Taylor, Department of Kinesiology, September 1, 2018-August 31, 2019.

PAROKARAN VARGHESE, Jessy, Department of Kinesiology, October 1, 2018 – September 30, 2019.

VANDERLEE, Lana, School of Public Health and Health Systems, November 12, 2018 – November 12, 2021.

VELASQUEZ GARCIA, Hector, School of Public Health and Health Systems, May 1, 2019 – September 30, 2020.

Postdoctoral Reappointment

KING, Emily, Department of Kinesiology, October 1, 2018 – November 30, 2018.

VALAITIS, Renata, School of Public Health and Health Systems, September 11, 2018 – March 31, 2019.

C. SABBATICALS

For approval by the Board of Governors

JOHNSON, Corey, Professor, Department of Recreation and Leisure Studies, September 1, 2019 – August 31, 2020 at 85% salary.



Paul Stolee, Interim Dean
Faculty of Applied Health Sciences

UNIVERSITY OF WATERLOO
REPORT OF THE DEAN OF THE FACULTY OF ARTS TO SENATE
November 19, 2018

FOR INFORMATION

A. APPOINTMENTS

Definite Term Appointments

BENNETT, Christopher (BA 2011 MA 2012 Queen's University, PhD 2017 Warwick University), Lecturer, Department of Political Science, July 16, 2018 – July 15, 2020. Dr. Bennett has been appointed into Political Science in support of the Arts First program. His PhD dissertation, "For the Sake of Future Generations: intergenerational justice and climate change mitigation" and his wealth of knowledge of pedagogical practices make him an excellent fit for the Arts First program, teaching first-year students this fall in the "Inquiry and Communication" course under the topic "Climate Change and Denial".

BLOEMHOF, Barbara (BA University of Guelph, MA Queen's University, PhD 2005 McMaster University), Lecturer, Department of Economics, July 16, 2018 to July 15, 2020. An instructor at Waterloo from 2009-14 and at McMaster University from 2003 to 2018, Dr. Bloemhof has been hired in support of the Arts First program. An instructional research consultant and a researcher in the scholarship of higher education, Dr. Bloemhof is teaching "Information and Analysis" to first-year Arts students this fall under the topic "How to Win a Trade War".

DENTON, Stacy (BA 2001 State University of New York, MA 2003 University of Albany, PhD 2013 Concordia University), Lecturer, Department of English Language & Literature, July 16, 2018 to July 15, 2020. With extensive interdisciplinary teaching experience in first-year, post-secondary classes in the US and at York University, Dr. Denton is a welcome addition to the Arts First program. This fall, she is instructing first-year Arts students in the "Inquiry and Communication" course under the topic "Intersecting Identity and Image".

MCCARTHY, Megan (BA 2005 Brock University, MA 2010 Wilfrid Laurier University, PhD 2016 University of Waterloo), Lecturer, Department of Psychology, July 16, 2018 to July 15, 2020. An instructor at UW, Renison University College, and St. Jerome's University since 2014, Dr. McCarthy recently developed a multi-disciplinary seminar on Race and Gender Equity, and is passionate about developing materials and methods for teaching that actively engage students in the learning process. Dr. McCarthy is teaching "Information and Analysis" within the Arts First program this fall, under the topic "Myths of Sex and Love".

TAYLOR, Christopher (BA 2008 University of Toronto, MA 2009 PhD 2013 University of Western Ontario), Lecturer, Department of History, July 16, 2018 to July 15, 2020. Since his graduation, Dr. Taylor has been employed in the Ontario government, for two years in the Ministry of the Attorney General in roles with the Indigenous Justice Division and as Diversity and Inclusion Coordinator, and most recently as Senior Policy Advisor in the Anti-Racism Directorate, where teaching has been a fundamental feature of his work. Dr. Taylor is teaching "Inquiry and Communication" to Arts First students this term under the topic "Taking B[L]ack History".

Adjunct Reappointments – Graduate Supervision

GAVRIC, Dubravka, Clinical Supervision, Department of Psychology, September 1, 2018 to August 31, 2019.

HENDRY, Carol-Anne, Clinical Supervision, Department of Psychology, September 1, 2018 to August 31, 2019.

MARIN-DOMINE, Martz, Associate Professor, Department of Sociology and Legal Studies, October 1, 2018 to September 30, 2019.

ROWA, Karen, Graduate Supervision, Department of Psychology, September 1, 2018 to August 31, 2024.

STEVENS, Elizabeth, Clinical Supervision, September 1, 2018 to August 31, 2019.

Graduate Students Appointed as Part-Time Lecturers

ETMANSKI, Brittany, Department of Sociology and Legal Studies, September 1, 2018 to December 31, 2018.

HINTON, Lucy, Department of Political Science, September 1, 2018 to December 31, 2018.

MITCHELL, James, Department of French Studies, September 1, 2018 to December 31, 2018.

YESAYA, David, Department of French Studies, September 1, 2018 to December 31, 2018.

B. ADMINISTRATIVE APPOINTMENTS

HABIB, Jasmin, Associate Chair, Undergraduate Studies, Department of Political Science, October 1, 2018 to June 30, 2021.

CHANGE in DATES

ESSELMONT, Anna, Department of Political Science, Chair, **from** July 1, 2017 to August 31, 2018 **to** July 1, 2017 to August 31, 2019, and Associate Chair, Undergraduate Studies, **from** July 1, 2018 to June 30, 2019 **to** July 1, 2018 to September 30, 2018.

MACLEOD, Colin, Chair of Psychology, **from** July 1, 2016 to June 30, 2018 **to** July 1, 2016 to June 30, 2019.

RAVENHILL, John, Director, Balsillie School of International Affairs, **from** September 1, 2013 to August 31, 2018 **to** September 1, 2013 to August 31, 2019.

C. RESIGNATION

DOUGLAS, Heather, Associate Professor, Department of Philosophy, effective August 31, 2018.

KIM, Jeong-bon, Professor, School of Accounting & Finance, effective June 30, 2018.

D. UNPAID LEAVE

WALKER, James, Professor, Department of History, January 1, 2019 to April 30, 2019.



Douglas M. Peers
Dean, Faculty of Arts

UNIVERSITY OF WATERLOO
REPORT OF THE DEAN OF ENGINEERING TO SENATE

November 19 , 2018

FOR INFORMATION

A. APPOINTMENTS

New Definite Term – full-time

EL-HAG, Ayman, Lecturer, Department of Electrical & Computer Engineering, September 1, 2018 – August 31, 2019. PhD University of Waterloo 2003; MS King Fahd University of Petroleum and Minerals, 1998; BS King Fahd University of Petroleum and Minerals 1993. Dr. El-Hag will be teaching several courses in the circuits and power electronics areas, both to ECE students, and in our partner programs.

MAHMOUDI, Pendar, Lecturer, Department of Chemical Engineering, January 1, 2019 – December 30, 2020. PhD University of Waterloo 2018; BSc Sharif University of Technology 2013.

ZILBERMAN-SIMAKOV, Yael, Department of Chemical Engineering, Lecturer, January 1, 2019 – December 30, 2020. PhD Israel Institute of Technology, Haifa, Israel 2011; MSc Israel Institute of Technology 2009; BSc Technion, Haifa, Israel 2006.

Definite Term Reappointment – full-time

BORJI, Amir, Research Assistant Professor, Department of Electrical & Computer Engineering, September 1, 2018 – January 31, 2019. PhD University of Waterloo 2004; MSc Isfahan University of Technology, Isfshan, Iran 1998; BSc Isfahan University of Technology 1994.

Visiting Appointments

AHN, Hyeong-Joon, Researcher, Department of Mechanical Engineering December 1, 2018 – February 29, 2020.

CHITSAZ, Masoud, Scholar, Department of Management Sciences, October 1, 2018 – December 31, 2018.

CHOI, Yejung, Scholar, Department of Chemical Engineering, October 2, 2018 – May 12, 2019.

ISLAM, Shariful, Scholar, Department of Electrical & Computer Engineering, September 13, 2018 – September 30, 2019.

JAHANIAN NAJFABDI, Ali, Associate Professor, Department of Chemical Engineering, November 1, 2018 – October 31, 2018.

KOBABYASHI, Shigeki, Scholar, Department of Mechanical & Mechatronics Engineering, October 20, 2018 – May 30, 2019.

LI, Guopeng, Researcher, Department of Mechanical & Mechatronics Engineering, December 31, 2018 – December 30, 2019.

LI, Jun, Researcher, Department of Mechanical & Mechatronics Engineering, December 15, 2018 - December 14, 2019.

LYU, Wentao, Scholar, Department of Electrical & Computer Engineering, September 14, 2018 - September 13, 2019.

MATHEW, Manoj, Researcher, Department of Chemical Engineering, September 1, 2018 – August 31, 2019.

MOHAMMADI, Mhammad Reza, Associate Professor, Department of Chemical Engineering, February 1, 2019 – January 25, 2020.

OCHIAI, Hideki, Professor, Department of Electrical & Computer Engineering, March 1, 2019 – August 31, 2019.

RECH, Rosane, Professor, Department of Chemical Engineering, September 4, 2018 – August 31, 2019.

SONG, Yunchao, Scholar, Department of Electrical & Computer Engineering, December 1, 2018 – November 30, 2019.

SU, Haoru, Scholar, Department of Electrical & Computer Engineering, December 27, 2018 – December 26, 2019.

SUN, Bai, Scholar, Department of Mechanical & Mechatronics Engineering, October 3, 2018 – August 31, 2019.

XU, Jian, Scholar, Department of Electrical & Computer Engineering, October 1, 2018 – September 30, 2019.

YANG, Haomiao, Scholar, Department of Electrical & Computer Engineering, December 15, 2018 – December 14, 2019.

ZHANG, Yan, Researcher, Department of Civil & Environmental Engineering, November 1, 2018 – October 31, 2019.

Visiting Reappointments

PAN, Junjie, Scholar, Department of Mechanical & Mechatronics Engineering, September 30, 2018 – November 1, 2018.

Special Appointments

Undergraduate Instruction

YIN, Demin, Lecturer, Department of Electrical & Computer Engineering, September 1, 2018 – December 31, 2018.

Special Appointments

Graduate Instruction

JACKSON, Tim, Lecturer, Conrad Business Entrepreneurship & Technology Centre, September 1, 2018 – June 30, 2019.

Special Appointments

Other

HEWITT, Allyson, Social Entrepreneur-in-Residence, Conrad Business Entrepreneurship & Technology Centre, September 1, 2018 – June 30, 2019.

Adjunct Appointments

Graduate Supervision and Research

AZIMIFAR, Zohreh, Associate Professor, Department of Systems Design Engineering, October 1, 2018 – September 30, 2021.

KHALVATI, Farzad, Assistant Professor, Department of Systems Design Engineering, September 1, 2018 – August 31, 2021.

Adjunct Reappointments

Graduate Supervision

YEE, Eugene, Professor, Department of Mechanical & Mechatronics Engineering, October 1, 2018 – September 30, 2021.

Graduate Supervision & Research

ALMANSOORI, Ali, Professor, Department of Chemical Engineering, January 1, 2019 – December 31, 2021.

ENTCHEV, Evgeniy, Professor, Department of Chemical Engineering, September 1, 2018 – December 31, 2021.

STEVENS, Matthew, Assistant Professor, Department of Chemical Engineering, June 1, 2018 – May 31, 2020.

TAMER, Melih, Assistant Professor, Department of Chemical Engineering, May 1, 2018 – April 30, 2021.

Cross Appointments

BROUWER, Roy, Professor, Department of Economics, Faculty of Mathematics to Civil & Environmental Engineering, September 1, 2018 – August 31, 2021.

MITRA, Sushanta, Professor, Department of Mechanical & Mechatronics Engineering to Department of Chemical Engineering, September 1, 2018 – August 31, 2021.

SLAVCEV, Roderick, Associate Professor, School of Pharmacy, Faculty of Science to Department of Chemical Engineering, August 1, 2018 – July 31, 2021.

Changes in Appointments

LIEN, Fue-Sang, Administrative Appointment, Interim Associate Chair, Graduate Studies, Department of Mechanical & Mechatronics Engineering, was May 1, 2018 – April 30, 2019 changed to May 1, 2018 – September 2018.

B. ADMINISTRATIVE APPOINTMENTS

KWON, Hyock Ju, Interim Associate Chair, Graduate Studies, Department of Mechanical & Mechatronics Engineering, October 1, 2018 – December 21, 2018.

TAN, Zhongchao, Associate Dean, International, January 1, 2019 – December 31, 2021.

ADMINISTRATIVE REAPPOINTMENTS

BRUSH, David, Associate Chair, Undergraduate Studies, January 1, 2019 – December 31, 2020.

D. SABBATICAL LEAVES

For Approval by the Board of Governors

CHANDRASHEKAR, Naveen, Associate Professor, Department of Mechanical & Mechatronics Engineering, May 1, 2019 – October 31, 2019, six months at 100% salary.

CULHAM, Richard, Professor, Department of Mechanical & Mechatronics Engineering, January 1, 2019 – December 20, 2020, twelve months at 100% salary.

ELHEDHLI, Samir, Professor, Department of Management Sciences, January 1, 2019 – December 31, 2019, twelve months at 100% salary.

FREEMAN, George, Associate Professor, Department of Electrical & Computer Engineering, March 1, 2019 – August 31, 2019, six months at 95% salary and March 1, 2020 – August 31, 2020, six months at 95% salary.

GZARA, Fatma, Associate Professor, Department of Management Sciences, January 1, 2019 – June 30, 2019, six months at 85% salary.

HALDENBY, Eric, Professor, School of Architecture, January 1, 2019 – June 30, 2019, six months at 100% salary and January 1, 2020 – June 30, 2020, six months at 100% salary.

KAZERANI, Mehrdad, Professor, Department of Electrical & Computer Engineering, March 1, 2019 – August 31, 2019, six months at 100% salary.

MUSSELMAN, Kevin, Assistant Professor, Department of Mechanical & Mechatronics Engineering, January 1, 2019 – June 30, 2019.

RYNNIMERI, Valerio, Associate Professor, School of Architecture, January 1, 2019 – December 31, 2019.

SACHDEV, Manoj, Professor, Department of Electrical & Computer Engineering, March 1, 2019 – August 31, 2019, six months at 100% salary and January 1, 2020, six months at 100% salary.

E. SPECIAL LEAVE

TAN, Lin, Associate Professor, Department of Electrical & Computer Engineering, January 1, 2019 – December 31, 2019, twelve month unpaid leave.



Pearl Sullivan
Dean, Faculty of Engineering

University of Waterloo
REPORT OF THE DEAN OF ENVIRONMENT TO SENATE
November 19, 2018

FOR INFORMATION

A. APPOINTMENTS

Adjunct Appointment

Graduate Supervision

McCARTER, Colin, Postdoctoral Fellow, Department of Geography and Environmental Management, October 1, 2018 to September 30, 2022.

Adjunct Re-Appointment

Graduate Supervision

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

Special Appointments

Instruction

BAKER, Denise, Lecturer, School of Planning, January 1, 2019 to April 30, 2019.

POLLOCK, Rebecca, Lecturer, School of Environment, Resources and Sustainability, January 1, 2019 to April 30, 2019.

SMITH, Nancy, Lecturer, School of Planning, January 1, 2019 to April 30, 2019.

Cross Appointments

ARMITAGE, Derek, Professor, School of Environment, Resources and Sustainability to the Department of Geography and Environmental Management, January 1, 2019 to December 31, 2021.

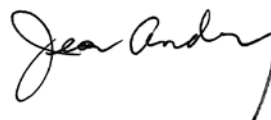
HIPEL, Keith, Professor, Department of Systems Design Engineering, Faculty of Engineering, to the Department of Geography and Environmental Management, January 1, 2019 to December 31, 2020.

SZEMAN, Imre, Professor, Department of Communication Arts, Faculty of Arts, to the Department of Geography and Environmental Management, November 1, 2018 to October 31, 2021.

QUILLEY, Stephen, Associate Professor, School of Environment, Resources and Sustainability to the Department of Geography and Environmental Management, January 1, 2019 to December 31, 2021.

B. ADMINISTRATIVE APPOINTMENTS

PARKER, Dawn, Director, Waterloo Institute for Complexity and Innovation [WICI], Faculty of Environment, September 1, 2018 to August 31, 2019.



Jean Andrey
Dean

University of Waterloo
REPORT OF THE DEAN OF MATHEMATICS TO SENATE
November 19, 2018

FOR INFORMATION

A. APPOINTMENTS

Definite Term - Appointments

LANCOT, Kevin (BSc, 1984, University of Toronto; MSc, 1990, Carleton University; PhD, 2000, University of Waterloo), Lecturer, David R. Cheriton School of Computer Science, September 1, 2018 – August 31, 2019. Dr. Lancot will teach six courses per year and be assigned service tasks and other duties by the Director of the School.

SHARMA, Puneet (BSc, 1998, Guru Nanak Dev University; MSc, 2001, Panjan University; PhD, 2015, University of Waterloo), Lecturer, Dept. of Applied Mathematics, September 1, 2018 – August 31, 2019.

Definite Term - Reappointments

NEKRITCH, Iakov, Research Assistant Professor, David R. Cheriton School of Computer Science, March 1, 2019 – February 28, 2022.

PEI, Martin, Lecturer, Dept. of Combinatorics & Optimization, December 31, 2018 – August 31, 2020.

Visiting Appointments

BONIFATI, Angela (Université Claude Bernard Lyon), Professor, David R. Cheriton School of Computer Science, January 1, 2019 – April 30, 2019.

LAROCQUE, Luc, Research Associate, Dept. of Applied Mathematics, September 1, 2018 – December 31, 2018.

MARTIN, Robert, Research Associate, Dept. of Pure Mathematics, September 1, 2018 – August 31, 2019.

Adjunct Appointments

Instructor

CASIEZ, Gery, Lecturer, David R. Cheriton School of Computer Science, September 1, 2018 – December 31, 2018.

VISHWANATHA, Sowmya, Lecturer, Office of the Dean, September 1, 2018 – December 31, 2018.

Adjunct Reappointments

Instructor

RADOCCHIA, Joseph, Lecturer, Office of the Dean, January 1, 2019 – April 30, 2019.

TOSH, Stephen, Lecturer, Office of the Dean, September 1, 2018 – December 31, 2018.

Research

BRZOZOWSKI, Janusz, Professor Emeritus, David R. Cheriton School of Computer Science, July 1, 2018 – June 30, 2021.

GILBERT, Will, Professor Emeritus, Dept. of Pure Mathematics, October 1, 2018 – September 30, 2021.

ZORZITTO, Frank, Professor Emeritus, Dept. of Pure Mathematics, September 1, 2018 – August 31, 2021.

Joint Appointments

STEBILA, Douglas (Associate Professor, Combinatorics & Optimization), in the David R. Cheriton School of Computer Science, August 1, 2018 – June 30, 2021.

Graduate Students reappointed as Part-time Lecturers

HUANG, Hongdi, Dept. of Pure Mathematics, September 1, 2018 – December 31, 2018.

JUNG, Joshua, David R. Cheriton School of Computer Science, October 1, 2018 – December 31, 2018.

McCARTY, Rose, Dept. of Combinatorics and Optimization, September 1, 2018 – December 31, 2018.

Postdoctoral Fellows appointed as Part-time Lecturers

ABEDI, Ali, David R. Cheriton School of Computer Science, September 1, 2018 – August 31, 2019.

BOCOVICH, Cecylia, David R. Cheriton School of Computer Science, October 1, 2018 – September 30, 2019.

WU, Lin, David R. Cheriton School of Computer Science, November 1, 2018 – October 31, 2019.

A.1. Change

BELTAOS, Andrew, Lecturer, Office of the Dean (*ref.* Dean's Report to Senate, May 2018)

From: August 29, 2018 – August 27, 2020

To: September 1, 2018 – August 31, 2021

FOUNTOULAKIS, Kimon, Assistant Professor, David R. Cheriton School of Computer Science (*ref.* Dean's Report to Senate, June 2018)

From: January 1, 2019 – June 30, 2022

To: November 1, 2018 – June 30, 2022

SPEZIALE, Sean, Lecturer, Office of the Dean (*ref.* Dean's Report to Senate, May 2018)

From: August 29, 2018 – August 27, 2020

To: September 1, 2018 – August 31, 2021

B. SABBATICALS (already approved by the Board of Governors)

COLEMAN, Thomas, Professor, Dept. of Combinatorics & Optimization, January 1, 2019 – December 31, 2019, with 94.72% salary.

NAYAK, Ashwin, Professor, Dept. of Combinatorics & Optimization, January 1, 2019 – June 30, 2019, with 85% salary. This is an early sabbatical.

ZHU, Mu, Professor, Dept. of Statistics and Actuarial Science, March 1, 2019 – August 31, 2019, with 100% salary.

A handwritten signature in black ink, appearing to read "Stephen Watt", with a stylized flourish at the end.

Stephen M. Watt
Dean

UNIVERSITY OF WATERLOO
REPORT OF THE DEAN OF SCIENCE TO SENATE
November 19, 2018

For information:

A. *APPOINTMENTS*****

Adjunct Appointments

Graduate Supervision

BAYNE, Erin, Professor, Department of Biology, October 1, 2018 to September 30, 2021.

McKENNEY, Dan, Assistant Professor, Department of Biology, October 1, 2018 to September 30, 2021.

Research

NAMBIAR, Shruti, Assistant Professor, School of Pharmacy, October 1, 2018 to September 30, 2021.

NICOL, Robert, Professor, School of Pharmacy, October 1, 2018 to September 30, 2021.

Graduate Supervision and Graduate Instruction

AUSTIN, Zubin, Professor, School of Pharmacy, October 1, 2018 to September 30, 2021.

Graduate Supervision and Research

HE, Yin-Chen, Assistant Professor, Department of Physics and Astronomy, September 1, 2018 to August 31, 2023.

Adjunct Reappointments

Graduate Supervision

MORGAN, Alan, (Professor Emeritus), Professor, Department of Earth and Environmental Sciences, September 1, 2018 to August 31, 2021.

Research

HORNE, Stephen, Professor, Department of Chemistry, September 1, 2018 to August 31, 2021.

McCOURT, Frederick, (Distinguished Professor Emeritus), Professor, Department of Chemistry, September 1, 2018 to August 31, 2021.

Graduate Supervision and Research

HESS, Robert, Professor, School of Optometry and Vision Science, June 1, 2018 to May 31, 2021.

Undergraduate Instruction, Graduate Supervision and Research

DARKO, Johnson, Professor, Department of Physics and Astronomy, September 1, 2018 to August 31, 2021.

Cross Reappointments

AUCOIN, Marc, Associate Professor, Department of Chemical Engineering cross appointed to Department of Chemistry, September 1, 2018 to August 31, 2021.

FORREST, James, Professor, Department of Physics and Astronomy cross appointed to School of Optometry and Vision Science, March 1, 2018 to February 28, 2021.

LI, Yuning, Professor, Department of Chemical Engineering cross appointed to Department of Chemistry, September 1, 2018 to August 31, 2021.

NEKKAR, Praveen, Associate Professor, School of Pharmacy cross appointed to Department of Chemistry, September 1, 2018 to August 31, 2021.

REN, Carolyn, Professor, Department of Mechanical and Mechatronics Engineering cross appointed to Department of Chemistry, September 1, 2018 to August 31, 2021.

Special Reappointments
Undergraduate Instruction

HRYCYSHYN, Matthew, Lecturer, Department of Biology, January 1, 2019 to April 30, 2019.

WILSON, Graham, Lecturer, Faculty of Science and Department of Earth and Environmental Sciences, March 1, 2019 to June 30, 2019.

B. ADMINISTRATIVE APPOINTMENTS

HUTCHINGS, Natalie, Associate Director, Academics and Student Affairs, School of Optometry and Vision Science, October 1, 2018 to September 30, 2022.

ADMINISTRATIVE REAPPOINTMENTS

CHRISTIAN, Lisa, Associate Director, Clinical Education and Professional Affairs, School of Optometry and Vision Science, September 1, 2018 to September 30, 2022.

THOMPSON, Ben, Associate Director, Research, School of Optometry and Vision Science, October 1, 2018 to September 30, 2022.

FOR APPROVAL BY THE BOARD OF GOVERNORS

C. SABBATICAL

GRINDROD, Kelly, Associate Professor, School of Pharmacy, September 1, 2019 to August 31, 2019, 100% salary arrangements.

A handwritten signature in black ink, appearing to read 'R.P. Lemieux', with a long horizontal flourish extending to the right.

R.P. Lemieux
Dean

University of Waterloo
SENATE
19 November 2018

FOR APPROVAL

Committee and Appointments

Motion: To approve the following appointments:

- **Senate Graduate & Research Council:** Lauren Meliss Holt (replacing Emily Cyr) as graduate student representative from the Faculty of Arts, term to 30 April 2019.
- **Senate Nominating Committee for Honorary Degrees:** Alysia Kolentsis (replacing Marlene Epp) as the affiliated and federated institutions of Waterloo member, term 1 January 2019 to 30 April 2019.
- **Amit and Meena Chakma Awards for Exceptional Teaching by a Student Committee:** Giuseppe Femia (arts and business), Navroop Kaur (biology), Nicholas Mok (biology) undergraduate student representatives, terms to 31 December 2019.
- **Distinguished Teacher Awards Committee:** Firas Mansour (physics and astronomy) as faculty representative, term ending 31 December 2019; Wei-Chau Xie (civil and environmental engineering) as faculty representative, term ending 31 December 2020; Wanis Nafo (civil and environmental engineering) as graduate student representative, term ending 31 December 2020; Giuseppe Femia (arts and business), Bilal Akhtar (software engineering), Magda Bentia (biology) as undergraduate student representatives, terms ending 31 December 2020.

University of Waterloo
SENATE GRADUATE & RESEARCH COUNCIL
Report to Senate
19 November 2018

Senate Graduate & Research Council met on 1 October 2018 and agreed to forward the following items to Senate for approval as part of the regular agenda.

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

FOR APPROVAL

NEW RESEARCH CENTRE

Waterloo Centre for Astrophysics

1. **Motion:** To approve the establishment of the Waterloo Centre for Astrophysics, as presented in Attachment 1.

Rationale: The Waterloo Centre for Astrophysics (WCA) is proposed as a strategic investment to synergize the world-leading research and training in astrophysics and related areas rapidly developing in the Waterloo region. The focus of the WCA will primarily be on making and analyzing a new generation of experimental measurements aimed at discovering new astrophysical processes. The WCA will be complemented by and will work closely with the Centre for the Universe at the Perimeter Institute for Theoretical Physics (PI), and other regional centres including the Canadian Institute for Astrophysics (CITA) and the Dunlap Institute, both at the University of Toronto. The enormous amount of experimental data that will be acquired by scientists within the Centre places the science firmly in the contemporary realm of “Big Data”, and the development and use of statistical and machine learning techniques will be a common theme throughout much of the science pursued within the WCA. Thus, while the WCA will be primarily based at the Department of Physics and Astronomy, it will reach out to the Department of Applied Mathematics, and the Cheriton School of Computer Science.

CLARIFYING GRADUATE DIPLOMAS, FIELDS, AND SPECIALIZATIONS

Graduate Studies and Postdoctoral Affairs

2. **Motion:** To approve text that defines academic credentials at the graduate level, as presented in Attachment 2. This text, once approved, will appear in the Graduate Studies Academic Calendar.

Rationale: In an effort to clarify and standardize the types of academic “products” (in addition to degrees) offered at the graduate level, the following definitions are proposed. In each case, these guidelines indicate the academic requirements, the way in which the products are recorded (on transcripts or diplomas), and, finally, the role of the Quality Council. Please note that if these guidelines are accepted, the terms used here – particularly fields and Specializations – will become “reserved words” and their use at the University will be limited to these applications, effective Winter 2019.

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

Charmaine Dean
Vice President, University Research



To: Senate Graduate & Research Council

From: Prof Will Percival

Date: 18 Sept 2018

Subject: Proposal for the Waterloo Centre for Astrophysics

Please accept the following for consideration at the next Senate Graduate and Research Council meeting. Specifically, please find attached (1) Proposal for the Waterloo Centre for Astrophysics (Appendix A)

Item for Consideration

To approve the proposal for the Waterloo Centre for Astrophysics

Background/Context

The Waterloo Centre for Astrophysics (WCA) is proposed as a strategic investment to synergize the world-leading research and training in astrophysics and related areas rapidly developing in the Waterloo region. The focus of the WCA will primarily be on making and analyzing a new generation of experimental measurements aimed at discovering new astrophysical processes. The WCA will be complemented by and will work closely with the Centre for the Universe at the Perimeter Institute for Theoretical Physics (PI), and other regional centres including the Canadian Institute for Astrophysics (CITA) and the Dunlap Institute, both at the University of Toronto. The enormous amount of experimental data that will be acquired by scientists within the Centre places the science firmly in the contemporary realm of “Big Data”, and the development and use of statistical and machine learning techniques will be a common theme throughout much of the science pursued within the WCA. Thus, while the WCA will be primarily based at the Department of Physics and Astronomy, it will reach out to the Department of Applied Mathematics, and the Cheriton School of Computer Science.

Consultation Process

Discussed at dedicated Physics and Astronomy department meeting (Aug 27)
Science Faculty Council, passed unanimously (Sept 12)
Research Leaders Council, passed unanimously (Sept 17)

Review and Approval Process

Support letter from Robert P. Lemieux, Dean of Science (v1: Aug 1, v2: Sept 18)
Support letter from Brian R. McNamara, Chair, Department of Physics & Astronomy (v1: Aug 31)

Yours sincerely,

A handwritten signature in black ink that reads "Will Percival".

Prof Will J. Percival

Proposal to Establish the Waterloo Centre for Astrophysics

1	OVERVIEW	4
2	CONSTITUTION	5
2.1	Mission of the WCA	5
2.2	Membership	5
2.2.1	Regular Members	5
2.2.2	Associate Members	6
2.2.3	Membership Privileges and Responsibilities	6
2.3	Governance	6
2.4	Positions and Committees	7
2.4.1	Director	7
2.4.2	Administrative Assistant	7
2.4.3	Standing and Ad Hoc Committees	8
2.5	Gender balance and support of minorities	8
2.6	Statement on conduct and behaviour	8
3	LIST OF PROPOSED MEMBERS	9
3.1	Regular Members (initial list)	9
3.2	Associate Members	10
4	RESEARCH/EDUCATIONAL COMPONENT	10
4.1	Current and Future Experiments with WCA interest	10
4.2	Links between different experiments	14
4.3	Link between observations and theory	15
4.4	Training & Enrichment of Highly Qualified Personnel	17
4.5	Outreach and Dissemination	17
4.6	Measurement of Success	18
5	FACILITIES	18
6	BUDGET	19

6.1	Income	19
6.2	Expenditure	20
6.3	Road to sustainability	21
7	STATEMENTS OF SANCTION AND COMMITMENT	21

1 Overview

The Waterloo Centre for Astrophysics (WCA) is proposed as a strategic investment to synergize the world-leading research and training in astrophysics and related areas rapidly developing in the Waterloo region. Although much progress has been made in the fields of astrophysics and cosmology over the past decade, many fundamental questions remain: the physics driving the current accelerated expansion of the Universe is unknown; the physics driving the period of acceleration in the early Universe, often termed inflation, is unknown; the physics driving galaxy formation and evolution is still not fully understood. The WCA will aim to answer these remaining questions, increasing the visibility of Waterloo as a world-leading place to do astrophysics.

The WCA will support and capitalize on involvement in upcoming transformational projects including the Cerro Chajnantor Atacama Telescope-prime, the Event Horizon Telescope, the Dark Energy Spectroscopic Instrument on the Mayall Telescope, the Large Synoptic Survey Telescope, the Thirty Meter Telescope, and the satellite missions Euclid, the James-Webb Space Telescope and the X-ray Imaging and Spectroscopy Mission. Proposed WCA Members are also involved in a number of mission concepts including the Cosmological Advanced Survey Telescope for Optical and UV Research, the Wide-Field Infrared Survey Telescope and the Maunakea Spectroscopic Explorer, and in a number of ongoing surveys including the Canada-France-Imaging Survey, and the extended Baryon Oscillation Spectroscopic Survey. We are clearly entering a Golden Age of astronomical data, and the new WCA will be at the heart of it.

The focus of the WCA will primarily be on making and analyzing a new generation of experimental measurements aimed at discovering new astrophysical processes. The WCA will be complemented by and will work closely with the *Centre for the Universe* at the Perimeter Institute for Theoretical Physics (PI). There are strong synergies between the two: the Centre for the Universe has a theoretical focus, creating models that will be tested by the Observational experiments undertaken by the WCA. Furthermore, the WCA is expected to establish ties (in the form of joint recruitments, visitors, seminar series, etc.) with other regional centres including the Canadian Institute for Astrophysics (CITA) and the Dunlap Institute, both at the University of Toronto. The enormous amount of experimental data that will be acquired by scientists within the Centre places the science firmly in the contemporary realm of “Big Data”, and the development and use of statistical and machine learning techniques will be a common theme throughout much of the science pursued within the WCA. Thus, while the WCA will be primarily based at the Department of Physics and Astronomy, it will reach out to the Department of Applied Mathematics, the Cheriton School of Computer Science, and to other Universities in South-Western Ontario.

The founding WCA Director will be Professor Will Percival, a recent appointment to a Distinguished Astrophysics Chair at the University of Waterloo (UW), following an external donation by Mike Lazaridis. We anticipate approximately a dozen local Regular Members, with a similar number of Associate Members. In collaboration with the Advancement team, the Director and Regular Members are expected to raise additional external and university funds to establish distinguished postgraduate and postdoctoral fellowship programs, as well as a vigorous and lively visitor and workshop program.

2 Constitution

2.1 Mission of the WCA

To facilitate and conduct groundbreaking research, training, and outreach in Cosmology and Astrophysics at the University of Waterloo. The WCA will foster new and exciting discoveries about the nature of the Cosmos and establish the University of Waterloo as a world leader in observational astrophysics and cosmology and the detailed testing of theoretical models of the Universe.

1. **Research:** The WCA will stimulate fundamental research in Astrophysics and Cosmology, catalyze and foster national and international collaborations.
2. **Training:** The WCA will add to the graduate and postdoctoral training and mentorship undertaken in the Department of Physics and Astronomy, leading to the successful entry of the trained highly qualified personnel into a career in astrophysics, cosmology and industry.
3. **Partnership:** The WCA seeks to partner with regional and international centres of excellence in astrophysics in order to promote synergies and further WCA missions.
4. **Dissemination:** The WCA will facilitate dissemination of astrophysical sciences by hosting topical conferences and focused workshops, as well as by developing and maintaining an active visitor program.
5. **Outreach:** The WCA will engage the broader academic community at UW, as well as the general public, via physical and virtual platforms, in order to promote the significance of fundamental research and share the excitement of the science done by WCA members. In particular, it will strive to engage and recruit women, underrepresented minorities, and indigenous communities in its scientific and outreach activities.

2.2 Membership

2.2.1 Regular Members

Regular Members of the WCA are faculty members at the University of Waterloo whose research interests overlap with the mission of the WCA. The membership will be granted upon expression of interest and the approval of the Director, subject to ratification at the next meeting of the Board. Membership will be for a period of 7 years, with the possibility of renewal after review by the Director and ratification by the Board. Student and Postdoctoral membership may also be granted upon the endorsement of a Regular Member with the agreement of the Director. These will be reviewed annually by the Board. Regular, Student and Postdoctoral Members are expected to be primarily “in residence” at the University of Waterloo.

2.2.2 Associate Members

Scientists with primary appointments outside the University of Waterloo may seek to become Associate Members of the WCA. Membership will be granted upon expression of interest and the approval of the Director. Associate Members will have access to shared desk space during the time they spend within the WCA.

2.2.3 Membership Privileges and Responsibilities

WCA Regular and Associate Members will be able to use WCA facilities and funds to conduct and disseminate their research, within the framework described in this document, and established by the Director. In return, Regular and Associate Members will be expected to acknowledge their WCA affiliation and/or funding.

2.3 Governance

The oversight and financial responsibility of the Centre will rest with the University of Waterloo, through the Dean of the Faculty of Science as described in UW Policy #44. The operations are to be supervised and conducted by the WCA Director, assisted by an administrative assistant, subject to this constitution.

There will be a single Governing Board (hereafter referred to as the Board), composed of:

1. Dean of Science or a delegate (Chair)
2. Director of the WCA
3. Chair of Physics and Astronomy or a delegate*
4. Two representatives from the Regular Membership
5. Director of *Centre for the Universe* at PI or a delegate
6. One member of high standing selected from the Canadian astrophysics community
7. One member of high standing selected from the international astrophysics community

* If the chair of Physics and Astronomy is also a WCA member, he/she will nominate an additional non-WCA member of the Physics and Astronomy Faculty to join the Board for the term of their position.

This Governing Board has the authority to execute and monitor the affairs of the Research Centre, subject to all applicable University policies, procedures and guidelines. As described in UW Policy #44, this includes the ability to:

- Enact rules and regulations for membership of the Governing Board and the conduct of its affairs;
- Recommend appointment of the Director and other leaders to the Dean;
- Recommend appointment and removal of staff to the Dean;
- Appoint and remove Members, and establish categories of membership and associated fees;
- Plan and implement the Centre's development;

- Establish processes to manage and monitor the Research Centre's financial affairs;
- Establish and enforce rules and regulations governing the Research Centre's activities, provided such rules and regulations are consistent with University policies, procedures and guidelines; and
- Establish such committees as it deems necessary to discharge its responsibilities; this may include establishing advisory bodies comprised primarily of external Members for the purpose of providing strategic or scientific advice to the Governing Board or the Director.

On the Board, the external members and the representatives of Regular Membership will serve a 3-year term, with possible renewal for a single additional term. Renewal and selection of external members will be undertaken by the Dean in consultation with the Director. A call will be put out for new representatives of the Regular Membership when they are required. If there are more applicants than positions available, the Director of the WCA will organize an election, where Regular Members have a single transferable vote on their representatives.

The Board will meet annually to review the budget, as reported by the Director. It will also review the activity, membership, and development of the Centre and any specific issues or concerns relating to the points listed above. The Board may meet at other times if requested by the Director or the Dean of Science. Following policy #44, in order to be quorate, the majority (50%+1) of the attendees must be Regular Faculty Members of UW.

Board meetings will be announced to all the WCA members in sufficient time for them to propose agenda items. The final agenda will be circulated to all the WCA members, indicating all decision items and background material. After each meeting, the minutes will be circulated to all members.

Only the Board may propose amendments to this Constitution. After proposal by the Board, these changes will be put to a vote: a two-thirds majority of the WCA Regular Membership is required to ratify amendments to the constitution.

2.4 Positions and Committees

2.4.1 Director

The director will lead the activities within the centre, working towards the goals described in the mission statement in Section 2.1. Procedures for the appointment and possible preemptory removal of the Director of the WCA shall follow that described in UW policy #40, except as modified by policy #44, which states that the first term of office for the Director will be five years, renewable for up to five years, to a maximum of ten years.

2.4.2 Administrative Assistant

An administrative assistant will manage the Institute's finances and operations, provide organizational and logistical support, and serve as the initial point of contact between the WCA and internal/external individuals and organizations. They will help manage the visitors and meetings programs, and with the hiring of WCA postdoctoral researchers.

2.4.3 Standing and Ad Hoc Committees

Standing and Ad Hoc Committees will be established by the Director to provide advice on policy and operational matters. A typical example of such a committee is for the WCA Postdoctoral Fellow recruitment using Centre funding.

2.5 Gender balance and support of minorities

Having a diverse workforce has been shown to provide a more robust, flexible, and successful work environment. In particular, given the under-representation of female scientists within the discipline of physics, the WCA would take progressive steps to develop a gender balance and become a leader for other astrophysics groups, centres and institutes within Canada and across the world. Similarly, the WCA is committed to increasing the representation from all equity-seeking groups thereby creating a diverse workforce that truly represents the diversity within Canada.

In order to support these efforts, the WCA will educate its membership through equity-related training and information sessions. This is especially important for those members who will be engaged in recruiting, selection and hiring new members of the Centre. In addition, these educational initiatives will be aimed at creating and maintaining work environments that are welcoming, inclusive and respectful of all members and the diversity they bring to the Centre.

When recruiting and hiring postdoctoral fellows, the WCA will strongly encourage applications from candidates that would help to provide equity across all groups. In particular, every member of the Centre will encourage and facilitate applications from qualified candidates from all of the equity-seeking groups.

The WCA will also undertake, through outreach activities, to promote physics and astronomy as both an area of study and a career. In doing so, the WCA hopes to increase the participation of women, visible minorities and indigenous communities in the field of physics and astronomy in Canada.

2.6 Statement on conduct and behaviour

The WCA will be proud to provide an environment where all staff, regardless of gender, race, sexual orientation, age, religious belief and disability can work towards the mission statement in Section 2.2.

Harassment, discrimination, or the abuse of supervisory authority will not be allowed for any activity connected with the WCA. UW policies will be used to define unacceptable behavior including the Conflict of Interest Policy #69, Ethical Behavior policy #33, and Prevention and Response to Sexual Violence Policy #42. Training and open discussion will be used to encourage the welcoming, inclusive and respectful workplace desired (See Sec 2.5).

Use of Waterloo computing and network resources by WCA members will follow standard UW guidelines. This includes following the Use of Proprietary Software Policy #64.

Any issues covered by UW policies will be handled using the standard UW procedures, and all WCA members will be expected to fully cooperate with any inquiries. If a concern is directed towards a non-UW member and consequently the formal UW procedure cannot be applied, the Director and Board (excluding any members or the Director if conflicted) will investigate, following the UW procedure as closely as possible. Possible outcomes include the loss of privileges and/or expulsion from the Centre.

All external members will be made aware of the UW policies, and this constitution upon joining the WCA.

3 List of Proposed Members

Regular Membership will be regularly reviewed and will be open to faculty members in other departments. In addition, Associate Memberships will be possible for external qualified collaborators, upon approval by the Director.

3.1 Regular Members (initial list)

Percival	Will	Physics and Astronomy	Distinguished Chair in Astrophysics
Afshordi	Niayesh	Physics and Astronomy	Associate Professor
Balogh	Michael	Physics and Astronomy	Professor; Associate Chair
Broderick	Avery	Physics and Astronomy	Associate Professor
Epp	Richard	Physics and Astronomy	Continuing Lecturer; Undergraduate Officer; Undergraduate Advisor - Math Phys
Fich	Michel	Physics and Astronomy	Professor
Hudson	Michael	Physics and Astronomy	Professor
Mann	Robert	Physics and Astronomy	Professor
McNamara	Brian	Physics and Astronomy	Professor; Department Chair; University Research Chair in Astrophysics
Taylor	James	Physics and Astronomy	Associate Professor; Graduate Officer
Geshnizjani	Ghazal	Applied Mathematics	Research Associate Professor
Kempf	Achim	Applied Mathematics	Professor, Canada Research Chair

Weinstein	Steve	Philosophy	Associate Professor
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3.2 Associate Members

After the formation of the new Centre, in consultation with Regular Members, the Director will approach a number of prominent astronomers and cosmologists from Universities in South-West Ontario, to invite them to become Associate Members. In particular, there are a number of members of the Perimeter Institute for Theoretical Physics who have collaborated in the past with WCA members; this includes Neal Dalal, Dustin Lang, Luis Lehner, Kendrick Smith and Neil Turok, who we would encourage to join. By offering these scientists and others selected from the Universities of Guelph, McMaster, Toronto, York and Western, Associate Member positions, we would be encouraging them to extend these links to include additional WCA members, to undertake future visits to the Centre and to perform research with Centre members. As the Centre grows the Director in consultation with the Board will look to extend the geographical area from which we draw Associate Members.

4 Research/Educational Component

The WCA is proposed as a means to capitalize on the UW leadership role in several exciting and promising areas of Astrophysics and Cosmology, as well as to synergize with the efforts at the Centre for the Universe at PI. Although much progress has been made in the fields of astrophysics and cosmology over the past decade, many fundamental questions remain: The physics driving the current accelerated expansion is unknown; the physics driving the period of acceleration in the early Universe, often termed inflation, is unknown; the physics driving galaxy formation and evolution is still not 100% understood. The answers to these and other questions are encoded in the data sets that will soon become available to the WCA-based researchers.

Section 4.1 provides more details of these projects, and explains how WCA members are involved. The experiments are often inter-connected, and there are significant gains to be had from the joint analysis of multiple data sets. Forging these links is one of the key aspirations of the WCA, and this is discussed further in Section 4.2. While 4.3 describes how the WCA will link the observations to theoretical models.

4.1 Current and Future Experiments with WCA interest

The following facilities are either currently available to WCA members, have components led by WCA members, or will become available over the next five years.

CASTOR: The Cosmological Advanced Survey Telescope for Optical and UV Research is a proposed Canadian Space Agency satellite mission that would provide high-resolution imaging in the UV/optical (0.15–0.55 μm) spectral region. This versatile ‘smallSAT’-class mission would far surpass any ground-based optical telescope in terms of angular resolution and would provide

ultra-deep imaging in three broad filters to supplement longer-wavelength data from planned international dark energy missions (Euclid, WFIRST – see below) as well as from the ground-based Large Synoptic Survey Telescope (LSST). Combining the largest focal plane ever flown in space with an innovative optical design that delivers Hubble Space Telescope-quality images over a field two orders of magnitude larger than the Hubble Space Telescope, CASTOR would image about 1/8th of the sky to a (u-band) depth ~ 1 magnitude fainter than will be possible with LSST even after a decade of operations. No planned or proposed astronomical facility would exceed CASTOR in its potential for discovery at these wavelengths. Balogh is the lead of the “Galaxies and Evolution of Cosmic Star Formation” Science Working Group for CASTOR and has been on the science team for the concept study and previous Discipline Working Group where the idea was launched (~ 2009). Percival was recently asked to join.

CCATp: The Cerro Chajnantor Atacama Telescope-prime is a submillimeter wavelength telescope designed for very wide field observing. This 6-meter aperture telescope will begin operations in Chile in 2022, carrying out several large-area surveys with a mapping speed unchallenged by any current or near-future facilities in the 150 to 1500 GHz telluric window. These surveys will be combined with data from other facilities to trace the first galaxies as they reionize the Universe, to constrain the physics driving the current acceleration of the cosmic expansion rate, to determine the sum of neutrino masses via observations of foreground effects on the Cosmic Microwave Background, and to use the distribution of dusty galaxies to test inflation and search for primordial gravitational waves. Fich is the leader of the Canadian CCAT-p team that holds a 20% share of the facility.

CFIS: The Canada-France-Imaging Survey is a Large Program on the Canada-France-Hawaii-Telescope to map 5000 square degrees of the northern sky in the r-band with exquisite image quality, and 10,000 square degrees in the u-band. This takes advantage of two unique strengths of this 4-m class telescope: good image quality and blue sensitivity. In addition to the standalone science goals (weak lensing of galaxies, and stellar populations in the Galactic halo), CFIS will provide some of the optical imaging that is critical to the success of the Euclid mission. CFIS membership is open to everyone in the Canadian and French communities. Balogh and Hudson are members of the CFIS Steering Group, Hudson is leading the weak lensing Science Working Group.

DESI: The Dark Energy Spectroscopic Instrument is a new multi-object spectrograph being built for the Mayall telescope, which will be able undertake a spectroscopic survey 20 times faster than the Sloan Telescope, used for the influential Sloan Digital Sky Survey. It will be used to create a galaxy survey containing 30 million galaxies forming an unprecedented large-scale structure survey, which will be cosmic variance limited out to redshift $z < 1.4$. Percival is one of the working group chairs for this survey and a member of the DESI executive. Previously he led the UK contribution to this experiment, including managing the 5M (CAD) contribution from the UK government.

eBOSS: The extended Baryon Oscillation Spectroscopic Survey is an ongoing survey using the Sloan telescope. It is the only ongoing cosmological galaxy redshift survey and has already

published a number of cosmological measurements covering the intermediate redshift range $0.9 < z < 2.0$. Percival is Survey Scientist for this experiment

Euclid: In 2022 the European Space Agency will launch the Euclid satellite mission. Euclid is a medium class astronomy and astrophysics space mission that will undertake a galaxy redshift survey over the redshift range $0.9 < z < 1.8$, while simultaneously performing an imaging survey in both visible and near infrared bands. The complete survey will provide hundreds of thousands of images and several tens of Petabytes of data. About 10 billion sources will be observed by Euclid out of which several tens of million galaxy redshifts will be measured and used to make galaxy clustering measurements. These observations will be used to help to understand Dark Energy, the physical mechanism causing the current acceleration in the expansion of the Universe. Percival is one of four science coordinators for the mission and co-leads the galaxy clustering science working group. Balogh, Hudson and Taylor are members of the experiment.

EHT: The Event Horizon Telescope is an Earth-sized network of millimeter-wavelength telescopes that together comprise the highest resolution imaging instrument in the history of astronomy, sufficient to image the event horizons of known astronomical black holes. Over the past decade pathfinder experiments have provided the first direct evidence of horizon-scale structures about the black holes at the centre of the Milky Way and the giant elliptical galaxy M87. Since April, 2017, the full EHT has started operations, and will transform our understanding of the nature of black holes and the processes underlying the growth of black holes, including their inordinate impact on their host galaxies and galaxy clusters. Broderick leads the EHT Initiative at PI, is a key organizing member of the EHT collaboration and currently serves on the EHT Board.

JWST: The James Webb Space Telescope, set to launch in 2019, is the long-anticipated successor to the Hubble Space Telescope. Optimized for near-infrared observations, with a dazzling array of instrumentation, JWST will make fundamental new discoveries about the very early Universe, the assembly of galaxies, the birth of stars and planets, and the origins of life. Through the involvement of the Canadian Space Agency, Canadian astronomers have access to 5% of time for PI-driven projects on this extraordinary facility. With a lifetime requirement of 5 years (and a goal of 10 years), and a limited proprietary time of 12 months, there will be a lot of pressure to exploit these data shortly after they are obtained. Balogh, McNamara and Hudson are expected to be heavy users of the JWST.

LSST: The Large Synoptic Survey Telescope is an ambitious, US-led experiment to map most of the observable sky at optical wavelengths, revisiting each point on the sky approximately every three nights for ten years. Each visit will consist of multiple images spaced by about 15 seconds. This will provide an unprecedented look at the transient universe, discovering myriad phenomena that vary on timescales ranging from seconds to years. In addition, the cumulative exposures result in a very deep image of the night sky, providing optical characteristics for tens of billions of faint stars and galaxies. Balogh, Hudson, McNamara, Taylor and Afshordi are members of the LSST Consortium through a Memorandum of Assurance between the Dunlap Institute and the University of Waterloo. Balogh's annual fee is supported by Dunlap at the level of 50%, and he is

a member of the LSST Galaxies Science Collaboration. Percival was a member of LSST before moving to Canada and is looking at mechanisms to continue that membership.

MSE: The Maunakea Spectroscopic Explorer is a proposed spectroscopic survey telescope, to replace the CFHT on Maunakea. The telescope will have an 11m primary mirror and a 1-degree field of view, with a fibre-fed spectrograph capable of obtaining simultaneous spectra for thousands of objects at resolutions spanning 2000 to 20,000. Its operations will be dedicated to conducting several wide area surveys that provide a critical complement to the ambitious imaging surveys on the horizon. Balogh is a member of the Science Executive for this international facility, and Percival co-leads the Cosmology study group.

TMT: Participation in the Thirty Meter Telescope Project has been the top recommendation of Canada's Long-range Plan for astronomy for the last 15 years. Federal funding obtained in 2014 currently affords Canada about a 15% share in this facility, one of only three planned telescopes in its class worldwide. As the name suggests, the TMT is an optical/infrared telescope with a single, segmented mirror that is 30m in diameter. This provides an advantage in both light collecting power and angular resolution over smaller telescopes; specifically, it is 80 times more sensitive than the largest existing telescopes, and 200 times more sensitive than Canada's largest existing national optical facility, Gemini. First light is expected in 2028. Balogh is presently the Chair of an advisory committee that serves as a link between the professional Canadian community and the TMT project.

WFIRST: The Wide-Field Infrared Survey Telescope is a NASA flagship space mission – the grandchild of the Hubble Space telescope - to launch in 2025 that will study dark matter, dark energy and exoplanets with unprecedented precision. Mike Hudson has been leading the scientific effort that will enable Canada to join this mission. He is also a member of the WFIRST Cosmology Science Investigation Team.

XRISM: The X-ray Imaging and Spectroscopy Mission succeeds the Hitomi X-ray Observatory that failed on orbit in 2016. Prior to the failure, Hitomi delivered a ground-breaking observation of the Perseus Cluster of Galaxies' hot atmosphere. The observations revealed bulk and turbulent velocities and chemical composition with unprecedented detail. XRISM's Resolve microcalorimeter spectrometer will reveal atmospheric gas motions and chemical compositions of dozens of galaxies and clusters, supernova remnant expansion velocities and chemical compositions, winds from massive black holes, and feedback physics from massive black holes and starbursts. McNamara is the principal investigator and lead of Canada's effort to calibrate Resolve's optical blocking filters at the Canadian Light Source in Saskatoon. He is also a member of the XRISM Science Working Group and NASA's calibration group centered at Goddard Space Flight Center in Maryland, USA. Scheduled for launch in 2022, Canadian astronomers, along with partners in the Japan, the United States, and Europe, will have access to XRISM through the usual proposal process.

4.2 Links between different experiments

A significant amount of scientific advancement comes from the adoption of methodologies developed for other applications, fields or experiments. Thus, it is important to promote dialogue between different fields and sub-fields, both within astrophysics and cosmology and with outside areas. For example, a technique developed to mitigate a systematic error in an X-ray survey might solve a similar problem in an optical survey. The research environment and atmosphere provided by the WCA will encourage collaboration between members leading to both the cross-fertilization of ideas and to joint analyses of multiple data sets.

Examples of techniques that can be utilized in numerous applications include data compression and statistical inference techniques, machine learning techniques for data analysis, and fast computer algorithms. In many ways, astronomy is the archetypal Big Data science, with future experiments such as the Large Synoptic Survey Telescope predicted to produce 20TB of data per night. Artificial Intelligence techniques, specifically machine learning and the sub-class of deep learning algorithms have the potential to transform astronomical data analysis, using the new data sets. One obvious example is the application of machine learning to find anomalous objects, either resulting from extreme or rare physical processes. Another example is the accurate removal of contaminants from data sets, such as removing stars from samples of galaxy.

Significant science from the next generation of astronomical experiments will result from the cross-correlation of different data. Examples include multi-wavelength studies where sources are observed in multiple bands, or the follow-up of one type of object discovered in one survey with a different instrument, or the analysis of the same objects in a different data set. In survey science, the statistical cross-correlation of populations can highlight physical processes (e.g. Integrated Sachs-Wolfe and Sunyaev-Zel'dovich measurements from the cross-correlation of Cosmic Microwave Background and intervening large-scales structure). They can also beat down systematics effects and remove foreground contamination: if these are different in two experiments, then they cancel in cross-correlation measurements.

The analysis of the next generation of experiments will require considerable computing resources, which will be obtained through Compute Canada. Thus, we will utilize the new UW supercomputer, Graham. If these resources are not adequate, we will look for alternatives, including, if necessary, purchasing a WCA supercomputer.

An example of great synergy between experiments is the link between CASTOR with Euclid, LSST and WFIRST. A significant amount of time (at least 50%) of CASTOR will be dedicated to surveys, which are being planned to overlap with the other surveys. The addition of the high spatial resolution, ultraviolet imaging of CASTOR provides an important improvement in photometric redshift measurements, breaking degeneracies in solutions and increasing precision. This aids in the primary, dark energy science objective of Euclid, LSST and WFIRST. Moreover, the UV is sensitive to the hottest, most massive stars in the Universe, and thus provides a good tracer of star formation rates in galaxies. By combining data over all wavelengths it is possible to reconstruct a spatially resolved star formation history for many millions of galaxies.

An example of synergy through follow-up observations is provided by the TMT. TMT will be a transformative facility on its own. However, with a relative small field of view (tens of square arcminutes), in many cases it will rely on wide-field, deep photometric surveys like LSST, Euclid and WFIRST to identify targets. With the 30-m aperture, TMT will be able to study spectroscopically some of the faintest objects that are imaged in these larger surveys. Moreover, with good sensitivity down to 310nm, TMT will provide critical blue coverage that perfectly complements the redder light that is the focus of Euclid, WFIRST and JWST.

DESI will measure redshifts for galaxies over exactly the redshift range where the weak lensing kernel for Euclid peaks. Thus, by comparing the dark matter map created from the Euclid data to the galaxy field created by DESI, we will be able to measure galaxy bias, or the way in which galaxies trace the dark matter field, enabling the high-resolution galaxy distribution observed by DESI to be fully utilized to constrain cosmological acceleration, and the growth of structure on large scales. This provides a mechanism to probe the nature of gravity on the largest scales in the observable Universe, testing for deviations from the theory of General Relativity.

4.3 Link between observations and theory

Future astrophysical observations are poised to provide unprecedented windows into the fundamental natures of our physical theories. The link between cutting-edge theoretical frameworks and upcoming observational data is critical to much of this endeavor, and the WCA will be in a unique position to make such links. It will create and motivate links in-house by connecting members working on both theoretical and observational studies, and through collaboration with outside groups including PI and CITA.

A specific example of such a link is given by one of the most compelling questions in modern physics, which is to understand the observed late-time acceleration of the cosmological expansion. The acceleration cannot be explained in standard models using known physics, and there are many theoretical ideas for explaining this phenomenon, collectively termed “dark-energy”. If the answer lies in a new form of energy-density, then observationally, it contributes $\sim 75\%$ of the energy density of the Universe and acts as a material with equation of state $w(z) \approx -1$. Although the behaviour approximately matches Einstein’s cosmological constant (Λ), it is a factor of $\sim 10^{120}$ smaller than the “natural” quantum vacuum energy density. Other possible explanations include a new scalar field with an effective negative pressure and an equation-of-state parametrized by $w(z)$, that is dependent on redshift. Alternatively, modifications of General Relativity have been proposed, such as scalar-tensor theories or $f(R)$ theories, or dark energy could be the signature of extra dimensions, as proposed in brane-world cosmologies. These scenarios can be distinguished by detailed observations of the expansion of the Universe and of structure growth within it, and many of the experiments described in Section 5.1 are designed to make those observations.

Theoretical arguments, coupled with recent observations, particularly of the Cosmic Microwave Background have provided evidence for another period of cosmological acceleration in the very

early Universe. Although we cannot directly probe this regime of the Universe's expansion, we can make indirect measurements of it. One of these routes is to measure the degree of non-Gaussianity present in large-scale density fluctuations, and this can be achieved using large-galaxy surveys such as DESI, WFIRST and Euclid. A key technique, which utilizes the link between galaxies and mass to make such measurements was initially developed by Neal Dalal, who is proposed as an Associate Member, while the measurements are being led by Regular Members of the WCA as described in Section 4.1. Thus, the WCA offers an excellent opportunity for collaboration to mutual benefit.

Another example of synergy between theory and observations is development of paradigms for gravity that could address theoretical puzzles of Quantum Gravity and Dark Energy, and simultaneously make testable predictions for astrophysical observations. These models can be tested against measurements of the gravitational waves emitted in mergers of black holes, the spectrum of the Cosmic Microwave Background anisotropies, or other experiments discussed in Sec. 4.1. This is the type of link already being studied by future members of the WCA and can lead to groundbreaking insights into fundamental nature of our physical theories.

Current observations of a wide range of astrophysical phenomena, including fluctuations in the Cosmic Microwave Background (CMB), patterns in the large-scale distribution of galaxies, and the distortion of distant galaxies by gravitational lensing, all indicate that visible structure in the Universe is bound together by a more abundant, invisible, 'dark matter' component. This dark matter is not distributed evenly but clumps together into 'halos' surrounding galaxies. As galaxies merge into groups and clusters, they are predicted to bring some of their surrounding halo with them, making groups and clusters complex, lumpy environments.

While these predictions have existed for almost two decades, we are only just starting to be able to test them directly. One powerful method for measuring the dark matter distribution around galaxies and in clusters of galaxies is gravitational lensing. The gravitational field of matter along the line of sight to a distant galaxy can act as a lens, bending the path of the light rays and thus distorting the image of the galaxy. Members of the astrophysics group have already used this technique to measure the density profile of galaxy groups, the distribution of dark matter around individual group galaxies, and large-scale filaments of matter between galaxy pairs in the field. Ongoing and future surveys, including the Canada-France Imaging Survey (CFIS) on the Canada-France Hawaii Telescope, and the Euclid and WFIRST satellite missions, will revolutionize this field by providing accurate images for hundreds of millions of background galaxies. To interpret this data, we need a detailed theoretical understanding of how dark matter is distributed on galaxy scales; this is the focus of ongoing theoretical work and computational simulations by members of the astrophysics group.

While numerical simulations can predict the expected dark matter distribution in increasing detail, we are only just starting to be able to link actual structures in the nearby universe to these predictions. In recent work, future members of the new Centre have compared the dark matter distribution in simulated galaxy clusters to an extensive new catalogue of galaxies in the Virgo cluster, the nearest cluster in the local Universe, completed as part of the Next Generation Virgo

Survey (NGVS) on the Canada-France Hawaii Telescope. On the basis of raw numbers alone, the comparison reveals a surprising difference between cluster galaxies and independent 'field' galaxies. In clusters, luminous galaxies appear to trace dark matter structure in a simple, consistent way, whereas in the field many dark matter structures seem to be devoid of visible galaxies. This gives an important clue as to how the immediate environment of a galaxy influences its formation. A next step in this work will be to extend the comparison within Virgo and other clusters, and also to more galaxies in the field. As the depth and size of galaxy surveys increases, comparing them directly to numerical models will become a growth area in studies of galaxy formation.

4.4 Training & Enrichment of Highly Qualified Personnel

Having a Centre for Astrophysics in Waterloo, with the benefits and atmosphere that it will have, will bring in the best HQP research talent from around the world, enhancing the quality of the research and increasing the probability of key research breakthroughs.

The Centre Postdoctoral Fellows, students and postdocs of WCA faculty members and the Regular Members will be exposed to a lively research atmosphere dedicated to astrophysical and cosmological research. Regular seminars, journal clubs and hosted conferences will keep members up to date with developments, while a well-used visitors program will ensure exposure to a variety of viewpoints and ideas and provide a stream of scientists to interact and work with. Graduate student participation in the conferences will enrich their studies and provide an avenue for presentations within familiar surroundings. Postdoctoral researchers supported by WCA funds will be encouraged to interact and/or collaborate with multiple members of the WCA – the use of WCA funds ensures that they are not tied to any individual or group for that fraction of their time. Thus, the WCA postdocs will be able to receive rounded research training, and to be more mobile in their research than is the traditional situation. This will enhance the research done once the HQP are present in the Centre.

In addition to indirect research training, the WCA will provide career advice for students and postdocs, including special seminars on career progression, writing research proposals, and applying for grant funding, at appropriate times. We will encourage former WCA members to retain links to the Centre, and to continue to visit and collaborate with current members, again enhancing the research to be done.

4.5 Outreach and Dissemination

WCA members will disseminate research results, publishing high profile papers in highly regarded journals including Nature and Science. Scientific results will be accompanied by news and press releases, which will highlight the key contribution of the WCA to the work. The administrative assistant and UW press office will help with this.

Members will contribute to community outreach events, including giving public talks, and taking part in UW outreach events, with an emphasis on engaging underrepresented minorities and

indigenous communities. Some outreach events will be targeted, on the advice of Advancement, in order to promote the Centre to Waterloo Alumni.

The WCA visitors program will provide distinguished visitors, who are broadly recognized as good public speakers. We will exploit this to raise the profile of the Centre in the local community by, in collaboration with UW, running a series of public talks.

The WCA will maintain a web site promoting the Centre, its members and its activity. Science highlights and upcoming events will be advertised.

4.6 Measurement of Success

For the reasons listed in Sections 4.2 and 4.3, promoting collaboration and science based on the experiments listed in 4.1 is an excellent way to raise overall research output, and the new Centre is designed to do just that. The research success of the Centre will primarily be measured by major national or international awards, grants and recognitions, as well as increased research output including journal articles, presentations at conferences, and related public outreach including press releases from members. The WCA will lead to increased citation rates for WCA members, and corresponding improvement in publication statistics.

The training of HQP as described in Section 4.4, will be judged on the increased number of successful WCA PhD students and postdoctoral researchers graduating from within the University and moving on to further academic or industry positions. This success will lead to further PhD student training and enrichment.

Practically, the success of the Centre lies in its ability to attract further funding and resources, ensuring its sustainability, and to grow in size and ability to perform research.

5 Facilities

It is natural that the physical footprint of the WCA be within the Department of Physics and Astronomy on the UW campus. However, the current building is inadequate for the proposed Centre and for its future expansion. In order to attract excellent scientists to visit and/or join the Centre, it must be on a par with other related groups, such as the Canadian Institute for Theoretical Astrophysics and the Dunlap Institute for Astronomy & Astrophysics at the University of Toronto, and the Centre for the Universe at the Perimeter Institute. The new Centre must therefore provide modern and inspiring office and meeting space, in a location providing a collaborative and open atmosphere, whilst forging its own unique identity.

The proposed refurbishment and/or partial/full replacement of the Physics building on the UW campus offers an excellent opportunity for creating the appropriate space for the new Centre. In line with the aims of the Centre, there should be ample space for visitors. Such visitors, post-graduate students, postdocs and WCA postdoctoral fellows should have offices interspaced with

those of faculty in order to provide a collaborative atmosphere. The Centre should be designed to promote interaction, making sure that individual researchers are not isolated: for example, having privacy within offices provided by shades or frosted glass rather than solid walls and doors. It should be bright and give the feel of space.

The identity of the WCA and ability of the members to associate with it, will be enhanced by having a modern innovative structure that provides an architectural statement. This would also help external people to locate the WCA both physically, but also in terms of associating a physical presence with the WCA. It would also provide an identity for members and a level of pride in the environment, that would help to attract top talent.

Formally, the requirements for internal space are:

1. Office space for 10-12 faculty
2. Office space for 4-6 WCA postdoctoral fellows
3. Office space for 8-10 postdoctoral researchers
4. Office space for 45-55 graduate students
5. Office space for 3-6 visitors
6. Two meeting rooms, suitable for round table meetings of ~14 people
7. One Seminar room, suitable for talks attended by 50-60 people
8. An open interaction area, possibly with
 - a. alcoves for small (3-4 people) informal meetings
 - b. a patio area
9. A place with basic kitchen facilities (sink, coffee maker, fridge)

6 Budget

6.1 Income

For the first five years of operation of the WCA, the Distinguished Astrophysics Chair stipend (controlled by the Director) will support the Institute's operations, while the individual NSERC Discovery grants of WCA members will continue to be held individually and although they will be used to contribute to aims of the Centre, they will not be included in its budget. Financial seed support from the Dean of the Faculty of Science will cover administrative support.

Source	Year 1 (\$)	Year 2 (\$)	Year 3 (\$)	Year 4 (\$)	Year 5 (\$)
Distinguished Chair Funding	500,000	500,000	500,000	500,000	500,000
Dean of Science - admin	50,000	50,000	50,000	50,000	50,000
Total	550,000	550,000	550,000	550,000	550,000

6.2 Expenditure

The primary expenditure will be the salaries for postdocs at the WCA, as well as the administrative cost, a visitor program, seminar series, and 2-3 workshops per year. The following budget is approximate, and may be adjusted at the Director's discretion, although any major changes will be reported to the Board.

Item	Year 1 (\$)	Year 2 (\$)	Year 3 (\$)	Year 4 (\$)	Year 5 (\$)
Hosting meetings	40,000	40,000	40,000	40,000	40,000
WCA postdoctoral fellowships	340,000	340,000	340,000	340,000	340,000
Postdoctoral researcher matching funds	80,000	80,000	80,000	80,000	80,000
Visitors program	30,000	30,000	30,000	30,000	30,000
Administrative assistant	50,000	50,000	50,000	50,000	50,000
Discretionary	10,000	10,000	10,000	10,000	10,000
Total	550,000	550,000	550,000	550,000	550,000

The WCA will host approximately two collaborative meetings per year, with travel paid for approximately 4 invited speakers for each. The expected cost is 20k/meeting.

WCA Postdoctoral Fellows: The Centre will have a competitive program to hire distinguished research fellows, aiming to hire one or two 3-year fellows per year, meaning that on average there are approximately 3-4 in the Centre at any time. Selection will be by an Ad-hoc committee chosen to balance science interests across the Centre and to enhance links to other groups, particularly the Centre for the Universe at the Perimeter Institute. Initially these positions will be known as the WCA Postdoctoral Fellows. Although these Fellowships will be advertised as stand-alone, the hiring committee will reach out to the Dunlap Centre, CITA and the PI to see if a joint hire would be of interest, possibly allowing an attractive 5-year offer to be made for a candidate who is willing to spend time at multiple institutes and centres.

The Centre will aim to provide limited matching funds for postdocs hired by Regular Members. These will be allocated in units of $\frac{1}{2}$ postdoctoral researcher per year and will be distributed on demand across the members of the Centre by the Director, aiming to provide a fair distribution. This funding is designed to allow members to leverage funding (e.g. connected with satellite projects such as CASTOR) or extend funding (e.g. from a successful JWST proposal), to obtain postdoctoral support.

Visitors program: We expect a vibrant visitors program, with many international and national visitors contributing to the Centre. The visitors budget will be administered by a rolling ad-hoc committee, which will keep a running tally of the cost of visitors against Centre member and balance the available funding. A request for visitor funding including an estimate of costs will be made to this committee before funds are allocated.

In order to help with the administration of the Centre, we initially request a half-time admin person. This will be reviewed after one year to check if this is adequate provision.

The Centre will consider on a case-by-case basis requests for funding to join collaborations, and other requests to support research activities. In general, the Centre will only provide matching funding for members, where the other portion of the funding could be spent in other ways; i.e. the member has to choose to contribute money that they control to support the activity and choose to do this rather than spend the money in some other way, such as on travel, students or postdocs.

6.3 Road to sustainability

The Director and all members of the WCA will work with the Dean of Science, and the Department of Advancement at the University of Waterloo to leverage the creation of the new Centre to bring in further funding, allowing an expansion of the Centre and its ability to perform world-leading science. Possible options linked with such funding include the naming of the Centre, the naming of the building or annex in which the Centre is located, the naming of the post-doctoral fellowship program, and/or a PhD student fellowship program.

The work of the Centre, by raising the profile of its members, will help them to gain more from NSERC discovery grants, and CSA grants connected to Space missions. All members of the Centre will be expected to investigate these and further avenues for funding.

The Centre will maintain close links with CITA, Dunlap and the Centre for the Universe, and we expect the impact to be increased by joint activity.

In the longer term, we will review and apply for government grants if and when suitable calls are made in order to enhance the ability of the WCA to achieve its research goals.

7 Statements of Sanction and Commitment

- Letter of support by the Chair of the Physics and Astronomy is attached
- Letter of support by the Dean of Faculty of Science is attached

August 31, 2018

Professor Charmaine Dean
Vice President, University Research
University of Waterloo

Dear Charmaine,

The Waterloo Centre for Astrophysics will be the focal point for astrophysical research within the Waterloo region. It will boost the research output of its members through enhanced collaboration, interactions with visiting scientists, and through enhanced access to data and computing resources. The centre (akin to centres in Toronto, Harvard, Cambridge, etc) will raise significantly the already strong profile astrophysics enjoys worldwide. The centre will become a magnet attracting top talent from around the world.

The proposal was carefully constructed to ensure the department as a whole will have a voice in the centre's management. Non-members of WCA will be represented on the governing board through the Department Chair. If, as is currently the case, the department chair is a member of the WCA, the chair will nominate an additional non-WCA member of the Physics and Astronomy Faculty to attend Board meetings in a non-voting capacity. This, together with the available agenda and minutes of board meetings, will ensure that the centre interacts with the department transparently. It is my hope that WCA will be a model for other centres in physics and related fields.

The WCA requires additional space. I am happy to make that space available within the Department of Physics and Astronomy. The space allocation ties into the department's plan to refurbish or replace the west office wing of the Physics building.

Following an exhaustive search, Professor Will Percival was recruited for the Distinguished Research Chair in Astrophysics, funded in part by a private donation. Will has agreed to become the inaugural director of the WCA. Will's exceptional profile within the field of observational cosmology makes him the ideal choice to grow our reputation in astrophysics in part by linking the new centre to others, including the Centre for the Universe at Perimeter Institute.

The research stipend of the Distinguished Chair will be used, at Will's direction, to support activities of the new centre, primarily to launch a new postdoctoral fellowship program. A steady stable of outstanding postdocs will create a vibrant atmosphere for scholarship and learning in astrophysics that will be unique to Canada.

Will will lead the effort to attract additional funding to propel the centre forward and to ensure its vitality in perpetuity. We hope that the rather generic, WCA, will eventually be renamed at the behest of a private donor.

I am happy to provide my full support for both the centre and Will Percival as its inaugural director.

With warm regards,

A handwritten signature in black ink, appearing to read 'B. McNamara', with a stylized, cursive script.

Brian R. McNamara
Professor & University Research Chair
Chair, Department of Physics & Astronomy

September 18, 2018

Dr. Charmaine Dean
Vice President, University Research
University of Waterloo

Re: Proposed Waterloo Centre for Astrophysics

Dear Charmaine:

I am pleased to write in strong support of the proposed new Waterloo Centre for Astrophysics. The WCA will provide a focal point for astrophysics at the University of Waterloo, providing support – both financial and through the environment created – for its members. Given the faculty members involved and the work described in the proposal, it is clear that this centre will raise the international profile of UW, and increase our ability to secure research funding and support, and to bring the best researchers in the world to UW. Although astrophysics is not my area of expertise, the list of experiments that the members are involved with is impressive, and the work of the WCA has the potential to make significant inroads into a number of important problems in astrophysics.

Plans are currently being made to modernize and/or replace the Physics building infrastructure, which include creating appropriate space for the WCA. Indeed, the synchronicity of the building project and the creation of the new centre has the strong potential to enhance both projects by giving the WCA a physical base for its operations, and by using the WCA aims to help to design an iconic building for the UW campus. Furthermore, the Faculty of Science will contribute \$50,000 annually for the first 5-year term of the Centre to support its operations.

The inaugural Director of the WCA will be Prof. Will Percival, who was recently hired as the Mike and Ophelia Lazaridis Distinguished Research Chair in Astrophysics. Although still in mid-career, he has published over 230 research papers, and helps to manage a number of exciting physics experiments that have the potential to revolutionize the field over the next decade. At his previous position, he brought in over \$8M of research funding over 10 years to build-up a research group focused on observational cosmology. At UW, he wishes to repeat this through the WCA, but with a broader scope by using the gift from Mike Lazaridis to create an exciting and vibrant research environment for the wider astrophysics community at UW via the WCA.

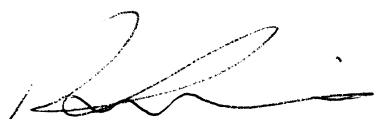
Thanks to the gift from Mike Lazaridis, this centre request is rather unusual for a faculty centre in that it has a budget that is larger than most. Because of this, it has a stronger requirement for administrative support, and I am pleased to provide this support. I understand that Will has already been working with our Advancement team to look at possible ways to support the Centre going forward, and he is working with other proposed WCA members to submit applications for fellowships, for example.



Although primarily based in the Department of Physics and Astronomy, the proponents of the new centre have already reached out to faculty members in other departments, including Applied Mathematics and Philosophy who are already involved in Astrophysics-based research.

In summary, I strongly support this application for a Waterloo Centre for Astrophysics. Prof. Will Percival has been an outstanding addition to our faculty complement who has already made a significant impact in Physics and Astronomy at UW, and the WCA proposal is a strong reflection of his leadership qualities.

Sincerely,

A handwritten signature in black ink, appearing to read 'R. Lemieux', with a stylized flourish at the end.

Robert P. Lemieux, PhD
Dean of Science and Professor of Chemistry






MEMORANDUM

TO: Will Percival
Department of Physics and Astronomy

CC: Kathy Winter
Secretariat

FROM: Charmaine B. Dean 
Vice-President, University Research

DATE: Thursday, September 27, 2018

RE: Support for the Establishment of the Waterloo Centre for Astrophysics

I am pleased to inform you that, following your presentation at the Research Leaders Council meeting of September 17, 2018, it was with unanimous decision that the Council recommends supports the establishment of the Waterloo Centre for Astrophysics.



Clarifying Diplomas, Fields and Specializations McKenzie and Casello September 2018

Introduction:

In an effort to clarify and standardize the types of academic “products” (in addition to degrees) offered at the graduate level, the following definitions are proposed. In each case, these guidelines indicate the academic requirements, the way in which the products are recorded (on transcripts or diplomas), and, finally, the role of the Quality Council. Please note that if these guidelines are accepted, the terms used here – particularly fields and Specializations – will become “reserved words” and their use at the University will be limited to these applications.

Motion: To approve the following text that defines academic credentials at the graduate level. This text will appear in the Graduate Studies Academic Calendar.

Graduate Type 2 Diplomas:

A graduate Type 2 Diploma (GDip) is intended to demonstrate mastery of a topic area that is usually complementary to, but not embedded within, a graduate student’s primary area of study. The goal of the GDip is to encourage breadth at the graduate level, often through interdisciplinary studies. A student who completes a degree program and a GDip should have achieved different learning outcomes than a student who has completed only the normal degree requirements.

GDips at the University of Waterloo are achieved by successfully completing the academic requirements of the student’s program AND additional academic requirements – a combination of courses and / or academic milestones – specific to the GDip that total to the equivalent of 1.0 (academic) units.

Normally, obtaining a GDip will require at least:

- Two 0.5 unit courses in addition to the program’s normal requirements; or
- one additional 0.5 unit course and one or more milestones the academic requirements of which are equivalent to a 0.5 unit course; or
- a set of milestones the academic equivalent of which are two 0.5 unit courses.

The Department offering the GDip may also require specific courses that replace electives in the student’s core program.

GDips:

- require Quality Council approval;
- should normally contain course or milestone options that promote interdisciplinarity; and
- are recognized on the student’s transcript and on the Diploma.

Graduate Research Fields:

Graduate programs and research areas are often defined by the administrative unit within which the graduate student or supervisor is appointed. Often fields define specific areas of research within the unit; in other cases, the research conducted is “at the edge” of the normal understanding of the administrative unit’s commonly understood focus. Graduate research fields are used to better define a student’s research concentration when the broader program definition is insufficient to appropriately represent (to academic and professional audiences) the student’s focus. Examples of existing research fields at Waterloo include several in the Master’s programs offered in [Applied Math](#), [Computer Science](#) and [Civil Engineering](#).

Research fields are specified at the time of application. Academic units who wish to employ research fields are encouraged to include specific course requirements that support the learning outcomes associated with that field. An assessment of whether or not the student's completed research warrants the field designation should be completed by the Department or Faculty at the time of degree completion.

Graduate Research fields:

- are reported to Quality Council as part of the major modification report;
- may be specified by the student when applying to a program or unit;
- may have a corresponding unique set of required and elected courses;
- should not require additional academic accomplishments beyond the normal degree requirements;
- should be a recognized area of research;
- are recognized on the student's transcript but not on the Diploma.

Graduate Specialization:

A graduate Specialization reflects expertise achieved by a graduate student in a sub-discipline of their primary area of study. Specializations are normally available in course-based graduate programs or research programs where there is sufficient required coursework to allow for the customization of the student's program. For example, a Master's research program with two required courses and two electives (four total courses), would not qualify for a Specialization because there is insufficient flexibility for the student to demonstrate mastery of a sub-discipline. In contrast, a research program with four required courses and four electives could easily be designed with multiple Specializations achieved by completing a specific set of courses as the electives.

A Specialization is achieved at the University of Waterloo by successfully completing a set of courses defined by the academic unit that collectively contain the necessary depth of material to ensure a student's level of mastery.

Specializations:

- do not require Quality Council approval;
- do not require additional (to the host program) coursework or milestones;
- should include at least four 0.5 unit courses or 2.0 academic units in total specific to the Specialization;
- should reflect themes that are emerging or established in the discipline, such that the completion of the Specialization has meaning to an external audience;
- should only be offered in disciplines where sufficient breadth of scholarship or professional areas exists to warrant such a distinction;
- are recognized on a student's official transcript, but not recognized on a student's Diploma.

University of Waterloo
SENATE GRADUATE & RESEARCH COUNCIL
and
SENATE UNDERGRADUATE COUNCIL
Report to Senate
19 November 2018

Senate Graduate & Research Council (SGRC) met on 1 October 2018 and 12 November 2018 and Senate Undergraduate Council (SUC) met on 9 October 2018. Both councils considered academic calendar dates for 2019-2020, as well as calendar guidelines for establishing academic dates. Each council also considered calendar guidelines regarding scheduled academic pauses – new for the graduate calendar and revised for the undergraduate calendar. SUC and SGRC (subject to approval at 12 November 2018 meeting) agreed to forward the following items to Senate for approval as part of the regular agenda.

Further details are available at:

<https://uwaterloo.ca/secretariat/committees-and-councils/senate-undergraduate-council>

<https://uwaterloo.ca/secretariat/committees-and-councils/senate-graduate-research-council>

FOR APPROVAL

ACADEMIC CALENDAR DATES 2019-2020

1. **Motion:** To approve the 2019-2020 calendar dates and calendar guidelines for establishing academic dates as presented in Attachment #1 (clean copy) and Attachment #2 (red-line copy).

Rationale: The dates lay out major academic milestones throughout the year and provide guidance to units throughout the campus community as they conduct academic planning within their respective areas. The dates presented in the Attachment reflect a four-day fall reading week.

The Registrar's Office has modelled the impact of a four-day fall reading week following Thanksgiving Monday and adjusted the calendar guidelines for establishing academic dates accordingly. The revised guidelines are in accordance with the framing guidelines and principles outlined in Mario Coniglio's 15 October 2018 presentation to Senate, including 60 teaching days, 13 exam days, maximum of one Sunday exam day on the 1st Sunday of the exam period and one "snow day" at the end. See Attachment #1, pp.2-3 for the revised guidelines.

UNDERGRADUATE CALENDAR GUIDELINES RE: SCHEDULED PAUSES

2. **Motion:** To update the Study Days calendar text, for undergraduate students, as follows.

Rationale: Two separate Calendar pages (Study Days, Mid-Term Study Break) were amalgamated in 2018 due to the similarity of the content. With the Fall Reading Week proposal approved at October Senate, this was an opportunity to review and simplify the text.

Current Undergraduate Calendar Page: <http://ugradcalendar.uwaterloo.ca/page/Acad-Regs-Study-Days>

Page title: ~~Study Days~~ **Scheduled Pauses in the Academic Term**

Study Days and Reading Weeks

Study days and reading weeks are designated periods where normal class schedules and academic requirements are suspended for a specified period of time to act as a pause for students in an academic term, to reflect upon and catch up on their term's work to date and, as necessary, prepare for any upcoming assignments and assessments. The dates are published in the [Calendar of Events and Academic Deadlines](#).

Examples of study days include mid term study breaks, as well as, the days in each term between the Formal Lecture Period and beginning of the Final Examination Period.

Student services such as student advising support, Health Services, Counselling Services, the library, and residences continue to provide service.

~~Except where classes are rescheduled as the result of a campus-wide emergency closure, no classes are to be held during study days. With the exception of the English Language Proficiency Examination, I~~
Instructors are not permitted to administer, and students are not required to sit for examinations, tests, or lectures during a scheduled pause study days. There are to be no compulsory academic events (e.g., classes, labs, tutorials, seminars, exams). Deadlines for assignments are not permitted during a scheduled pause.

While exceptions may exist (e.g., clinical rotations, Year Four Optometry and Pharmacy courses) the scheduled pauses apply to both undergraduate and graduate students.

Study Days

There are one or two study days each term, between the end of the Formal Lecture Period and the beginning of the Final Examination Period. No classes are to be held during study days, except where classes are rescheduled as the result of a campus-wide emergency closure.

Mid-Term Study Breaks Reading Weeks

Reading Weeks occur in the fall and winter terms; they start with the statutory holidays of Thanksgiving Day and Family Day.

~~During this pause, there are to be no scheduled meetings or assignments for students (e.g., classes, labs, tutorials, seminars, exams, TA-related work). While exceptions may exist (e.g., co-operative employment interviews, clinical rotations, PhD comprehensive exams, graduate thesis defenses), the pause applies to meetings involving both undergraduate and graduate students.~~

~~Deadlines for student submissions will not be scheduled during the break. Student services such as student advising support, Health Services, Counselling Services, the library, and residences are expected to continue to provide service.~~

~~The above terms of reference are not meant to include responsibilities associated with graduate students in their roles as research assistants or in any other employment capacity (excluding TA-related work as mentioned above) with the University. In these situations, students and employers should clarify their mutual expectations concerning work-related responsibilities during the mid-term break.~~

Proposed text (clean copy):

Page title: Scheduled Pauses in the Academic Term

Study Days and Reading Weeks

Study days and reading weeks are designated periods where normal class schedules and academic requirements are suspended for a specified period of time. The dates are published in the Calendar of Events and Academic Deadlines.

Student services such as student advising support, Health Services, Counselling Services, the library, and residences continue to provide service.

Instructors are not permitted to administer, and students are not required to sit for examinations, tests, or lectures during a scheduled pause. There are to be no compulsory academic events (e.g., classes, labs, tutorials, seminars, exams). Deadlines for assignments are not permitted during a scheduled pause.

While exceptions may exist (e.g., clinical rotations, Year Four Optometry and Pharmacy courses) the scheduled pauses apply to both undergraduate and graduate students.

Study Days

There are one or two study days each term, between the end of the Formal Lecture Period and the beginning of the Final Examination Period. No classes are to be held during study days, except where classes are rescheduled as the result of a campus-wide emergency closure.

Reading Weeks

Reading Weeks occur in the fall and winter terms; they start with the statutory holidays of Thanksgiving Day and Family Day.

GRADUATE CALENDAR GUIDELINES RE: REQUIREMENTS DURING SCHEDULED PAUSES

3. **Motion:** To include the following specific guidance in the Graduate Studies Academic Calendar that specifies the requirements for graduate students during scheduled academic pauses.

Rationale: Graduate students are engaged in both their own educational activities – taking courses and conducting research – and in assisting the university to deliver its academic mission – serving as Teaching and Research Assistants. As such, it is useful to clarify the roles and responsibilities of graduate students during scheduled academic pauses. To this end, the following guidelines are established:

- If a grad student is **enrolled in courses**, then that student (like all students) is on an academic pause. Graduate students shall not have academic due dates during a scheduled academic pause.
- If a graduate student is serving as a **Teaching Assistant**, then that student is not obligated to interact with students enrolled in the course during the academic pause. But, the graduate student (at their discretion only) may wish to conduct activities that are supportive of the enrolled students. For other TA requirements, particularly marking, graduate TAs are encouraged to coordinate with the course instructors to agree on due dates that allow for the grad students to balance workloads with the opportunity to have an academic pause.
- If a graduate student is **conducting research** as an Graduate Research Assistant or as part of a Graduate Research Studentship that requires regular activity (lab work that requires daily data collection, for example), then it is the student's responsibility to see that those responsibilities are met during the academic pause. Supervisors are encouraged to provide the break as an opportunity for students to have a pause in activities when the research activities are not time sensitive and are required to articulate expectations for breaks in the research assistantship or research studentship agreement.

- PhD comprehensive exams, graduate thesis defences, etc. may take place during this time.

/rmw & kw

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

Charmaine Dean
Vice President,
University Research

Mario Coniglio
Associate Vice-President, Academic

Cathy Newell-Kelly
Registrar

Academic Calendar Dates, 2019-2020

The following symbols and abbreviations are used throughout this table:

- (M) Monday, (T) Tuesday, (W) Wednesday, (R) Thursday, (F) Friday, (S) Saturday, (U) Sunday
- N/A – Not Applicable

	Fall 2019	Winter 2020	Spring 2020
Co-operative Work Term Begins	Sept. 3 (T)	Jan. 6 (M)	May 4 (M)
Classes Begin	Sept. 4 (W)	Jan. 6 (M)	May 4 (M)
Holidays	Oct. 14 (M)	Feb. 17 (M) Apr. 10 (F)	May 18 (M) July 1 (W) Aug. 3 (M)
Reading Week	Oct. 15-18 (T-F)	Feb. 18-21 (T-F)	N/A
Convocation	Oct. 25, 26 (F,S)	N/A	June 16-20 (T-S)
Classes End	Dec. 3 (T)	Apr. 3 (F)	July 28 (T)
Make-up Day(s) for in-term holidays	N/A	N/A	July 28 (T) following (W) schedule for July 1
Pre-Examination Study Days	Dec. 4, 5 (W,R)	Apr. 6, 7 (M,T)	July 29, 30 (W,R)
On-Campus Examinations Begin	Dec. 6 (F)	Apr. 8 (W)	July 31 (F)
Online Class Examination Days	Dec. 6, 7 (F,S)	Apr. 17, 18 (F,S)	Aug. 7, 8 (F,S)
On-Campus Examinations End (including Emergency Day)	Dec. 21 (S)	Apr. 25 (S)	Aug. 15 (S)
Co-operative Work Term Ends	Dec. 20 (F)	Apr. 24 (F)	Aug. 21 (F)
Teaching days	60	60	60
Pre-examination Study Day(s)	2	2	2
Examination days	13 (+1 Emergency Day)	13 (+1 Emergency Day)	11 (+1 Emergency Day)

Guidelines for Determining Academic Calendar of Dates

The following are principles and guidelines either formally agreed upon by Senate or adopted as common practice in determining the dates for the academic year.

1. That the practice of setting dates for each academic year continues to be an annual exercise.
2. That there be no fewer than 60 teaching days (12 weeks) in a term. A clear rationale for fewer than 60 teaching days must be communicated to Senate at the time calendar dates are approved. In calculating teaching days in a term, Saturdays, Sundays, and statutory or University holidays are excluded.
3. That attention be given to balancing the number of meets in courses. Where an imbalance may occur because of statutory holidays, the class schedule for a day different than the calendar day can be used to balance the number of course meets.
4. That Fall Convocation be the Friday and Saturday that fall in the third full week (beginning Sunday) of October.
5. That Spring Convocation be the Tuesday to Saturday in the second full week (beginning Sunday) in June.
6. That Reading Weeks occur in the fall and winter terms, beginning with the statutory holidays of Thanksgiving Day and Family Day.
7. That Fall Term classes in September begin on the Wednesday following the Labour Day holiday.
Exception: The Fall Term begins on Tuesday, September 8th when Labour Day is September 7th.
8. That the start date for Winter Term be set as follows:
 - If January 1st is a Sunday, then start of classes is Wednesday, January 4th.
 - If January 1st is a Monday, then start of classes is Wednesday, January 3rd.
 - If January 1st is a Tuesday, then start of classes is Monday, January 7th.
 - If January 1st is a Wednesday, then start of classes is Monday, January 6th.
 - If January 1st is a Thursday, then start of classes is Monday, January 5th.
 - If January 1st is a Friday, then start of classes is Tuesday, January 5th.
 - If January 1st is a Saturday, then start of classes is Wednesday, January 5th.
9. The start date for Spring Term be set as follows:
 - If May 1st is a Sunday, then start of classes is Monday, May 2nd.
 - If May 1st is a Monday, then start of classes is Monday, May 1st.
 - If May 1st is a Tuesday, then start of classes is Tuesday, May 1st.
 - If May 1st is a Wednesday, then start of classes is Wednesday, May 1st.
 - If May 1st is a Thursday, then start of classes is Monday, May 5th.
 - If May 1st is a Friday, then start of classes is Monday, May 4th.
 - If May 1st is a Saturday, then start of classes is Monday, May 3rd.

10. That there be no fewer than one pre-examination study day and when possible, two pre-examination study days (excluding Saturday, Sunday, and holidays) between the end of classes and the beginning of examinations. A clear rationale for using fewer than 2 days or Saturday, Sunday, and holidays as pre-examination study days, must be communicated to Senate at the time calendar dates are approved.
11. That there be no fewer than 13 examination days in the Fall and Winter Terms, and 11 examination days in the Spring Term. In addition, one Emergency Day with no scheduled examinations is added to the end of the examination period.
12. In calculating examination days, Saturdays which fall within the period are included, whereas Sundays and statutory or University holidays are excluded.
Exceptions:
Examinations will not be scheduled on the Saturday following Good Friday when that day falls within the examination schedule or the Saturday of the Civic Day weekend.
The first Sunday within the examination period may be used when required to accommodate the prescribed number of examination days in the Fall Term.
13. That in the Fall Term no examinations be scheduled beyond December 22nd. The Emergency Day cannot be scheduled beyond December 23rd.
14. That Online Course Examination Days in each term normally be the first consecutive Friday and Saturday in the examination period.
15. Grades due dates for on-campus courses are normally scheduled seven days from the date of the final examination. Grades for Online (Centre for Extended Learning) courses that have a scheduled final examination are due on the last day of the grades submission period. Grades for all courses without a scheduled final examination are normally due 14 days after the start of examinations.
16. Co-op work terms are expected to be 16 week in duration. Actual start and end dates may vary depending on employer or student requirements in consultation with CECA.

Prepared by:
C. Newell Kelly, Registrar
September, 2018

Academic Calendar Dates, 2019-2020

The following symbols and abbreviations are used throughout this table:

- (M) Monday, (T) Tuesday, (W) Wednesday, (R) Thursday, (F) Friday, (S) Saturday, (U) Sunday
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	Fall 2019	Winter 2020	Spring 2020
Co-operative Work Term Begins	Sept. 3 (T)	Jan. 6 (M)	May 4 (M)
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Reading Week	Oct. 15-18 (T-F)	Feb. 18-21 (T-F)	N/A
Convocation	Oct. 25, 26 (F,S)	N/A	June 16-20 (T-S)
Classes End	Dec. 3 (T)	Apr. 3 (F)	July 28 (T)
Make-up Day(s) for in-term holidays	N/A	N/A	July 28 (T) following (W) schedule for July 1
Pre-Examination Study Days	Dec. 4, 5 (W,R)	Apr. 6, 7 (M,T)	July 29, 30 (W,R)
On-Campus Examinations Begin	Dec. 6 (F)	Apr. 8 (W)	July 31 (F)
Online Class Examination Days	Dec. 6, 7 (F,S)	Apr. 17, 18 (F,S)	Aug. 7, 8 (F,S)
On-Campus Examinations End (including Emergency Day)	Dec. 21 (S)	Apr. 25 (S)	Aug. 15 (S)
Co-operative Work Term Ends	Dec. 20 (F)	Apr. 24 (F)	Aug. 21 (F)
Teaching days	60	60	60
Pre-examination Study Day(s)	2	2	2
Examination days	13 (+1 Emergency Day)	13 (+1 Emergency Day)	11 (+1 Emergency Day)

Guidelines for Determining Academic Calendar of Dates

The following are principles and guidelines either formally agreed upon by Senate or adopted as common practice in determining the dates for the academic year. **Changes are highlighted.**

1. That the practice of setting dates for each academic year continues to be an annual exercise.
2. ~~That there be no fewer than 13 examination days in the Fall and Winter Terms, and 11 examination days in the Spring Term.~~
3. ~~That there be no fewer than two pre-examination study days (excluding Saturday, Sunday, and holidays) between the end of classes and the beginning of examinations and the University will attempt to schedule more study days when possible (including Saturday, Sunday, and holidays). A clear rationale for using Saturday, Sunday, and holidays as pre-examination study days must be communicated to Senate at the time calendar dates are approved.~~
4. ~~2.~~ That there be no fewer than 60 teaching days (12 weeks) in a term. A clear rationale for fewer than 60 teaching days must be communicated to Senate at the time calendar dates are approved. In calculating teaching days in a term, Saturdays, Sundays, and statutory or University holidays are excluded.
5. ~~3.~~ That attention be given to balancing the number of meets in courses. Where an imbalance may occur because of statutory holidays ~~or the Mid-Term Study Break, courses may use~~ the class schedule for a day different than the calendar day ~~in order~~ can be used to balance the number of course meets ~~across all courses~~.
4. That Fall Convocation be the Friday and Saturday that fall in the third full week (beginning Sunday) of October.
5. That Spring Convocation be the Tuesday to Saturday in the second full week (beginning Sunday) in June.
6. That Reading Weeks occur in the fall and winter terms, beginning with the statutory holidays of Thanksgiving Day and Family Day.
6. ~~7.~~ That Fall Term classes in September begin on the ~~Thursday~~ Wednesday following the Labour Day holiday ~~as per the requirements of the three year Fall Break pilot starting in Fall 2016.~~
7. ~~That in the Fall Term no examinations be scheduled beyond December 22.~~

Exception: The Fall Term begins on Tuesday, September 8th when Labour Day is September 7th.

8. That the start date for Winter Term be set as follows:
 - o If January 1st is a Sunday, then start of classes is Wednesday, January 4th.
 - o If January 1st is a Monday, then start of classes is Wednesday, January 3rd.
 - o If January 1st is a Tuesday, then start of classes is Monday, January 7th.
 - o If January 1st is a Wednesday, then start of classes is Monday, January 6th.

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- If January 1st is a Thursday, then start of classes is Monday, January 5th.
 - If January 1st is a Friday, then start of classes is Tuesday, January 5th.
 - If January 1st is a Saturday, then start of classes is Wednesday, January 5th.
9. ~~That the 5-day Winter Reading Week occurs in all Faculties and must begin on the third Monday in February in keeping with an informal agreement with Wilfrid Laurier University and University of Guelph.~~
9. The start date for Spring Term ~~is normally~~ be set as follows:
- ~~If May 1, 2, or 3 when these dates fall on 1st is a Monday, Tuesday, or Wednesday. Otherwise the Sunday, then start date of classes is the first Monday, May 2nd.~~
 - ~~10.○~~ If May 1st is a Monday, then start of classes is Monday ~~following~~ May 3rd 1st.
 - If May 1st is a Tuesday, then start of classes is Tuesday, May 1st.
 - If May 1st is a Wednesday, then start of classes is Wednesday, May 1st.
 - If May 1st is a Thursday, then start of classes is Monday, May 5th.
 - If May 1st is a Friday, then start of classes is Monday, May 4th.
 - If May 1st is a Saturday, then start of classes is Monday, May 3rd.
10. That there be no fewer than one pre-examination study day and when possible, two pre-examination study days (excluding Saturday, Sunday, and holidays) between the end of classes and the beginning of examinations. A clear rationale for using fewer than 2 days or Saturday, Sunday, and holidays as pre-examination study days, must be communicated to Senate at the time calendar dates are approved.
11. That there be no fewer than 13 examination days in the Fall and Winter Terms, and 11 examination days in the Spring Term. In addition, one Emergency Day with no scheduled examinations is added to the end of the examination period.
11. ~~In calculating teaching days in a term, Saturdays, Sundays, and statutory or University holidays are excluded. An exception may be made to have a make-up class on Saturday in the Fall term when there is a late Labour Day.~~
12. In calculating examination days, Saturdays which fall within the period are included, whereas Sundays and statutory or University holidays are excluded. ~~One exception to the above, approved by Undergraduate Operations Committee is that normally examinations will not be scheduled on the Saturday which follows Good Friday or the Saturday of the Civic Day weekend when that day falls within the examination schedule.~~
- Exceptions:
Examinations will not be scheduled on the Saturday following Good Friday when that day falls within the examination schedule or the Saturday of the Civic Day weekend.
The first Sunday within the examination period may be used when required to accommodate the prescribed number of examination days in the Fall Term.
13. That in the Fall Term no examinations be scheduled beyond December 22nd. The Emergency Day cannot be scheduled beyond December 23rd.

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That Online

~~14. Course Examination Days in each term normally be the first consecutive Friday and Saturday in the examination period.~~

~~13.15. Grades due dates for on-campus courses are normally scheduled seven days from the date of the final examination. Grades for Online (Centre for Extended Learning) courses that have a scheduled final examination are due on the last day of the grades submission period. Grades for all courses without a scheduled final examination are normally due 14 days after the start of examinations. ~~Grades for Online (Centre for Extended Learning) courses are due on the last date of the grades submission period.~~~~

~~14. That Fall Convocation be the Friday and Saturday that fall in the third full week of October.~~

~~15. That Spring Convocation be the Tuesday to Saturday in the second full week in June.~~

~~16. That Online Class Examination Days in each term be the first Friday and Saturday after the exam period starts.~~

~~17.16. Co-op work terms are expected to be 16 week in duration. Actual start and end dates may vary depending on employer or student requirements in consultation with CECA.~~

~~18. That there be a two day Fall Study Break following Thanksgiving Monday by starting classes on Thursday of Orientation week. This is a three year pilot starting in Fall 2016.~~

Prepared by:
C. Newell Kelly, Registrar
~~December 11, 2017~~
September, 2018

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University of Waterloo
UNIVERSITY COMMITTEE ON STUDENT APPEALS (UCSA)
REPORT TO SENATE
19 November 2018

FOR INFORMATION

In accordance with Policy 72 – Student Discipline, the UCSA is to provide an annual report to Senate on the number of student discipline cases heard at the University and faculty levels, their nature and such recommendations as it sees fit to make with respect to matters under its jurisdiction. Provided in this report is the required information for 1 September 2017 to 31 August 2018, as well as the required information for the two years prior.

The numbers reported in the chart below include findings of guilt for graduate and undergraduate students at the University and faculty levels.

In an attempt to preserve confidentiality, cases are not reported by faculty, unit or program. Annual summaries (with identifying student and faculty names removed) of discipline cases, grievances and appeals are posted to the Secretariat's website: https://uwaterloo.ca/secretariat/sites/ca.secretariat/files/uploads/files/mail_merge_1.pdf.

Summary of Student Discipline Cases – Guilty Findings

DISCIPLINE OFFENCE	2015-2016	2016-2017	2017-2018
ACADEMIC			
Academic or admission fraud	81	88	14
Altering or falsifying a relevant document	29	19	13
Cheating	512	257	324
Contravention of statute	0	0	0
Impersonation	0	22	38
Misrepresentation	96	92	125
Obtaining confidential academic materials	0	0	0
Plagiarism	853	1441	1477
Theft of intellectual property	16	11	53
Unauthorized aids or assistance	47	32	56
Unauthorized co-operation or collaboration	772	740	821
Unauthorized resubmission of work	41	20	75
Violation of examination regulations	15	11	40
Other	4	12	12
NON-ACADEMIC			
Contravention of a statute	7	3	0
Disruptive, dangerous, aggressive or threatening behaviour	39	16	31
Infringing unreasonably on the work of others	9	8	9
Mischief	2	39	0
Misuse of University resources	8	27	1
Theft	11	0	0
Unauthorized use of equipment	4	3	4
Unethical behaviour	52	74	61
Other	11	13	10

4 October 2018

/ns

Mario Coniglio
Chair

Report of the Vice-President, University Research to Senate

November 2018

RESEARCH Infosource – University of the Year 2018

Waterloo has been designated **Research University of the Year** in the Comprehensive category for 2018 from RESEARCH Infosource. Waterloo also ranked 12th among Canada's Top 50 research universities total sponsored research income and placed second among comprehensive universities for total corporate research income over the past five years.

NSERC Strategic Partnership Grant for Projects

Waterloo received six (6) grants totaling **\$3.89M** from the NSERC Strategic Partnership Grant for Projects - 2018 competition. 36 letters of intent were submitted including nine (9) from engineering, four (4) from science and three (3) from math. Sixteen LOIs were invited to submit a full proposal (44% success rate) with a final six awarded including three from engineering and three from science.

IDEaS Micro-net Advanced Materials Challenge

The Department of National Defence (DND) has launched the Innovation for Defence Excellence and Security (IDEaS) Program. The IDEaS Program supports the establishment of new Innovation Networks and, where appropriate, existing networks, to stimulate collaboration and the free flow of ideas critical to innovation.

Three Waterloo teams moving to full proposal stage each with a project valued at \$1.5 million:

- Duane Cronin (Eng), Mihaela Vlasea (Eng), Michael Worswick (Eng)
- Mike Pope (Eng)
- John Montesano (Eng).