

**UNIVERSITY OF WATERLOO  
SENATE GRADUATE & RESEARCH COUNCIL  
NOTICE OF MEETING**

DATE: Monday 14 September 2020  
TIME: 10:30 a.m. – 12:00 noon  
PLACE: Microsoft Teams

Chair – C. Dean

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**AGENDA**

<u>Item</u>	<u>Action</u>
1. Declarations of Conflict of Interest	
a. Excerpt from Bylaw 1, section 8*	Information
2. Minutes of 11 May 2020* and Business Arising	Decision (SGRC)
3. Co-chairs' Remarks	Information
4. Academic Program Reviews	
a. <u>Status of Reports under Review</u>	Information
b. Guiding Questions for Final Assessment Reports and Two-Year Progress Reports*	Information
c. Two-Year Progress Report: Pharmacy* (David Edwards; reviewer: Ferrer)	Decision (SGRC)
d. Final Assessment Report: Chemical Engineering* (Eric Croiset; reviewer: Samuel/Singh)	Decision (SGRC)
e. Final Assessment Report: Psychology * (Heather Henderson; reviewer: Rehder/Staines)	Decision (SGRC)
f. Final Assessment Report: Theological Studies* (Jeremy Bergen; reviewer: Duncker/ Kolkiewicz)	Decision (SGRC)
5. Curricular Submissions	
a. Arts* (Esselment)	Decision (SGRC)
5.5 University Research (Joza) – Research Ethics Committees – membership changes*	Decision (SGRC)
6. Graduate Awards*	
a. Mathematics International Master's Award of Excellence - operating	Decision (SGRC)
b. Mark Zanna Graduate Scholarship in Psychology - endowment	Decision (SGRC)
c. Pella Awards – trust	Decision (SGRC)
d. School of Accounting and Finance Doctoral Award – trust	Decision (SGRC)
e. Iranian Student Memorial Engineering Graduate Scholarship – endowment	Decision (SGRC)
f. University Professor Garry L Rempel Memorial Graduate Scholarship – endowment	Decision (SGRC)
g. J. Frank Brookfield Memorial Graduate Scholarship - endowment	Decision (SGRC)
h. Rotary Peace Scholarship – trust	Information
i. Phyllis Young Forsyth Graduate Scholarship in Classical Studies – trust	Information
j. Graduate Student Thesis Completion Award – trust, operating	Information
k. Academic Readiness Bursary - trust	Information
l. Math Domestic Graduate Student Award – operating	Information
7. New Academic Program: GDip Computational Data Analytics for the Social Sciences and Humanities (Faculty of Arts)* (Anindya Sen)	SEN-Regular
8. Other Business	Information
9. Next Meeting: 5 October 2020 from 10:30 a.m. - 12 noon; location TBD	Information

\*material attached

“SGRC” to be approved on behalf of Senate  
“SEN” to be recommended to Senate for approval

8 September 2020

Kathy Winter, PhD, CPsych  
Assistant University Secretary

# Excerpt from Senate Bylaw 1

## 8. Declarations of conflict of interest

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8.01	At the beginning of each meeting of Senate or any of Senate’s committees or councils, the chair will call for members to declare any conflicts of interest with regard to any agenda item. For agenda items to be discussed in closed session, the chair will call for declarations of conflict of interest at the beginning of the closed portion of the meeting. Members may nonetheless declare conflicts at any time during a meeting.
8.02	A member shall be considered to have an actual, perceived or potential conflict of interest, when the opportunity exists for the member to use confidential information gained as a member of Senate, or any of Senate’s committees or councils, for the personal profit or advantage of any person, or use the authority, knowledge or influence of the Senate, or a committee or council thereof, to further her/his personal, familial or corporate interests or the interests of an employee of the university with whom the member has a marital, familial or sexual relationship.
8.03	Members who declare conflicts of interest shall not enter into debate nor vote upon the specified item upon which they have declared a conflict of interest. The chair will determine whether it is appropriate for said member to remove themselves from the meeting for the duration of debate on the specified item(s).
8.04	Where Senate or a committee or council of Senate is of the opinion that a conflict of interest exists that has not been declared, the body may declare by a resolution carried by two-thirds of its members present at the meeting that a conflict of interest exists and a member thus found to be in conflict shall not enter into debate on the specified item upon which they have declared a conflict of interest. The chair will determine whether it is appropriate for said member to remove themselves from the meeting for the duration of debate on the specified item(s).

**University of Waterloo**  
**SENATE GRADUATE & RESEARCH COUNCIL**  
**Minutes of the 11 May 2020 Meeting**  
**[in agenda order]**  
**Microsoft Teams Meeting Videoconference**

**Present:** David Billedeau, Jeff Casello, Amelia Clarke, Peter Deadman, Bernard Duncker, Ana Ferrer, Nathan Funk, Rhona Hanning, Alison Hitchens, Lauren Meliss Holt, Julie Joza, Adam Kolkiewicz, Anita, Layton, Dmitrii Marin, Daniel Martel, Bruce Muirhead, Kirsten Müller (for Daniela O’Neill), Liz Nilsen, Jack Rehder, Max Salman, Naima Samuel, Siva Sivoththaman, Richard Staines, Shirley Tang, Kareem Tarek Mostafa, Shawn Wettig, Kathy Winter (secretary)

**Resources:** Trevor Clews, Jennifer Kieffer, Carrie MacKinnon, Amanda McKenzie, Alyssa Voigt.

**Guests:** Liz Meiering

**Regrets:** Charmaine Dean\*, David Clausi\*, Mike Szarka\*.

**Organization of Meeting:** Jeff Casello, co-chair of the council, took the chair, and Kathy Winter acted as secretary. The secretary advised that due notice of the meeting had been given, a quorum was present, and the meeting was properly constituted.

## **1. DECLARATIONS OF CONFLICT OF INTEREST**

No conflicts of interest were declared.

## **2. MINUTES OF 13 APRIL 2020 AND BUSINESS ARISING**

By consensus, the minutes were approved as distributed.

## **3. CO-CHAIRS’ REMARKS**

Casello reported: (a) Fall 2020: preliminary model includes remote learning and some on-campus activity (e.g., labs, research) – all in accordance with public health directives, protocols, and legislation, (b) Research: critical lab research requests continuing to be received; field research applications are also continuing to be received and reviewed – also all in accordance with public health directives, protocols, and legislation; contact Mike Szarka for assistance regarding any faculty who is unfunded by the Tri-agency at this time, and (c) Scholarships and Awards: 62 NSERC; 17 SSHRC; CIHR – awaiting responses; Banting – delayed; AMTD – shortlist has been made and interviews being arranged; Doctoral completion awards awaiting final approval and will be available during spring and at least into fall term 2020. Council was reminded to have their constituents contact Jana Carson at IAP regarding COVID-19 related academic planning survey activity.

## **4. ACADEMIC PROGRAM REVIEWS**

**a-b.** Items were received as information.

**c. Two-Year Progress Report: Guelph-Waterloo Centre for Chemistry and Biochemistry.** Council heard a motion to endorse the Two-Year Progress Report: Guelph-Waterloo Centre for Chemistry and Biochemistry on behalf of Senate, as presented. It was noted that the program was reviewed and approved at the University of Guelph given that current directorship (Meiering) is from that institution. Wettig and Müller. Carried.

## **5. CURRICULAR SUBMISSIONS**

**a. Arts.** Council heard a motion to recommend to Senate to approve the conversion of the Master of Digital Experience Innovation (MDEI) program from its current in-person, on-campus delivery mode to a leading-edge hybrid degree program with most course elements converted to online delivery, effective 1 September 2021, as presented. It was emphasized that the program will ensure appropriate guidance and timelines are in place to support ethics approval of capstone projects. Nilsen and Ferrer. Carried. This SGRC recommendation was conditional on verification of Provost’s approval of the program, which was confirmed on 15 May 2020. Council heard an omnibus motion to approve items ii to vi, as presented. Nilsen and Ferrer. Carried.

## **b. Engineering**

Effective 1 September 2020, and as presented, Council heard a motion to recommend to Senate:

- to approve the updating of the Master of Engineering (MEng) degree requirements in Mechanical and Mechatronics Engineering (MME) to include 1 new specialization.
- to approve discontinuation of the (type 3) Graduate Diploma (GDip) in Green Energy (direct entry).
- to approve the discontinuation of the (type 2) Graduate Diploma (GDip) in Green Energy.

Sivoththaman and Kolkiewicz. Carried. Council heard a motion to approve items 2 (Sivoththaman and Kolkiewicz. Carried.) and 3 (Sivoththaman and Holt. Carried.), as presented.

**c. Mathematics.** Council heard a motion to approve Applied Mathematics items 1 and 2, as presented. Kolkiewicz and Wettig. Carried. Council heard a motion to approve Pure Mathematics items 1 and 2, as presented. Kolkiewicz and Joza. Carried.

**d. Science.** Council heard a motion to recommend to Senate to approve the addition of a course-based MSc in Physics with a specialization in Quantum Technology, effective 1 September 2020, as presented. Wettig and Duncker. Carried. Council heard a motion to approve Pharmacy items a and b, as presented. Wettig and Tarek Mostafa. Carried. Council heard a motion to approve Chemistry items a and b, as presented. Impetus for change is to promote early development of foundational skills (e.g., writing and literature search). Wettig and Sivoththaman. Carried.

## **6. GRADUATE STUDIES ACADEMIC CALENDAR CHANGES**

Council heard a motion to recommend to Senate to approve a Graduate Studies' Academic Calendar change under Regulations (i.e., Enrolment and Time limits), effective 1 September 2020, as presented:

- Add required to withdraw regulations. **Rationale:** Required to withdraw regulations are being added to the Graduate Studies Academic Calendar to provide clarity and information for students, faculty, and staff on processes that already occur. Müller and Sivoththaman. Carried.

By e-vote (15 May 2020), Council heard a motion to recommend to Senate to approve an additional Graduate Studies' Academic Calendar change also under Regulations (i.e., Enrolment and Time limits) and also effective 1 September 2020, as presented:

- Update voluntarily withdraw regulations. **Rationale:** Voluntarily withdraw regulation updates are being made to the Graduate Studies Academic Calendar to provide more clarity and information for students, faculty, and staff on processes that already occur. Clarke and Wettig. Carried.

## **7. GRADUATE AWARDS**

Council received one item for information, as presented.

## **8. OTHER BUSINESS**

There was no other business.

## **9. NEXT MEETING**

The next meeting will be held Monday 14 September 2020 from 10:30 a.m. to 12 noon; Microsoft Teams. The 8 June 2020 SGRC meeting was cancelled.

29 May 2020

Kathy Winter, PhD, CPsych,  
Assistant University Secretary

## Handling of Final Assessment Reports & Two-Year Progress Reports related to academic program reviews

### Introduction

Waterloo's Senate Undergraduate Council (SUC) and Senate Graduate and Research Council (SGRC) have a duty to consider all aspects relating to the academic quality of undergraduate studies and graduate studies within the University. As described in Waterloo's Institutional Quality Assurance Process ([IQAP](#)), documentation emerging from the [cyclical program review](#) process includes:

- [Final Assessment Report](#), which summarizes the self-study, external reviewers' report, program response, and implementation plan, and
- [Two-Year Progress Report](#), which reports on progress related to the implementation plan.

Final Assessment Reports (FARs), require two SUC or SGRC members to review the report, whereas, Two-Year Progress Reports only require one SUC or SGRC member, although at the SUC/SGRC Chair's discretion, a second reviewer may be sought. In order to ensure that student representatives have the opportunity to review each report, the WUSA VP, Education and GSA President receive these documents in advance for information. Any questions or concerns they might have can be raised and addressed, if needed, prior to the report being approved at SUC/SGRC. This review process is coordinated by the Quality Assurance (QA) Office.

To promote transparency and foster integrity in the review process, reviewers should not be members of the Faculty or Affiliated and Federated Institutions of Waterloo (AFIW) from which the report originates.

### Assessment

Reviewers will consider a series of **guiding questions** (see below) in arriving at their recommendation for revision or approval to SUC or SGRC. Before reporting to SUC or SGRC, reviewers will ask questions and share their observations, as well as any concerns they have identified with the report, to the Quality Assurance Office, who will then connect with the Chair or Director of the program. The FEDS and GSA representative will also receive these reports for information prior to submission to SUC/SGRC.

The Quality Assurance Office will ensure that any revisions to the reports are completed by the Chair or Director of the program, prior to the QA Office submitting the report for approval at a SUC or SGRC.

#### Does the Final Assessment Report:

- 1) Include a credible implementation plan that not only addresses the substantive issues identified from the program review process but also identifies clearly:
  - What actions will follow from specific recommendations?
  - Who will be responsible for acting on those recommendations?
  - Who will be responsible for providing resources?
  - Priorities for implementation and realistic timelines for initiating and monitoring actions?
- 2) Provide a rationale as to why a recommendation(s) will not be pursued?

**Does the Two-Year Progress Report:**

- 1) Clearly describe progress achieved on the various action items in the implementation plan?
- 2) Explain convincingly any circumstances that would have altered the original implementation plan?
- 3) For items that are behind schedule, propose an amended implementation schedule that is reasonable and credible?
- 4) Address significant developments or initiatives that have arisen since the program review process, or that were not contemplated by the program review process?

The program Chair or Director (or their chosen delegate) will attend the SUC or SGRC meeting to address any questions or concerns that might arise during SUC/SGRC.

SUC's and SGRC's responsibility will be to focus on the overall credibility and feasibility of the report and the proposed plan of action – seeking to uncover, for example, unexplained disjunctions between the reviewers' recommendations and the program's response – as opposed to the minutiae of course content and curriculum structure.

A Final Assessment Report or Two-Year Progress Report that is approved by a majority vote of SUC/SGRC will be submitted to Senate for information. Should the discussion at SUC or SGRC reveal issues of concern that require revision, the Quality Assurance Office will work with the program Chair or Director to address the concern(s). If minor revisions are needed, the report will be edited and then it will proceed to Senate for information without re-approval from SUC/SGRC; however, any major revisions will require SUC/SGRC review and approval.

**Status of Reports under Review**

A summary of the status of all reports under review, including reports for which the QA Office is seeking reviewers, can be found at the following link:

<https://uwaterloo.ca/academic-program-reviews/status-reports-under-review>

# Two-Year Progress Report

## Pharmacy (MSc, PhD)

### March 2020

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#### Background

The self-study document for the cyclical review of the graduate programs (MSc, PhD) in the School of Pharmacy (SOP) was submitted in June of 2016. The external review and site visit took place on November 7-8, 2016. This response will specifically address the recommendations from the external reviewers, which were detailed in the Final Assessment Report.

#### Progress on Implementation Plan

The following section briefly describes the status of each recommendation. The updated Implementation Plan based on the status of the recommendations and our progress thus far is presented in Table 1.

#### Recommendations

1. We recommend the School to be pro-active and reach out to the Faculty of Science to identify Canadian Foundation for Innovation (CFI) opportunities and secure funding allocations.

Status: in progress

Details: The SOP was successful in receiving a CFI allocation that allows us to submit a CFI application for the Fall 2016 competition. This CFI application was not successful. In September 2017, our newest faculty member brought a CFI to the University of Waterloo and has used it for development of a dedicated computing infrastructure for big data analytics in health outcomes. We will continue to examine this as a viable funding mechanism.

2. We recommend use of a shuttle system or allocation of transportation funds to individual graduate students to facilitate transport of supplies and movement of students between the main campus and the School

Status: completed

Details: The SOP has an arrangement with a local taxi company to transport graduate students to the main campus for academic purposes at no charge to the students. In addition, all UW students have access to Grand River Transit (this service is included in the graduate student fees for full-time students, allowing them access to the transit system at no additional

cost), which operates multiple bus routes that stop at both the Pharmacy building and main campus, providing excellent transportation options to graduate students. In 2019, a new light rail transit system began operation within the Region of Waterloo, with stops right outside the Pharmacy building and on the main campus; this provides even more transportation options for students.

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

Status: completed

Details: Per their letter of offer, all students are guaranteed full funding for the duration of their studies (2 years – MSc; 4 years – PhD). In the event that the supervisor faces financial difficulties, the School must supplement. The School has implemented a process for approving bridging funding for these situations.

The new MPHARM is a revenue-generating endeavour through tuition. No stipend is offered to the students thus no guaranteed stipend is needed.

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

Status: completed

Details: The Faculty of Science offered [Graduate Student Incentives](#) for incoming domestic PhD students in Fall of 2018 and the SOP benefitted from this with its largest intake of students to date (n=10). Further, we continue to be engaged with the Faculty of Science to explore additional opportunities as they arise.

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

Status: in progress

Details: Our [website](#) is one of the first places a prospective student is likely to go. In Fall 2017, we redesigned the website to ensure that all resources were visible, such as the student handbook which is now complete.

The Faculty of Science is also active in this area with a Grad Open House event being delivered in both 2017 and 2018; both of which Pharmacy faculty attended and presented. Our faculty have also had recruitment booths at field-specific national and international conferences and

we are actively discussing options for portable recruitment brochures (e.g., a postcard) for faculty to take to conferences.

We have recruited five students to our graduate program from the PharmD program. We plan to continue actively recruiting these students through in-class presentations and independent-study elective courses.

In addition, the School has added three new research intensive faculty in the past couple of years and these faculty will attract new graduate students. As a result of new hires in data-driven fields, the needs of faculty have changed significantly in the past 5 years. In response, the School built the Health Services & Applied Research Lab housed in the Pharmacy building. This space features a secure entrance, graduate student offices, patient counselling and examination rooms, a meeting room, and a controlled-entry computer lab with dedicated workstations. The addition of this lab will help our faculty to attract and provide a specialized training space for new graduate students.

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

Status: in progress

Details: Since the time of the review, the School of Pharmacy (SOP) has developed a proposal for a Master of Pharmacy in Advanced Pharmacy Practice (MPHARM). The program is an advanced professional graduate-level program that will train advanced pharmacist practitioners for careers in clinical practice, education and clinical research. The program includes required and elective courses, a clinical practicum and completion of a non-thesis research project. Full-time students will be expected to complete the requirements in six semesters. The program will predominantly be delivered in-person with an emphasis on problem-based learning as the pedagogical model in the required courses. The clinical practicum will take place in a variety of health care settings including both institutional and primary care sites and will not use the co-op model. The students will pay higher fees consistent with those charged for other professional pharmacy programs in Canada.

The program proposal was developed throughout 2017 with internal and external stakeholder input and approved at School of Pharmacy Council on May 24, 2018. Ministry approval was given in summer of 2019 and the first cohort will begin in Fall 2020.

The required courses in this program include:

PHARM 651: Advanced Principles of Medication Management 1 – Students will learn advanced principles of drug action, pharmacodynamics, pharmacogenomics,

pharmacokinetics and pharmacotherapeutics and will apply these principles to identifying and resolving drug-related problems in a variety of therapeutic areas. A problem-based learning approach will be used to maximize student learning.

PHARM 652: Advanced Principles of Medication Management 2 – This course further expands the skills and knowledge developed by students in Advanced Principles of Medication Management 1.

PHARM 653: Methods in Clinical and Applied Research - This course will provide an overview of common research methods used to address questions in clinical and translational research. Research ethics and responsible conduct of research will be addressed. The course will also cover basic concepts in successful grant writing.

PHARM 654: Critical Appraisal and Evidence-based Practice – Using a journal club format, students will identify and analyze papers from the primary literature. Skills related to critical appraisal and evidence-based practice will be developed. Students will also have the opportunity to develop communication skills related to presenting scientific literature.

PHARM 655: Physical Assessment and Clinical Laboratory Testing – Fundamental skills of physical assessment and the basic understanding and interpretation of diagnostic testing, imaging and clinical laboratory tests relevant to monitoring the effects and adverse events associated with the use of medications will be covered (lecture and laboratory).

Biostatistics Requirement – Students must complete an approved course in biostatistics or quantitative data analysis offered in the SOP or other departments at the University of Waterloo.

In addition to the courses that will make-up the MPHARM program, additional courses are being developed for the MSc and PhD programs. PHARM 618: Pharmacoeconomics has been developed and delivered as a Special Topics course as it makes its way through the approval process within the University. Further, there have been ongoing face-to-face discussions between our pharmacoepidemiology, health services research and outcomes and pharmacoeconomics SOP faculty and colleagues in Statistics & Actuarial Science and School of Public Health & Health Systems to plan for further opportunities for cross-listing courses in shared areas of interest. Cross-listing has been successful for PHARM 614-STATS 814: Systematic Review and Meta-Analysis and we will use this as a benchmark.

Further, in September 2017, the School hired another faculty member in the area of health outcomes such that clinical pharmacy, pharmacoepidemiology and social and administrative science faculty now represent close to 50% of the SOP full-time research faculty. With the implementation of the MPHARM, our collaborations with other University Departments and our now full complement of research faculty, course offerings will increase in quantity and consistency.

7. The self-study asked for advice around building industrial partnerships and incorporating experiential learning into the graduate program. Reviewers recommended "... a duration of 4-6 months for this program towards the end of PhD studies upon completion of experimental phase of the PhD thesis and before the thesis defence when all program requirements are completed."

Status: in progress

Experiential education in graduate studies is within the new University Strategic Plan 2020-2025 as well as in the School of Pharmacy Strategic Plan 2020-2025. While this is something the SOP is interested in implementing, we are awaiting a University or Faculty level framework to work within. Neither the University nor the Faculty currently have such a framework however the SOP will be supportive of such an initiative.

Explain any circumstances that have altered the original implementation plan

The original implementation plan has been used by the School as a guidance document in the past 2 years. The major item identified by the site visit team, which was the lack of clinically-oriented courses, is addressed with the development of the MPHARM program and therefore the availability of five additional clinically-oriented courses that are available to all graduate students (MPHARM, MSc, PhD) in the School. Lesser items have also been reviewed and acted upon as presented in this report. There have been no extenuating circumstances hindering our ability to follow through on the implementation plan.

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

The SOP is in the process of developing and implementing an extensive Programmatic Assessment Plan. The Assessment Plan is a working document to drive a quality assurance process in all areas of the School (PharmD, MSc, MPHARM and PhD programs, staff and faculty development, student services) and is required by the PharmD accreditation body, the [Canadian Council for the Accreditation of Pharmacy Programs \(CCAPP\)](#). The graduate programs will have a functioning plan and the SOP will begin implementing this plan in 2020.

The planning and building of the Health Services & Applied Research Lab was a new initiative since the review. This lab addresses some of the needs of our faculty and graduate students who are engaged in clinical, quantitative health services or data-intensive research and provides a physical space for cross-faculty collaboration and graduate training.

Table 1. Updated Implementation Plan

	Recommendations	Proposed Actions	Responsibility for Leading and Resourcing (if applicable) the Actions	Timeline for addressing Recommendations
1.	We recommend the School to be pro-active and reach out to the Faculty of Science to identify CFI opportunities and secure funding allocations.	Engage with Associate Dean, Research to identify CFI opportunities and SOP faculty to identify need	Associate Director, Graduate Studies and Research  Research Fellow	Ongoing. The Research Fellow (Edginton) is active in the Faculty of Science Research Fellows group where this is regularly discussed.
5.	Development of a recruitment strategy for attracting excellent, prospective graduate students is strongly recommended.	Work with Faculty of Science on Faculty-wide recruiting strategies  Develop in house recruiting materials	Associate Director, Research and Graduate Studies  Associate Director, Research and Graduate Studies	Ongoing  MPharm postcard created in Nov 2019
6.	The School should focus on developing (or offering on a more regular basis) additional graduate courses especially in the clinical and pharmacy practice areas.	Secure approval for MPharm and enroll students    Continue discussions with other faculties re: cross-listing courses	Associate Director, Research and Graduate Studies  Hallman Director, School of Pharmacy  Associate Director, Research and Graduate Studies	Formal approval given in summer of 2019  2019-2020: Course development Fall 2020: First offering of courses  Ongoing

Date of next program review:

2023-2024  
Date

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Signatures of Approval:



David Edwards, Hallman Director  
cn=David Edwards, Hallman Director, o,  
ou=School of Pharmacy,  
email=david.edwards@uwaterloo.ca, c=CA  
2020.05.11 12:22:39 -04'00'

May 11, 2020

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Chair/Director

Date

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AFIW Administrative Dean/Head (For AFIW programs only)

Date

**Robert P.  
Lemieux**



Digitally signed by Robert P.  
Lemieux  
Date: 2020.05.14 14:09:06 -04'00'

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Faculty Dean

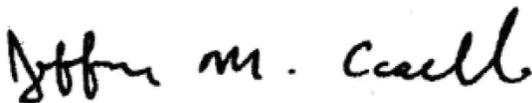
Date

Note: AFIW programs fall under the Faculty of ARTS; however, the Dean does not have fiscal control nor authority over staffing and administration of the program.

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

Date



May 27, 2019

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

Date

**Two-Year Progress Report: Pharmacy**

**Name of Reviewer: Ana Ferrer**

**Date: 3/18/2020**

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**Does the Two-Year Progress Report:**

- 1. Clearly describe progress achieved on the various action items in the implementation plan?  **Yes**     **No**
- 2. Explain convincingly any circumstances that would have altered the original implementation plan?  **Yes**     **No**
- 3. For items that are behind schedule, propose an amended implementation schedule that is reasonable and credible?  **Yes**     **No**
- 4. Address significant developments or initiatives that have arisen since the program review process, or that were not contemplated by the program review process?  **Yes**     **No**

**General Comments**

**The report has adequately responded to the items raised by reviewers**

# Final Assessment Report

## Chemical Engineering (MEng, MAsC, PhD)

### December 2019

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#### Executive Summary

External reviewers found that the Chemical Engineering programs (MEng, MAsC, PhD) delivered by the Department of Chemical Engineering were in good standing. Quoting from the reviewers' report:

*“Overall, the graduate programs in the Department of Chemical Engineering are strong. They have excellent faculty that have a broad range of expertise and research across the discipline; several of their faculty are exceptionally productive in terms of students, publications and patents. They have high quality administrative staff who have a strong service orientation to the students in the program. They are fortunate to have excellent physical space and facilities in the new building along with excellent technical support staff for their research and education.”*

A total of 10 recommendations were provided which focused on curriculum and program delivery, student recruitment, and research funding. In response, a plan was created outlining specific actions proposed to address each recommendation, as well as a timeline for implementation. The next cyclical review for this program is scheduled for 2024-2025.

#### Student Complement over the past three years

	MEng	MAsC	PhD
2015-2016	72 (42 new)	66 (25 new)	89 (25 new)
2014-2015	66 (32 new)	66 (25 new)	90 (15 new)
2013-2014	72 (39 new)	68 (29 new)	95 (17 new)

#### Background

In accordance with the University's Institutional Quality Assurance Process (IQAP), this final assessment report provides a synthesis of the external evaluation and the internal response of the Chemical Engineering programs (MEng, MAsC, PhD) delivered by the Department of Chemical Engineering. A self-study (Volume I, II, III) was submitted to the Associate Vice-President, Graduate Studies and Postdoctoral Affairs on March 31, 2017. Volume I presented the program descriptions and learning outcomes, and an analytical assessment of these three programs, including the standard data package prepared by Institutional Analysis & Planning (IAP). The CV

for each faculty member associated with the delivery of the programs was included in Volume II of the self-study.

From Volume III, arm's-length external reviewers were selected. Dr. D. Grant Allen, Professor and Chair of Chemical Engineering and Applied Chemistry, University of Toronto, and Dr. Peter Englezos, Professor and Department Head of Chemical and Biological Engineering, University of British Columbia, were chosen by the Associate Vice-President, Graduate Studies and Postdoctoral Affairs. An internal reviewer from the University of Waterloo, Dr. Daniel O'Connor, Department of Sociology and Legal Studies, was also selected.

Reviewers appraised the self-study documentation and conducted a site visit to the University on April 24-25, 2017. The visit included interviews with the Vice-President, Academic & Provost; Associate Vice-President, Graduate Studies and Postdoctoral Affairs; Acting Dean of Engineering; Faculty of Engineering Associate Dean of Graduate Studies; Chair of the Department of Chemical Engineering; Associate Chair, Graduate Studies of Department of Chemical Engineering; faculty members, staff and current graduate students. The reviewers also had an opportunity to meet with the liaison librarian and tour the facilities.

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

### **Program Characteristics**

**MEng in Chemical Engineering:** The Master of Engineering program advances students' knowledge through graduate-level courses and exposure to recent developments in their fields of interest. The primary objective is to enhance the academic and professional qualifications of students. This objective is achieved through course work and attendance at research seminars delivered by invited speakers.

**MASc in Chemical Engineering:** The Master of Applied Science program trains students to carry out original research and to enhance their academic and professional qualifications through graduate-level courses and research at a challenging and advanced level. Through a combination of course work and a Master's thesis, the program provides students with the background for careers in industry and government, primarily in the area of research and development and/or entry into a PhD program. Students graduating with a MASc degree from Chemical Engineering's thesis program will have a strong background in their field of specialization and related areas.

**PhD in Chemical Engineering:** The PhD program trains students to conduct independent original research and provides them with strong theoretical and fundamental backgrounds in their fields of interest. This will prepare them for University teaching and research careers and/or careers in industry or government, primarily in high-level research and development positions.

It is also expected that research carried out by PhD students during the course of their programs will make significant contributions to the Chemical Engineering discipline through, for example, publications in high-impact journals. These objectives are achieved through a combination of formal course work, a comprehensive examination to be completed by the end of the student's fourth term in the program, and a research program leading to a dissertation. PhD candidates conduct research under the supervision of faculty. The program of research and the resulting dissertation must demonstrate a critical awareness and understanding of the literature in the research field, exhibit a capability of defining original and useful research problems, and a capability of independent thought in solving a research problem.

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

#### **Strengths**

- Facilities: Engineering 6, home to the Department of Chemical Engineering, features 49 state-of-the art research labs for graduate students and faculty, bright appointed offices, comfortable student and faculty lounges, and spacious classrooms with modern technology. This new space provides an excellent home base for graduate students; its sense of place boosts the profile and credibility of work and, relatedly, the sense of pride felt by the students who study Chemical Engineering.
- Faculty: The Department of Chemical Engineering has developed a strong and multi-talented faculty with a wide range of research interests, experience and strengths, which facilitates interesting and useful research. As a whole, the faculty have well-respected education and experience, which attracts high caliber students, and the ability to encourage and guide students through effective classroom lessons and hands-on laboratory research.

#### **Challenges**

- Perception: The Department is challenged by the perception of the quality of graduate studies, compared to its excellence in undergraduate programs. The Department has been working to enhance graduate studies through strengthened recruitment efforts, additional in-house promotional activities and increased efforts to secure funding for high-profile research projects. These efforts will be maintained while additional ways to enhance the graduate program will be considered.

#### **Weaknesses**

- Research Funding: The capacity to conduct innovative research is dependent upon the Department's ability to secure research funding. While most faculty have made consistent efforts to attain research funding over the years, only a few pursued the large research grants that would benefit the Department as a whole. Canada Research Chairs have taken a leadership role in identifying and pursuing research funding for large-scale projects that

will improve the Department's ability to enhance the quality of the program, provide better resources and attract higher-caliber students.

### **Summary of key findings from the external reviewers**

Overall, the reviewers found that the graduate programs in the Department of Chemical Engineering are strong for many reasons: excellent faculty who are productive in terms of students, publications and patents; high quality administrative staff who have a strong service orientation to students in the programs; and excellent physical space and facilities. The Department has an impressive focus on safety, a key element of a graduate program in the discipline.

### **Program response to external reviewers' recommendations**

#### **Recommendations**

1. The Department should engage in a process that looks at its stated learning outcomes for their graduate programs, maps them to specific aspects (e.g. theses, courses) of each of the programs as well as methods of assessment (e.g. grades, term reports, committee meetings, qualifiers/defences, seminars, etc). This can then provide a framework for examining the various elements of their programs including core course requirements, theses, etc.

#### **Response**

The Graduate Review Committee (GRC) reviews high level learning outcomes for Chemical Engineering's graduate programs and some courses within them. The Department will continue to use high level learning outcomes to guide curriculum changes, and will start providing more details at the course level. Beginning with the MEng program, CHE will implement a detailed learning outcome process, as is used in the undergraduate CHE program. Once learning outcomes have been identified for MEng courses, the Department will move on to the MASc and PhD courses.

#### **Actions**

- Continue to refine existing high-level outcomes and create new ones, as appropriate, when courses are reviewed and updated, and when justifying the creation of a new course.

#### **Status**

The Graduate Review Committee (GRC) continuously reviews high level learning outcomes as part of a framework for program review.

As a direct result of this review, the graduate curriculum was significantly enhanced in the Fall 2019 term. Changes include the addition of formalized training in engineering practice,

research ethics and methods as well as some changes to course requirements to focus on foundational chemical engineering concepts and give students more options.

The Department is working on learning outcomes for an “MEng with a purpose” program, which will leverage departmental strengths to provide advanced training relevant to the chemical engineering industry. As part of this program development, the Department is investigating learning outcomes at the course level and attempting to establish “universal” course outlines to ensure consistency in course delivery.

2. The Department should undertake a review of their course requirements, including their core courses and the held with courses. We suggest that could be done with the elements identified in Recommendation 1 in mind. We also suggest the Department consider a course in Thermodynamics, perhaps connected to the area of energy systems, a subject that would cover a core area and also likely be very attractive to many students given the significant research going on in energy conversion and storage. In addition a course on Research Methods may be considered.

### **Response**

Between June 2017 and May 2018, the Department undertook extensive consultation to review course requirements and the core course model. This exercise culminated in actions, several of which have already begun, that address many of the points recommended by the reviewers.

### **Actions**

- Create CHE 600 – Engineering and Research Methods, Ethics, Practice, and Law. This course will be mandatory for all graduate students (PhD, MASc and MEng).
- Replace the core course list with two prescribed courses foundational to chemical engineering: CHE 601 Theory and Application of Transport Phenomena and CHE 602 Chemical Reactor Analysis.
- Revise degree requirements for PhD, MASc and MEng programs.
- Offer a course in Thermodynamics. The exact timing of the first offering depends on resource availability, but the Department is aiming to deliver the course in 2019.
- Continuously investigate program improvement, particularly in light of the major changes described above.
- Align the program improvement process with the learning outcomes assessments described in Recommendation 1.

### **Status**

All action items, except for the delivery of a Thermodynamics course, are complete. The courses CHE 600 Engineering and Research Methods, CHE 601 Theory and Application of

Transport Phenomena, and CHE 602 Chemical Reactor Analysis will be delivered for the first time during the 2019/2020 academic year.

Starting in 2019, the GRC composition was amended to include a graduate student who represents the Chemical Engineering Graduate Student Association (CEGSA). Each month, the GRC meets to look for ways to improve the graduate programs. They review, discuss and make decisions on various aspects, which are then presented and discussed at monthly Departmental meetings before being taken to a vote. In addition, the Department hosts an annual Departmental retreat to discuss more strategic aspects of the programs.

3. The Department continue to hire excellent faculty consistent with our understanding that there are five open positions. Particular attention should be made to reach out to women faculty to be more in line with the President's initiatives and the fraction of women students in the graduate program.

#### **Response**

The Department is committed to continue increasing the number of female faculty members. Some progress has been made: over the past five years, the proportion of female faculty members has more than doubled to 13.3%. It was less than 6%.

#### **Actions**

- Continue following current faculty hiring practices, including the on-going effort to hire more qualified women to join the department.

#### **Status**

The Department continues its mandate to hire the best person for the job and has been very successful in attracting highly qualified female faculty members. In just the past year, they hired three tenure-track female faculty members. Over the past two years they also hired two female lecturers who are anticipated to become continuing lecturers. Over the past seven years, the Department hired more female faculty members (six, including the two lecturers) than male ones (four).

4. The Department should revise the table listing each faculty member's fields (Table 3) to include more than one field allocated per faculty to more accurately reflect the breadth and depth of expertise. In addition to revamping this, the Department might consider ways to articulate their particular areas of application strengths to prospective students.

#### **Response**

The Chemical Engineering website includes a section on research areas that lists the department's high-level research areas and the faculty members who work within them: <https://uwaterloo.ca/chemical-engineering/research/research-areas>. This page lists faculty

members in multiple areas, as per their research focus, and demonstrates the breadth and depth of faculty expertise. Indeed, more can be done to promote the department and articulate its strengths to prospective students.

This recommendation touches on the broader and already recognized need for enhanced promotion of the Department, including its graduate studies and research. The department is in the process of obtaining resources to better promote all aspects of its graduate programs.

### **Actions**

- Hire personnel or redefine the roles of current team members to perform communication and marketing duties, including
- promoting research and graduate studies;
- enhancing the Department's website, including the research and graduate studies information;
- articulating each faculty member's expertise;
- helping faculty members without a personal research website to create one, and;
- helping to keep all faculty members' research websites current.

### **Status**

The Department has changed the job description of a qualified administrative staff member to include promotion of the Department, including its strengths and faculty member's breadth and depth of experience. This person will also help organize outreach activities for prospective graduate students. This change in job duties will take place in the Winter 2020 term.

5. The Department consider if there might be opportunities to build on their excellent reputation of co-op at the undergraduate level and see how it might be used to define a unique strength in any one or more of their three graduate degree programs.

### **Response**

Although this may appear to be a good opportunity, the Chemical Engineering Department is cautious of embarking on a graduate-level co-op program because it may reduce the number of opportunities available to senior undergraduate Chemical Engineering students, for whom co-op is a mandatory requirement for graduation.

While economic cycles influence the number and quality of co-op jobs available for all students, variability in the oil and gas sector further affects the opportunities available for chemical engineering students. In times when budgets are low and co-op jobs are scarce, employers may prefer to hire the more educated and experienced graduate students for their work terms, leaving qualified undergraduate students without the work term employment

they need to graduate.

Ideally, there would be enough jobs for both undergraduate and graduate students to secure suitable co-op employment; however, experience with the cyclic nature of the job market has shown that there are times when few co-op opportunities are available. Opportunities for undergraduate students must be protected.

### **Actions**

- Remain open to the possibility of expanding co-op into one or more graduate programs, if it can be done without adversely affecting senior undergraduate students' co-op positions.

### **Status**

The Department has made no effort to initiate a graduate co-op program.

Graduate co-op is not a priority now and, given the Department's efforts to address challenges associated with undergraduate co-op employment and its Graduate Review Committee's focus on enhancing the graduate program through MEng specializations and new mandatory courses, insufficient time is available to investigate the possibility of a graduate co-op program.

6. In order to enhance the pool of qualified PhD students and reduce time to completion, the Department consider new methods to determine which qualified students in an MASc would be able transfer to a PhD. There is some concern that the current method is too rigid and that this may be preventing suitable MASc students from transferring to the PhD. This could be done in conjunction with Recommendation 1, articulating the learning outcomes for the PhD.

### **Response**

Good progress has already been made in this regard, especially since the Faculty of Engineering became more open to allowing departments to admit students directly to PhD. A number of CHE MASc students have transferred to the PhD program over the past couple of years. The recent review and clarification of all CHE degree course requirements should reduce the complexity associated with switching degrees mid-stream, making it easier for more students to transfer.

### **Actions**

- Continue facilitating the transfer of MASc students to the PhD program. Facilitate and promote direct admit to PhD.
- Devise clear rules to increase the likelihood that the Department direct-admit only those students with the grades, aptitude and motivation to succeed in the PhD program.

**Status**

The Department has clear rules regarding pathways from MEng to MAsc, as well as from MEng to PhD. Every year, students follow the University's process for changing programs to transfer from MEng to research programs. This is working very well.

7. The Department explore ways to further maximize their leverage of industrial funding to bring in more funding from other sources (e.g. government). They seem to have an impressive level of industry funding in that it is about the same as their Tri-Council funding, which suggests possible untapped opportunities for further matching/leverage.

**Response**

All faculty members are aware of the matching fund mechanism. In some cases, it has been impossible for faculty members to leverage industrial funding due to the ineligibility of their partner company (e.g. foreign company with little activity in Canada or Ontario) or because some companies explicitly refuse involvement with Tri-Council funding due to concerns about IP handling and/or disclosure.

**Actions**

- Establish a Research Committee to investigate how to better capitalize on available opportunities.

**Status**

Now that the NSERC Alliance program has been established, a working group will investigate the extent of untapped opportunities to leverage industrial funding.

If the results of this investigation suggest that untapped opportunities for additional funding exist, then a research committee will be dedicated to this task. If the results determine that we have exhausted the opportunities for additional funding, then we will not strike a research committee to leverage industrial funding.

8. The Department should develop a space policy that provides flexibility to allow the space allotted to faculty to grow and shrink as their research activity levels shift throughout their careers. Related to this, the Department should continue to look to provide common lab space designed to enhance equipment and technical support sharing.

**Response**

Improving and expanding the common centralized research facility is of high priority to the Department.

**Actions**

- Establish an Analytical Lab Committee to oversee and establish rules and fees for the operation of the centralized facilities.
- Hire a second analytical technician to handle the increased workload associated with expanded centralized facilities.
- Continue refining rules regarding space allocation.

### **Status**

The Department has established rules and implemented a process to commission/decommission research space. Now, budget restrictions have forced the Department to postpone hiring a second analytical technician.

Factors out of the Department's control that affect its hiring budget, including student enrolment, Waterloo Budget Model influences and provincial political decisions, prevent the Department from providing a meaningful timeline for the hiring of a second analytical technician. Meanwhile, the Department will continue to move forward with its efforts to maximize the centralized research space within its current budget.

9. The Department develop incentives for faculty to lead large scale research initiatives, including allocation of CRC chairs, research administration support, etc. This might also be connected to Recommendation 7 to explore increased leverage of industry funds. We note that linking this to CRC chairs is already underway.

### **Response**

Resources to support applications to major grants are already in place at the Faculty of Engineering level.

### **Actions**

- Heighten the expectation for CRC Chairs to lead major grant applications. This is now one of the renewal criteria for CRC Chairs.
- Organize a retreat to address research within the Department.

### **Status**

The Department has a new CRC Tier 1 Chair as of May 1, 2019. Therefore, there are currently two CRC Tier 1 chairs and one CRC Tier 2 Chair.

All CRC Chairs have signed a form regarding their renewal, which includes, among other things, the commitment to lead major collaborative research grants. Discussion regarding strategic research directions began in December 2018 with a dedicated retreat. An immediate consequence of this planning was the selection of our most recent hire, who was favored for her data analytics and deep learning experience over the traditional process system engineering expertise of other candidates.

10. The Department could explore ways to have PhD students interact with other faculty beyond the comprehensive exam and defense. This can provide students and faculty with a broader range of perspectives on their research and also foster collaboration. Examples include having supervisory committee meetings to track progress and provide advice on research and courses, seminars to other students and faculty, etc.

### **Response**

The Department is attempting to increase student/faculty interactions. Discussions are underway with the Chemical Engineering Graduate Student Associate (CEGSA) to identify new opportunities. CEGSA has shown interest in coordinating a bi-annual research symposium, where students can *voluntarily* present their research to their peers and faculty members. Another option is to add a research talk as a milestone for the PhD program. Currently, the research talk is a milestone for MASc students only. From a more social perspective, the Department holds weekly coffee hours so students and faculty members can meet in the Faculty lounge for casual discussion. We will continue to look for other opportunities to increase interaction between faculty and PhD students.

### **Actions**

- Investigate, via the Graduate Review Committee (GRC), the benefits and drawbacks, if any, of formalizing increased interaction between PhD students and other faculty members, through a PhD milestone research talk, for example. Discuss this topic during a departmental meeting in the 2019-2020 academic year, to solicit ideas for increased/improved interactions.

### **Status**

Coffee hours are ongoing and have been reasonably successful in promoting student/faculty interactions. The students, through CEGSA, expressed a desire for stronger, academic related interactions with faculty and a willingness to coordinate such efforts, but have made little progress to that end. Enquiries will be made at upcoming Departmental meetings whether a graduate research colloquium would be of interest, especially if held as mini-symposia on targeted research areas to intensify the benefits.

11. The Department should explore ways to encourage faculty to share some of their best practices in areas related to the graduate program (e.g. student recruitment, mentoring students, etc.). Examples include social gatherings, regular retreats and items that may arise from Recommendations 9 and 10.

### **Actions**

- Organize a Best Practices Committee (independent of the GRC) dedicated to collecting and reporting best practices in research and graduate student recruitment and supervision. This might include a monthly dispatch with links to relevant articles (e.g. highlights from Tomorrow's Professor newsletter), or an overview of the latest collaboration trends (e.g. use tools to chat rather than email).
- Arrange an opportunity to discuss best practices and how to promote them among faculty members. Getting students involved in this improvement process is also considered crucial, so the Chemical Engineering Graduate Student Association (CEGSA) will be represented on the committee.

### **Status**

The issue of graduate student experience was discussed at length at the April 2019 graduate affairs retreat and opportunities for improvement, including graduate supervision, were collected from the group. A summary of the discussion will be converted into a set of suggestions and actionable ideas, then provided to all faculty members.

At the same time, the University has released an updated guide on Graduate Supervision, containing a set of specific expectations for both parties in the student/supervision relationship. Finally, in collaboration with the CEGSA, consultations are underway to solicit ideas for improved interactions as alluded to in item 10.

## Implementation Plan

	Recommendations	Proposed Actions	Responsibility for Leading and Resourcing (if applicable) the Actions	Timeline for addressing Recommendations
1.	Consider learning outcomes	<ul style="list-style-type: none"> <li>Continue to refine existing high-level outcomes and create new ones, as appropriate, when courses are reviewed and updated, and when to justify the creation of a new course.</li> </ul>	Graduate Review Committee	Continuous process, already in place.
2.	Review course requirements, including core courses and held with courses	<ul style="list-style-type: none"> <li>Create CHE 600 – Engineering and Research Methods, Ethics, Practice, and Law. This course will be mandatory for all graduate students (PhD, MASc and MEng).</li> <li>Replace core course list with two prescribed courses foundational to chemical engineering: CHE 601 Theory and Application of Transport Phenomena and CHE 602 Chemical Reactor Analysis.</li> <li>Revise degree requirements for PhD, MASc and MEng programs.</li> <li>Offer a course in Thermodynamics. The exact timing of the first offering depends on resource availability, but aiming to deliver the course in 2019.</li> <li>Continuously investigate program improvement, particularly in light of the major changes described above.</li> <li>Align the program improvement process with the learning outcomes assessments described in Recommendation 1.</li> </ul>	Graduate Review Committee  Graduate Review Committee  Graduate Review Committee  Graduate Review Committee  Graduate Review Committee	Complete – to be offered during 2019/20.  Complete – to be offered during 2019/20.  Complete.  Delayed pending resource availability. Re-evaluate when resources become available. Continuous process, already in place.  Continuous process, already in place.
3.	Hire excellent faculty, with effort to attract women	<ul style="list-style-type: none"> <li>Continue following current faculty hiring practices, including the on-going effort to hire more qualified women to join the department.</li> </ul>	Department Advisory Committee on Appointment (DACA) and faculty members in general.	Continuous process, already in place.

4.	Clearly indicate faculty expertise	<ul style="list-style-type: none"> <li>Hire personnel or redefine the roles of current team members to perform communication and marketing duties, including focusing on the promotion of research and graduate studies. This will include enhancing the presentation of each faculty member's expertise; helping those faculty members without a personal research website to create one and helping keep all research web sites current.</li> </ul>	Chair and CHE Communications Specialist	In progress. Job description of current staff member has been revised. Transition expected in Winter 2020 term.
5.	Consider grad-level co-op	<ul style="list-style-type: none"> <li>Remain open to the possibility of expanding co-op into one or more graduate programs, if it can be done without adversely affecting senior undergraduate students' co-op positions.</li> </ul>	Graduate Review Committee and Undergraduate Review Committee	Reevaluate during 2019-20 academic year.
6.	Facilitate direct admit to PhD	<ul style="list-style-type: none"> <li>Continue facilitating the transfer of MASc students to the PhD program. Facilitate and promote direct admit to PhD.</li> <li>Devise clear rules to increase the likelihood that the Department direct-admit only those students with the grades, aptitude and motivation to succeed in the PhD program.</li> </ul>	Graduate Review Committee  Graduate Review Committee	On-going, already in progress.  On-going, already in progress.
7.	Maximize research funding	<ul style="list-style-type: none"> <li>Establish a Research Committee to investigate how to better capitalize on available opportunities.</li> </ul>	Chair	In progress – pending working group in 2020 to investigate the extent of untapped opportunities.
8.	Accommodate changing research space and laboratory requirements	<ul style="list-style-type: none"> <li>Establish an Analytical Lab Committee to oversee and establish rules and fees for the operation of the centralized facilities.</li> <li>Hire a second analytical technician to handle the increased workload associated with expanded centralized facilities.</li> <li>Continue refining rules regarding space allocation.</li> </ul>	Chair  Chair and Analytical Lab Committee  Space Committee	Complete  On hold due to budget restriction.  On-going, already in progress

9.	Encourage large-scale research	<ul style="list-style-type: none"> <li>• Heighten the expectation for CRC Chairs to lead major grant applications. This is now one of the renewal criteria for CRC Chairs.</li> <li>• Organize a retreat to address research within the Department.</li> </ul>	<p>Chair</p> <p>Research Committee</p>	<p>Complete – through CRC renewal criteria</p> <p>Complete December 2018, discussions on-going.</p>
10.	Support PhD students	<ul style="list-style-type: none"> <li>• Investigate, via the Graduate Review Committee (GRC), the benefits and drawbacks of formalizing increased interaction between PhD students and other faculty members, through a PhD milestone research talk, for example.</li> <li>• Continue the weekly coffee hours for staff and faculty members to meet for casual discussion.</li> </ul>	<p>Graduate Review Committee</p> <p>Chair and Associate Chairs</p>	<p>On-going</p> <p>On-going</p>
11.	Share best practices	<ul style="list-style-type: none"> <li>• Organize a Best Practices Committee (independent of the GRC) dedicated to collecting and reporting best practices in research and graduate student recruitment and supervision. This might include a newsletter with links to relevant articles (e.g. Highlights from Tomorrow’s Professor), or an overview of the latest collaboration tools (e.g. to use tools to chat rather than email).</li> <li>• Arrange an opportunity to discuss best practices and how to promote them among faculty members.</li> </ul>	<p>Chair</p> <p>Best Practices Committee</p>	<p>In progress – graduate student experience was discussed at April 2019 Graduate Affairs retreat. To be converted into suggestions and actionable items and provided to all faculty members.</p> <p>Consultations underway with CEGSA to solicit feedback for improved interactions.</p>

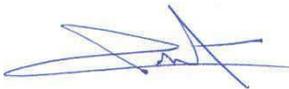
The Department Chair/Director, in consultation with the Dean of the Faculty shall be responsible for monitoring the Implementation Plan.

2024-2025

Date of next program review

Date

**Signatures of Approval**



May 19, 2020

Chair/Director

Date

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

Date



May 20, 2020

Faculty Dean

Date

**Note:** AFIW programs fall under the Faculty of ARTS; however, the Dean does not have fiscal control nor authority over staffing and administration of the program.

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

Date



December 10, 2018

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

Date

**Final Assessment Report: Chemical Engineering (MAsc, MEng, PhD)**

**Name of Reviewer: Naima Samuel**

**Date: 3/9/2020**

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**Does the Final Assessment Report:**

1. Include a credible implementation plan that not only addresses the substantive issues identified from the program review process, but also clearly identifies:
  - The actions that will follow from specific recommendations?  **Yes**  **No**
  - Those who will be responsible for acting on those recommendations?  **Yes**  **No**
  - Those who will be responsible for providing resources?  **Yes**  **No**
  - Priorities for implementation and realistic timelines for initiating and monitoring actions?  **Yes**  **No**
2. Provide rationales for any recommendations that have not been pursued?  **Yes**  **No**

**General Comments**

**The department's efforts towards reviewing program requirements and outcomes, and hiring are clearly articulated. Further efforts are needed in the area of adding a co-op for graduate students, and exploring ways to increase interaction among PhD students and faculty beyond the comprehensive exam and defense.**

**Final Assessment Report: Chemical Engineering (MAsc, MEng, PhD)**

**Name of Reviewer: Simron Singh**

**Date: 2/21/2020**

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**Does the Final Assessment Report:**

1. Include a credible implementation plan that not only addresses the substantive issues identified from the program review process, but also clearly identifies:
  - The actions that will follow from specific recommendations?  **Yes**  **No**
  - Those who will be responsible for acting on those recommendations?  **Yes**  **No**
  - Those who will be responsible for providing resources?  **Yes**  **No**
  - Priorities for implementation and realistic timelines for initiating and monitoring actions?  **Yes**  **No**
2. Provide rationales for any recommendations that have not been pursued?  **Yes**  **No**

**General Comments**

I appreciate that the department has made efforts to offer their responses to our comments. Some issues remain a moving target, and clearly systemic. If Naima is satisfied with responses to her queries, I am comfortable approving this for SGRC.

# Final Assessment Report

## Psychology (BA, BSc, MA, MASc, PhD, Minor)

### December 2019

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#### Executive Summary

External reviewers found that the Psychology programs (BA, BSc, MA, MASc, PhD, Minor) delivered by the Department of Psychology were in good standing.

*“..the undergraduate and graduate Psychology programs are in good standing. The programs provide students with excellent academic experiences that are well supported by outstanding faculty and staff.”*

A total of seven recommendations were provided by the reviewers, touching on improving communication and professional skills outcomes in the undergraduate program and providing increased support and opportunities for teaching and placement opportunities in the graduate program. In response, the program created a plan outlining the specific actions proposed to address each recommendation as well as a timeline for implementation. The next cyclical review for this program is scheduled for 2024-25.

#### Student Complement (All Years)\*

	Undergraduate Students						MA	MASc	PhD
	BA General	BA Honours	BA Honours Co-op	BSc Honours	BSc Honours Co-op	Minor			
Fall 2019	84	334	179	67	47	260	28	12	92
Fall 2018	99	327	168	59	37	260	25	7	82
Fall 2017	115	346	153	64	27	279	27	9	77

\*Active Students Extract pulled from Quest December 12, 2019

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#### Background

In accordance with the University of Waterloo’s Institutional Quality Assurance Process (IQAP), this final assessment report provides a synthesis of the external evaluation and the internal response of the Psychology programs (BA, BSc, MA, MASc, PhD, Minor). A self-study (Volume I, II, III) was submitted to the Associate Vice-President, Academic and Associate Vice-President, Graduate Studies and Postdoctoral Affairs on September 19, 2017. The self-study (Volume I) presented the program descriptions and learning outcomes and an analytical assessment of the programs, including the data collected from a student survey, along with the standard data package prepared by the Office of Institutional Analysis & Planning (IAP). The CVs for each faculty

member with a key role in the delivery of the program(s) were included in Volume II of the self-study.

From Volume III, two arm's-length external reviewers were selected by the Associate Vice-President, Academic and Associate Vice-President, Graduate Studies and Postdoctoral Affairs: Dr. Patrick Bennett, Professor of Psychology, Neuroscience and Behaviour, McMaster University, and Dr. Beverly Fehr, Professor of Psychology, University of Winnipeg.

Reviewers appraised the self-study documentation and conducted a site visit to the University on March 26-27, 2018. An internal reviewer from the University of Waterloo, Dr. Gordon Stuble, Professor of Mechanical and Mechatronics Engineering and Associate Dean, Teaching in the Faculty of Engineering, was selected to accompany the external reviewers. The visit included interviews with the Vice-President, Academic & Provost; Associate Vice-President, Academic and Associate Vice-President, Graduate Studies and Postdoctoral Affairs; Dean of Arts; Arts Associate Dean of Undergraduate Studies; Chair of the Department of Psychology; faculty members and staff. The review team had the opportunity to meet with groups of current undergraduate and graduate students, visit the facilities associated with the programs, and meet with representatives from the Library and Co-operative Education.

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

### **Program characteristics**

**3-year General BA in Psychology:** provides majors with a foundational understanding of core concepts, theoretical perspectives, and methodologies that psychologists use to understand mind and behaviour. In this program, students take a selection of discipline core courses, courses covering basic research methods and basic data analysis, and can select diverse upper-year electives to explore content domains of psychology in greater depth. Students may choose to restrict their electives to concentrate on courses within a particular content domain or they may opt to continue to explore the variety of content domains within the field.

**4-year General BA in Psychology:** provides greater exposure to the knowledge base of the discipline compared to the 3-year General program. In the 4-Year General program, students complete all six discipline core courses to ensure that they have a comprehensive understanding of psychology's various content domains and can recognize the shared and distinct theoretical perspectives and methodologies associated with these core areas. In this program, students also complete a larger set of advanced content courses and a capstone course that explores practical applications of psychological theory and research.

**Honours BA in Psychology:** has the same requirements as the 4-year general degree, but provides additional opportunities that are not available to 4-year general majors. Specifically, Honours BA majors have the option to complete a Research Intensive Specialization involving an additional

four courses that provide advanced training in research methods and design, information literacy, and quantitative analysis. Honours BA majors also have the option to enroll in co-operative education to gain work experience while pursuing their undergraduate studies and to explore the connections between psychology and diverse sectors of employment. For a capstone course, students enrolled in the Research Intensive Specialization enroll in an Honours seminar whereas other Honours students enroll in a fourth-year course that explores practical applications of psychology.

**Honours BSc in Psychology:** is similar to the Honours BA with the Research Intensive Specialization. However, the Honours BSc requires students to complete additional courses in mathematics and other science disciplines (e.g., biology, chemistry). This background in natural sciences can enrich students' understanding of the biological bases of cognition and behaviour and reinforce their appreciation of the value of studying the mind from a scientific perspective. This program is best suited to students with interests in neuroscience or cognition, or to students who anticipate postgraduate training in medicine. The Honours BSc in Psychology is offered as either a regular or a co-operative system of study.

**Psychology Minor:** provides a general overview of Psychology including a subset of the discipline core courses, some advanced content courses, and several electives within Psychology. However, unlike the General plans, basic methods and data analysis courses are not required.

**MA Program:** Depending on the area, completing the MA typically requires one or two years of full-time study. In most cases, the requirements for the MA are met by completing four one-term (0.5 credit) courses accepted for graduate credit by the Department, including at least one core statistics course, as well as the Master's Thesis, which must be passed by one to three readers in addition to the student's supervisor. Alternatively, a student may petition the Associate Chair, Graduate Studies, for permission to enter a Master's Research Paper option. This option requires the completion of eight one-term (0.5 unit) courses accepted for graduate credit by the Department, including at least one core statistics course, and the Master's Research Paper, which must be passed by two readers. The difference in number of required courses between these two streams reflects the greater research demands of the Master's Thesis compared to the Master's Research Paper.

There are differences in the role of the MA program that partly reflect important distinctions in how scholarship funding works in SSHRC-funded areas versus NSERC-funded areas. Unlike the MASc program, the MA program serves as the entry point to the PhD program. Students applying to work in the Clinical and Social Areas are first admitted to the MA and then ordinarily transfer into the PhD program once they have fulfilled the requirements for the MA. Students applying to the Cognitive Neuroscience or Industrial/Organizational Areas can be admitted either to the MA program or directly to the PhD program. Students in the Cognitive and Developmental Areas are admitted directly into the PhD program, but may obtain an MA along the way, when they have completed the requirements for it.

**MASc in Developmental and Communication Science:** is a one-year program offering advanced applied training with a specialization in social and/or cognitive development relevant to communicative development. It provides students with in-depth opportunities to observe communicative interactions between children in naturalistic settings and to develop skills related to the empirical measurement of communication such as transcription, coding strategies, and statistical analysis. The program includes both a Research Lab Internship and a Community Location Practicum, all within one year. The program's aims are (1) to augment a student's preparation for admission into postgraduate programs and/or (2) to increase employment opportunities in related professional fields.

**MASc Program in Applied Psychology:** is a two-year program designed to prepare students for careers in various capacities related to human resource management, including organizational consulting, organizational and policy research, training, and design of systems for personnel selection, job classification, and performance evaluation. It also prepares students for advanced studies in Industrial/Organizational Psychology at the doctoral level.

The program includes an Internship or Field Placement, usually completed by working full-time for four continuous months. Internship placements have occurred with major private corporations, crown corporations, consulting firms, and government agencies.

**PhD Program:** As outlined above, students who wish to complete the requirements for the PhD in the Cognitive and Developmental Areas are admitted directly to the PhD program, whereas students with the goal of completing the PhD in the Clinical or Social Areas are admitted first to the MA program and then transfer to the PhD. Students in the Cognitive Neuroscience and Industrial/Organization Areas may be admitted directly to the PhD program, but also can be admitted to the PhD upon first completing a Master's degree. Students typically complete their PhD degree in 4 to 5 years following their initial admission to the graduate program.

Completion of the PhD degree in Psychology requires the following:

- 1) A minimum of two courses in statistics or quantitative methods and four breadth courses (from outside the area of specialization)
- 2) A series of required core courses in the student's field  
(<https://uwaterloo.ca/psychology/current-graduate-students/degree-requirements>)
- 3) Successful defense of a dissertation describing original research carried out under the supervision of a faculty member having Approved Doctoral Dissertation Supervisor (ADDS) status.

In addition, students in Clinical Psychology must also complete a four-month fieldwork summer placement in a local clinical setting and a one-year internship at an approved clinical setting in North America.

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

### Strengths

- Faculty members are world-class researchers and superb teachers
- Graduate program is vibrant and Psychology graduate students are successful both in the program and upon graduation
- Undergraduate program is extremely well subscribed and well-reviewed both by outsiders and by the students themselves.
- Exceptional staff who are both very knowledgeable and very devoted, and who go out of their way to help students and faculty alike in many ways.

### Challenges – Undergraduate Program

- A key challenge for the undergraduate programs is the expansion of availability of Co-op to a much larger pool of students. Formerly the class size for Co-op was capped and enrolment was limited to students whose Psychology averages exceeded 78%. As of Fall 2016, any Honours Psychology major can enroll in Co-op. This means that any Honours Arts student who has a minimum Psychology average of 70%, and any Honours BSc student who has a minimum Psychology average of 75%, is automatically accepted into Psychology Co-op. These enrolment averages are considerably lower than the standard for admission to Co-op. It remains to be seen whether students with lower averages will struggle more with the challenges of Co-op, which may increase attrition from the program. Also, with more students competing for Co-op positions, we might observe a lower rate of employment for Co-op students, possibly coupled with less relevant employment options.
- A second challenge for the undergraduate program is the Arts First initiative being rolled out in the Faculty of Arts. All first-year students in Arts are required to take two small (25-student) seminar courses, one aimed at communication, one aimed at analysis. The goals are laudable—to provide students with seminar experiences, to emphasize and develop writing and presentation skills as well as critical analysis skills, and to permit students to be part of a couple of small-course cadres, connecting them to each other. The challenge, is finding instructors for these courses, which draws instructors away from other courses. If Psychology faculty are required to teach these new courses there will be implications for the other courses offered in the program. Coupled with the need for more Spring courses to accommodate the additional Co-op students expected, these joint pressures will strain Psychology's already stretched instructor resources, particularly given the Faculty of Arts simultaneously requiring that departments reduce the number of sessional instructors being employed.

### Challenges – Graduate Program

- The University makes one of its highest aspirations “international recognition”, yet in Arts, departments are simultaneously being discouraged from admitting international students, who do not receive government funding. It is hoped that this situation will be resolved in the near future so that the Department can admit some of the excellent international students who currently apply to our program and cannot be admitted.
- At present, the university guarantees \$15,000 for a maximum of two years to domestic students admitted to a Master’s program, and \$22,600 for a maximum of four years to students admitted to a PhD program. It is peculiar to offer a considerably lower value in the early years, given the goal of attracting top applicants. This has been especially hard on the MASc programs. As a consequence of this low funding, for example, the formerly very successful Industrial/Organizational MASc program, where students always obtain very good jobs in the business/consulting sector, has difficulty attracting students. For at least five years, the Department has been hearing that a plan has been presented to the Provost for a 5-year, \$25,000 package, which would significantly improve our attractiveness. Our chief competitors have longer periods of guaranteed support (e.g., 6 years at York, 5+ years at Toronto and Western), recognizing the need for 5 years of funding to allow students to build up sufficient CVs to be competitive for postdocs and other positions. The fervent hope is that the new funding package will finally be approved and put into place, and that attention will be given to both Master’s and PhD funding.

### Weaknesses

- The program wishes that the budgetary support for the Department was greater, but recognizes the constraints on the Faculty of Arts. Enhanced budget would enrich instructional innovation at both the undergraduate and graduate levels (e.g., in allowing more laboratories associated with courses and in providing more tutorials by graduate students; in permitting more graduate students to have at least one experience as sole instructor). The program is certainly grateful that faculty positions have not thus far been lost to budget cutting.
- The primary weakness financially is the graduate funding packages, both the too-small Master’s package (\$15,000 annual), and the too-short PhD package (4 years only).

### Summary of key findings from the external reviewers

*“..the undergraduate and graduate Psychology programs are in good standing. The programs provide students with excellent academic experiences that are well supported by outstanding faculty and staff.”*

*“The overall picture is one of high calibre students being attracted to the Psychology program at the University of Waterloo and exceling while they are in it. Following graduation, these students are extremely successful in finding employment.”*

### Program response to external reviewers’ recommendations

## Recommendations

1. Increase the emphasis on the development of communication and professional skills in the undergraduate program.

### Response

To enhance Psychology majors' training in communication skills, the program will integrate a writing lab component into the second-year research methods course (PSYCH 291). This writing lab will focus on the process of communicating psychological research in academic reports as well as popular media. The writing lab will include activities and assignments that reinforce and extend written and oral communication skills that are introduced in the first-year intensive communication courses (ARTS 130, ARTS 140, SCCOM 100) that launched in Fall 2018. The plan is for activities to include scaffolded research proposal assignments, peer review, and workshops on topics such as APA style. PSYCH 291 is an ideal context in which to deliver this writing-intensive lab because it is required for all majors, who normally take it during their first term following admission to the major. Learning how to communicate research designs and findings effectively is integral to research methods training so overall the writing lab will be a good fit with the timing and content of PSYCH 291.

All psychology instructors will be informed about the foundation of communication and analytic skills that students are expected to develop in the new first-year communication-intensive courses. Instructors of second- and third-year courses will be encouraged to consider incorporating activities and assignments that progressively build on this foundation of skills, and will be provided whatever resources possible to support such additions to their courses.

Psychology instructors who teach sections of ARTS 130 and 140 will be encouraged to discuss their experiences with colleagues to provide insights into the skills that students gain in these courses and to share ideas about implementing innovative instructional techniques to further develop and assess these skills. The ARTS 130/140 instructors have already begun to meet as a group to share insights and teaching resources with one another as they plan their outlines for these courses. Faculty are open to working together to strengthen the quality of undergraduate curriculum in terms of skill development. The program intends to encourage this collaboration and to promote the involvement of more faculty members in these discussions.

- 1a. *Consider how to better address UDLE 6 (Autonomy & Professional Capacity) for students who are not in the Co-op program.*

### Response

The curriculum mapping process and student consultation sessions identified gaps in coverage of autonomy and professional capacity for regular-stream students (i.e., students not enrolled in co-op). The program is taking a number of steps to address these gaps.

In May 2018, Psychology began to revamp the Applied Apprenticeship courses (PSYCH 465 and 467). These courses provide experiential learning opportunities in professional settings for students who are not enrolled in the co-op program. PSYCH 465 is intended for all psychology students; PSYCH 467 is available to students enrolled in the Human Resources Management (HRM) Minor. These experiential learning courses involve: (1) completing 60 hours of volunteer internship work for a community partner, and (2) participating in a seminar where students (a) discuss their internship experiences with each other and with a faculty instructor, (b) set professional development goals, and (c) review relevant resources and literature. In the past few years, the program had not been able to offer PSYCH 465 and 467 because there were insufficient resources to invest in the recruitment of potential community partners. This year, however, the Faculty of Arts secured a grant to hire a staff member to coordinate this recruitment process, to process student applications, and to conduct interviews to match students with partners. This has made it feasible for the courses to be re-introduced and to expand the enrollment to more students. Re-launching these courses will allow regular-stream students both to explore how their psychology training prepares them for careers and to make contributions to the community. These students will also have opportunities to practice and get feedback on their interview skills. The associated seminar challenges students to reflect on their work experiences, to identify and articulate career-relevant skills, and to draw connections between their internship experiences and their academic studies. The program is very excited to be offering these courses again and anticipate that they will go a long way toward addressing the gaps in coverage of autonomy and professional capacity within our curriculum. Importantly, students who are not enrolled in co-op will be given priority for enrollment in PSYCH 465/467.

Psychology instructors will be encouraged to incorporate into their courses more information about real-world applications of psychology as well as to build in assignments that cultivate professional skill development and autonomy. Some instructors already have course components that are highly relevant to professional development, but they may not explicitly articulate how the course material serves this learning objective. Making this more explicit should help students to better recognize how their coursework contributes to their career aspirations and other practical goals. To facilitate this, instructors will be provided with the American Psychological Association's recommendations for undergraduate learning outcomes and encourage them to describe in their course outlines how they deliver and assess these learning outcomes. In cases where learning outcomes related to autonomy and professional capacity are not currently present in a course, the plan is to ask instructors to consider adding course components that address these outcomes (to the extent that these are relevant and harmonizes with the instructor's other course objectives). For example, this

might include listing recommended readings or links to resources that provide students with information about practical applications of the course material or relevant career pathways. Or an instructor might include a guest lecture by a professional from a non-academic field who discusses how the concepts and skills that students are learning about in the course have practical applications within their profession.

Finally, the Department is launching a voluntary peer mentorship program for Psychology students in Winter 2019. In this program, third- and fourth-year Psychology majors volunteer to provide mentorship to a group of approximately 3 to 4 new majors who volunteer to receive mentorship. Peer mentors provide advice to incoming majors about setting goals, making connections with faculty and other psychology students, and balancing their studies with other activities. The experience of enabling the autonomy of less experienced students will contribute to the mentors' own professional development by promoting an ethic of responsibility and providing practice in communicating their experience and knowledge to peers. The mentors receive free training through the Student Success Office to provide them with relevant skills to take on this role. It is anticipated that the peer mentorship program will not only provide an opportunity for students to practice and develop skills related to autonomy and professional capacity but will also help to enrich the sense of community among our majors.

2. *Teach R and programming (e.g., Python) in the graduate program and offer a greater variety of statistics courses on a regular basis.*

### **Response**

The Department is working toward all of their graduate statistics courses being taught using R over the next few years. In Fall 2018, a new graduate course was offered on multi-level modelling which was taught exclusively using R. To ensure that students were up to speed, an R workshop was offered in the weeks preceding the course. Based on student feedback from the Fall 2018 course, the program will be developing an in-house workshop for R. This is anticipated to be complete by August 2020.

There is also a plan to introduce Bayesian analyses and other more contemporary statistical methods into current graduate course curriculum. In addition, on the programming front, there is discussion of offering a graduate course on Python and PsychoPy (developing experimental paradigms, statistical analyses, Data Visualization).

Also, there are several departments in Arts, led by Economics, collaborating on a Diploma in Computational Social Sciences. This will be geared toward providing graduate students with training in handling "big data" – including training in using Python. This still needs to be reviewed/approved by Economics but, if successfully initiated, will be useful for graduate

students in Psychology in that those choosing to pursue this diploma will receive additional training in skills relevant to industry.

- 3. Provide graduate students with more teaching opportunities. The implementation of the new university-wide writing requirement will require a re-structuring of the undergraduate Psychology program. It appears that the faculty resources that will need to be channeled into the writing program will free up courses that could well be taught by graduate students.*

### **Response**

The program certainly agrees with this goal and has devoted considerable discussion to the issue over the past couple of years. Psychology indicates that one problem is that support for sessional instructors has been decreasing, being one of the very few avenues left for tightening already very tight budgets at the level of the Faculty of Arts. At the same time, given the growth of Lecturer positions in universities, more of their graduate students will be pursuing these positions – positions that require demonstrable teaching experience. Students will need to be provided opportunities for that experience.

The new Arts First initiative resulted in a few courses becoming available each year for graduate students to teach when faculty members who normally teach those courses are instead teaching in the Arts First program. Beginning in 2018-2019, graduate students have been offered teaching opportunities to replace faculty who are covering ARTS 130/140. The number of available courses will become clearer over the next couple of years as Arts First rolls out. It is also believed, however, that this alone will not generate enough opportunities to meet the demand.

One route presently being discussed by Psychology is to have two graduate students co-teach a course, obviously doubling the teaching opportunities. Another route would capitalize on skills developed by undergraduates in their Arts First courses by increasing writing in subsequent years (see the response to Recommendation 1). For example, in a course such as PSYCH 291 Research Methods, graduate instructors could run a parallel “tutorial” section where they work on developing undergraduate student skills in writing up research.

The Department is currently working to develop a teaching practicum course supervised by faculty (as service), with aims to have this course complete by Winter 2020.

- 4. Provide graduate students with more opportunities for placements in industry and other non-academic organizations.*

### **Response**

At the time of the site visit, three of the five non-clinical research areas had applied practicum/internship opportunities for graduate students. The Developmental and

Industrial/Organizational areas have had these applied opportunities for students for quite a number of years. Specifically, students in the Developmental Area have the option to complete a community-based practicum at a variety of locations (e.g., Early Childhood Education Centre (ECEC) at University of Waterloo, McLennan Speech and Language Services), and students in the Industrial/Organizational Area have the opportunity to gain applied experience through internships at a variety of locations (e.g., Bell Canada, The Mutual Group). More recently, the Cognitive Area has also developed a practicum where students gain research experience at non-academic organizations. There are three students who have completed these practica in the Cognitive area. One student completed a practicum at BEWorks, a behavioural economics inspired consultancy in Toronto. A second student completed a practicum at the Centre for Extended Learning at the University of Waterloo. Finally, a third student did a practicum at a local private school where she designed lesson plans and strategies to improve student engagement.

As of Fall 2019, practicum courses have been developed for Social, Developmental and Industrial/Organizational areas, with plans to create practicum courses for Cognitive Neuroscience by Fall 2020.

With respect to professional development (outside experiential learning), Psychology is working on putting together a professional development course for all graduate students which would involve discussing issues such as interviewing, applying for funding, job searches, etc. In addition, individual research areas are now annually bringing in speakers who have Psychology graduate degrees and who work in non-academic settings to talk about their experiences (e.g., how to apply their PhD to industry). Moreover, Psychology graduate students are informed about Centre for Career Action workshops, which are geared toward various professional development activities.

- 5. Improve communication between the Dean of Arts' office and the Psychology Department. We also encourage Psychology faculty members to play a greater role in university governance.*

### **Response**

It was already noted in the submitted factual corrections to the External Reviewers' Report that both the Dean and the Department believe that this recommendation reflects something of a misunderstanding. The Dean and the Chair (and indeed individual faculty members in Psychology) see communication (in both directions) as actually very good between the Department and the Faculty.

In sum, the Department sees no issue in Psychology's service to the university community, either in the Faculty or in the wider university.

6. *Streamline and harmonize graduate admissions such that all entering students are either accepted into the Master's program to be followed by Ph.D. studies or accept all students directly into the Ph.D. program. This would eliminate inequities in student funding.*

#### **Response**

In the past, areas differed in whether they offered direct entry into the Ph.D. program. This unintentionally created inequities in funding over the course of students' graduate training programs. In order to address these inequities, as of 2019 we are initially accepting graduate students into the Master's program and then moving them on to the PhD (except for terminal MAsc students). Funding provided by the University is equitable for all students (\$15,000 for two years at the MA level, and \$25,000 for 4 years at the PhD level, with some additional funding provided for students holding Tri-Council scholarships). The program will move away from direct entry PhD in all areas to maximize funding flexibility for students and to maintain equity across areas. We feel this decision is absolutely necessary to remain competitive with our peer institutions across North America who routinely guarantee 5 years of funding to direct entry Ph.D. students (vs. UW where only 4 years of funding are guaranteed). In a research intensive program like ours, 4 years of funding simply does not provide Ph.D. students the time they need to be competitive for top tier academic positions. The removal of a direct entry Ph.D. stream did not negatively impact our application numbers or recruitment rates in 2019, although we will continue to track these numbers over time.

Faculty members do sometimes "top up" students to be competitive with offers from other institutions, with the goal of attracting top students. This is especially common at the MA level because of the lower amount provided at that level by the University. However, given inherent inequities across funding sources (e.g., Vanier vs CGS vs PGS Tri-Council awards) and the possibility of individual faculty top-ups, it is impossible to completely eliminate differences in funding across students. The program will continue to encourage faculty members to provide this additional funding via grants.

7. *Provide adequate and consistent support for international students applying to the graduate program.*

#### **Response**

There was a misunderstanding here, indeed reflected throughout the review document. Attracting international **undergraduate** students is a priority for Arts (and indeed university-wide) because their significantly higher tuition makes an important contribution to the budget of the unit. However, the opposite is true of international **graduate** students; they are a significant cost to the unit. Contrary to what is said in the review document, the former Dean (Peers) expressed his desire to see more international graduate students, given the rich experiences that they bring to the programs and the world-class visibility they provide, but the budget simply cannot accommodate very many of them at this time. There exists

significant regret about this, recognizing the many virtues of a more diverse graduate student complement, but unless or until budgetary changes make this more feasible, this situation is unlikely to change. In a memo to faculty in December 2019, the Associate Dean Graduate Studies (Linda Warley) explained that given the Faculty's current budget situation and in light of the provincial government's refusal to consider international graduate students as grant eligible, the Faculty would continue to place strict limitations on the number of international graduate students they could support each year. Over the past three years, Psychology was able to admit one faculty-funded international Ph.D. student in 2017, none in 2018, and one in 2019. We hope to be permitted by the Faculty to admit one funded international Ph.D. student again in 2020. Of course, individual supervisors are permitted to fully fund international graduate students from grants. The cost of this is simply too great for the vast majority of faculty given the need to provide funding for 5 years (average duration of Ph.D. in Psychology) and the fact that this level of support requires a large proportion of the typical annual funding amount provided to Psychology faculty in their tri-council grants. It is particularly difficult for SSHRC-funded faculty to guarantee support for international graduate students, given that the duration of SSHRC awards is highly variable (2-5 years). The Department will continue to work with the Dean and Associate Dean, Graduate Studies to identify possible sources of support for international graduate students, with understanding of the current financial situation at UW.

In 2016-17, the Department had actually resorted to explicitly saying on our website that international students should not apply—because it was felt that it was unreasonable for them to have to pay the application fee if there was no chance of them being accepted. This led to quite a few responses internationally saying such things as “I thought Waterloo was a world-class university.” The message has now been removed and instead, with considerable reluctance, the Department discourages individual international applicants when they contact Psychology. This is certainly regrettable given that Psychology admits a large number of domestic students, contributing substantially to the University's effort to reach its domestic targets, yet cannot admit any international students despite other units on campus having a large proportion of their graduate programs made up of international students.

**Implementation Plan**

	Recommendations	Proposed Actions	Responsibility for Leading and Resourcing (if applicable) the Actions	Timeline for addressing Recommendations
1.	Increase the emphasis on the development of communication and professional skills in the undergraduate program.	<ul style="list-style-type: none"> <li>• Integrate a writing lab component into PSYCH 291 (Introduction to Research Methods; required of all Psych majors). Activities and assignments will reinforce and extend written and oral communication skills covered in the first-year intensive communication courses (ARTS 130, ARTS 140, SCCOM 100). Sample activities include scaffolded research proposal assignments, peer review, and workshops on topics such as APA style.</li> <li>• Invite current and past ARTS 130/140 instructors in Psychology to explain and give examples of the foundational communication and analytic skills students are exposed to in first-year communication-intensive courses to all Department instructors</li> <li>• Encourage instructors of second- and third-year courses to incorporate activities and assignments that progressively build on these foundation of skills</li> <li>• Provide resources to upper year instructors to support such course additions</li> </ul>	<ul style="list-style-type: none"> <li>• Chair</li> <li>• Associate Chair, Undergraduate Affairs</li> <li>• Psych 291 Instructors</li> </ul>	Fall 2019 & Winter 2020 - Planning  Fall 2020 - Pilot
1a.	<i>Consider how to better address UDLE 6 (Autonomy &amp; Professional Capacity) for students who are not in the Co-op program.</i>	<ul style="list-style-type: none"> <li>• Revamp the Applied Apprenticeship courses (PSYCH 465 and 467) to provide experiential learning opportunities in professional settings for students who are not enrolled in the co-op program</li> </ul>	<ul style="list-style-type: none"> <li>• Chair</li> <li>• Associate Chair, Undergraduate Affairs</li> <li>• HRM Director</li> <li>• Program Manager</li> </ul>	September 2018 -Worked with EDGE to revamp Psych 465 and 467 – and offered these courses in Winter 2019

		<ul style="list-style-type: none"> <li>• Develop Applied Directed Studies (Psych 480) that are reflective learning on volunteer experiences.</li> <li>• Encourage all Psychology instructors to incorporate into their courses more information about real-world applications of psychology as well as to build in assignments that cultivate professional skill development and autonomy (to the extent that these are relevant and harmonizes with the instructor’s other course objectives).</li> <li>• Launch a voluntary peer mentorship program for Psychology students. In this program, third- and fourth-year Psychology majors will volunteer to provide mentorship to a group of approximately 3 to 4 new majors who volunteer to receive mentorship. The goal is to support autonomy and professional capacity in both the mentee and the mentor.</li> </ul>		<p>September 2019 -Edge no longer have the resources to assist us.</p> <p>Fall 2019 &amp; Winter 2020 – Planning Applied Directed Studies</p> <p>Fall 2020 – Pilot Applied Directed Studies</p> <p>Winter 2018 -Created a Peer Mentorship Program</p>
2.	<p><i>Teach R and programming (e.g., Python) in the graduate program and offer a greater variety of statistics courses on a regular basis.</i></p>	<ul style="list-style-type: none"> <li>• Transition all graduate statistics courses to being taught using R</li> <li>• Based on student feedback from Fall 2018 course, the program will create in-house workshop for R</li> <li>• Introduce Bayesian and other more contemporary statistical analyses into existing graduate course curriculum</li> <li>• Consider viability (teaching expertise, student interest) of offering a graduate course on Python and PsychoPy (developing experimental</li> </ul>	<ul style="list-style-type: none"> <li>• Associate Chair, Graduate Studies</li> <li>• Graduate Advisory Committee</li> </ul>	<p>Fall 2018 - a new graduate course was offered on multi-level modelling which was taught exclusively using R.</p> <p>August 2020 – New R in-house workshop</p>

		<p>paradigms, statistical analyses, Data Visualization)</p> <ul style="list-style-type: none"> <li>• Collaborate on Faculty-wide initiative (led by Economics) to develop a Diploma in Computational Social Sciences which it is believed will be relevant and beneficial to many of our graduate students, particularly those wishing to receive additional training in skills relevant to industry</li> </ul>		
3.	<p><i>Provide graduate students with more teaching opportunities. The implementation of the new university-wide writing requirement will require a restructuring of the undergraduate Psychology program. It appears that the faculty resources that will need to be channeled into the writing program will free up courses that could well be taught by graduate students.</i></p>	<ul style="list-style-type: none"> <li>• Identify teaching opportunities for graduate students (e.g., co-teaching assignments), working within the constraints of the Faculty and Department budget</li> <li>• Develop teaching practicum course supervised by faculty (as Service)</li> <li>• Provide faculty supervision for graduate student instructors (e.g., syllabus review, in-class teaching observations) to support growth and development and to provide written evaluations for teaching dossier</li> <li>• Consider having graduate students teaching the writing components of expanded undergraduate courses (e.g., Psych 291 as detailed in item 1 above)</li> </ul>	<ul style="list-style-type: none"> <li>• Associate Chair, Undergrad</li> <li>• Associate Chair, Grad</li> <li>• Chair</li> </ul>	<p>Ongoing</p> <p>Beginning in 2018-2019 Graduate students have been offered teaching opportunities to replace faculty who are covering ARTS 130/140;</p> <p>Winter 2020 – work on designing teaching practicum course</p>
4.	<p><i>Provide graduate students with more opportunities for placements in industry and other non-academic organizations.</i></p>	<ul style="list-style-type: none"> <li>• Develop applied graduate practicum/internship opportunities in all Areas</li> <li>• Develop a professional development course within our Area brown bag seminars for all graduate students covering topics such as interviewing, applying for funding, job searches, etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Area Heads,</li> <li>• Associate Chair, Grad</li> <li>• Chair</li> </ul>	<p>Fall 2019 and ongoing</p> <p>Fall 2019 - Practicum courses were developed in Social, Developmental, and</p>

		<ul style="list-style-type: none"> <li>• Invite at least one brownbag speaker a year (in each Area) who has a Ph.D. in Psychology and currently works in a non-academic setting to talk about their experiences</li> <li>• Continue to inform Psychology graduate students about Centre for Career Action professional development workshops</li> </ul>		<p>Industrial/Organizational areas.</p> <p>Fall 2020 – practicum courses will be developed for CNS (then all 6 areas will have applied practicums).</p>
5.	<p><i>Improve communication between the Dean of Arts’ office and the Psychology Department. We also encourage Psychology faculty members to play a greater role in university governance.</i></p>	<ul style="list-style-type: none"> <li>• Please refer to submitted factual corrections stating that both Dean Peers and the Department believe that this recommendation reflects a misunderstanding. The Dean and the Chair (and indeed individual faculty members in Psychology) viewed communication between the Faculty and the Department at the time of the review as very good. This level of communication is expected to continue with the new Dean (Sheila Ager) and the new Chair (Heather Henderson).</li> <li>• Please refer to submitted factual correction from Dean Peers in which he noted that in meeting with the reviewers he mentioned that faculty members in Psychology might be (or have been) under-represented in administrative posts outside the Department (with full recognition that most Psychology faculty members have very active, Tri-Council funded research programs, that require high levels of graduate and undergraduate supervision).</li> </ul>	<ul style="list-style-type: none"> <li>• Dean</li> <li>• Chair</li> <li>• Area Heads</li> </ul>	Ongoing

		<ul style="list-style-type: none"> <li>• Regardless, our Department faculty and staff members are routinely invited, and usually agree to serve, in a variety of contexts across campus. For example, Daniela O’Neill (Assistant Vice-President, Graduate Studies and Postdoctoral Affairs), Colin MacLeod (Acting Associate Dean, Research), Britt Anderson (Arts Faculty Council, former Chair), Ramona Bobocel (member, HREC), Dillon Browne, Paul Wehr (FAUW), Mike Dixon (FTPC, Arts), Dan Smilek (FTPC, Engineering), Colin MacLeod (RTPC, St. Jerome’s), Heather Henderson (Arts Representative on University Strategic Planning Committee, Learning Environment), Ori Friedman (faculty representative, Search Committee for Dean of Arts), Janice da Silva (staff representative, Search Committee for Dean of Arts).</li> </ul>		
6.	<p><i>Streamline and harmonize graduate admissions such that all entering students are either accepted into the Master’s program to be followed by Ph.D. studies or accept all students directly into the Ph.D. program. This would eliminate inequities in student funding.</i></p>	<ul style="list-style-type: none"> <li>• Move away from direct entry Ph.D. in all Areas to maximize funding flexibility for students and to maintain equity across areas</li> <li>• Continue to encourage faculty members to “top up” students (i.e., provide additional funding via grants) to be competitive with offers from other institutions</li> <li>• Given inherent inequities across funding sources (e.g., Vanier vs CGS vs PGS Tri-Council awards) and the possibility of individual faculty top-ups, it is impossible to completely eliminate differences in funding across students.</li> </ul>	<ul style="list-style-type: none"> <li>• Associate Chair, Grad</li> <li>• Chair</li> <li>• Area Heads</li> </ul>	Ongoing

7.	<i>Provide adequate and consistent support for international students applying to the graduate program.</i>	<ul style="list-style-type: none"> <li>• Noted misunderstanding throughout review document. Attracting international <b>undergraduate</b> students is a priority for Arts (and indeed university-wide), but the opposite is true of international <b>graduate</b> students. International graduate student support was the point raised by our Department members.</li> <li>• Work with the Dean and Associate Dean, Graduate Studies to identify possible sources of support for international graduate students, with understanding of current financial situation at UW. It is almost impossible for our faculty members to fully support international graduate students, given that the expense to their grants to cover tuition differential and other costs is simply too great.</li> </ul>	<ul style="list-style-type: none"> <li>• Dean</li> <li>• Associate Dean, Grad</li> <li>• Associate Chair, Grad</li> <li>• Chair</li> </ul>	Ongoing
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The Department Chair/Director, in consultation with the Dean of the Faculty shall be responsible for the Implementation Plan.

Date of next program review

2024-25

Date

## Signatures of Approval



August 10, 2020

Chair/Director

Date

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

Date

**Sheila Ager**

Digitally signed by Sheila Ager

Date: 2020.08.11 16:18:29

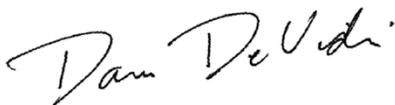
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August 11, 2020

Faculty Dean

Date

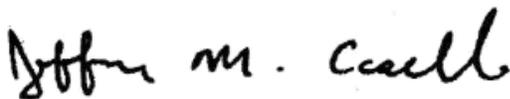
**Note:** AFIW programs fall under the Faculty of ARTS; however, the Dean does not have fiscal control nor authority over staffing and administration of the program.



January 2, 2020

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

Date



December 16, 2019

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

Date

**Final Assessment Report: Psychology**

**Name of Reviewer: Jack Rehder**

**Date: 8/6/2020**

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**Does the Final Assessment Report:**

1. Include a credible implementation plan that not only addresses the substantive issues identified from the program review process, but also clearly identifies:
  - The actions that will follow from specific recommendations?  **Yes**  **No**
  - Those who will be responsible for acting on those recommendations?  **Yes**  **No**
  - Those who will be responsible for providing resources?  **Yes**  **No**
  - Priorities for implementation and realistic timelines for initiating and monitoring actions?  **Yes**  **No**
2. Provide rationales for any recommendations that have not been pursued?  **Yes**  **No**

**General Comments**

**My one question – about the impact of the discontinuation of the direct-entry PhD program – has been addressed in this revised version.**

**Final Assessment Report: Psychology (BA, BSc, MA, MASC, PhD, Minor)**

**Name of Reviewer: Richard Staines**

**Date: 7/28/2020**

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**Does the Final Assessment Report:**

1. Include a credible implementation plan that not only addresses the substantive issues identified from the program review process, but also clearly identifies:
  - The actions that will follow from specific recommendations?  **Yes**  **No**
  - Those who will be responsible for acting on those recommendations?  **Yes**  **No**
  - Those who will be responsible for providing resources?  **Yes**  **No**
  - Priorities for implementation and realistic timelines for initiating and monitoring actions?  **Yes**  **No**
2. Provide rationales for any recommendations that have not been pursued?  **Yes**  **No**

**General Comments**

I am quite happy with the responses of the program to all of the recommendations outlined in the report. I have no questions to add to the document as the plans to address each one were outlined quite clearly including appropriate timelines if not already initiated. In addition, the explanation regarding the funding for doctoral programs and the direct-entry option is good. I recommend acceptance of the report. Please let me know if you need anything else.

26 January 2020

Professor David DeVidi  
Associate VP Academic  
University of Waterloo

Dear Dave,

I am providing a brief decanal response to the Final Assessment Report for the Master of Theological Studies. Since this is an AFIW-based program, it does not fall within my immediate purview as UW Dean of Arts, but given that I am supposed to sign off on the FAR, I wanted to comment on one or two things.

I believe the enrolment looks healthy, and the program is clearly viable. I did want to query a couple of items brought up on page 4 of the report: students with three-year degrees, even if they are “well-prepared”, cannot enter the MTS, even though they can enter similar programs at other institutions; and (if I am reading it right) introductory-level biblical language courses cannot count towards the program’s total course count. I wonder if both these constraints are mandated by the MTS program itself? If so, it seems that they could be changed.

I also wanted to point out that I agree with the program’s decision (page 7) *not* to increase the number of core requirements. Increasing core requirements and reducing flexibility is the opposite of the strategy I am currently recommending to our graduate programs, so I’m pleased to see that MTS is not inclined to make this change. I am also in agreement with the program’s response to the reviewers’ recommendations around limiting service-load to student recruitment (page 9); this recommendation is at odds with the normal expectations of faculty service.

Sincerely,

A handwritten signature in cursive script, appearing to read "Sheila Ager".

Sheila Ager  
Dean, Faculty of Arts

Cc: Jeremy Bergen, Director, MTS  
Marcus Shantz, President, Conrad Grebel University College

# Final Assessment Report

## Theological Studies (MTS)

### August 2020

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#### Executive Summary

External reviewers found that the Master of Theological Studies program (MTS) delivered by Conrad Grebel (CG) University College was in good standing.

*“We find the program in overall good standing. Students are closely supervised and mentored throughout the program to ensure that the desired learning outcomes are met. The MTS clearly provides a valuable education for the students in the program through a great deal of flexibility and accommodation to each student’s needs.”*

A total of 12 recommendations were provided by the reviewers. In response, the program created a plan outlining the specific actions proposed to address each recommendation as well as a timeline for implementation. The next cyclical review for this program is scheduled for 2025-2026.

#### Student Complement over the past three years

	MTS
2017-2018	43 (17 new)
2016-2017	35 (14 new)
2015-2016	35 (14 new)

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#### Background

In accordance with the University of Waterloo’s Institutional Quality Assurance Process (IQAP), this final assessment report provides a synthesis of the external evaluation and the internal response of the Master of Theological Studies program (MTS). A self-study (Volume I, II, III) was submitted to the Associate Vice-President, Graduate Studies and Postdoctoral Affairs on September 18, 2018. The self-study (Volume I) presented the program descriptions and learning outcomes, an analytical assessment of the programs, including the data collected from a student survey, along with the standard data package prepared by the Office of Institutional Analysis & Planning (IAP). The CVs for each faculty member with a key role in the delivery of the program(s) were included in Volume II of the self-study.

From Volume III, two arm's-length external reviewers were selected by the Associate Vice-President, Graduate Studies and Postdoctoral Affairs: Dr. Richard Ascough, Professor of Religion, Queen's University, and Dr. Jo-Ann Brant, Professor of Bible, Religion and Philosophy, Goshen College.

Reviewers appraised the self-study documentation and conducted a site visit to the University on April 15-16, 2019. An internal reviewer from the University of Waterloo, Dr. Kankar Bhattacharya, Professor of Electrical and Computer Engineering, was selected to accompany the external reviewers. The visit included interviews with the Vice-President, Academic & Provost; Associate Vice-President, Graduate Studies and Postdoctoral Affairs; President of Conrad Grebel; Dean of Conrad Grebel; Faculty of Arts Associate Dean of Graduate Studies; Director, Theological Studies, as well as with faculty members, staff and current graduate students. The Review Team also had an opportunity to tour the facilities and meet with representatives from the Library.

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

### **Program characteristics**

The mission of the Master of Theological Studies (MTS) is to educate, equip, and form students through biblical, theological, historical, and pastoral study of Christianity in an Anabaptist-Mennonite and ecumenical context, for service to church and society. Students may study full-time or part-time. There are three options, or streams, with the degree: thesis, coursework, and applied studies.

**Thesis:** The thesis option is the most focused of the options and is often taken by students preparing for advanced graduate studies in Theology, Biblical studies, or History of Christianity, or by those who already have a strong undergraduate background in theological studies. It involves coursework and research and culminates in a thesis.

**Coursework:** The coursework option provides students with a broad understanding of theological disciplines. It consists of coursework and a final research paper. It is the most flexible option and is often the best option for students entering from another discipline or for those completing the program for personal enrichment. Students may begin in this option and decide to move to one of the other two options after they have completed several courses.

**Applied Studies:** The applied studies option integrates academic study and practical internships. It is for students involved in or preparing for the practice of ministry. "Ministry" is broadly understood to include pastoral roles in congregations, chaplaincy in hospitals, prisons, or elder care facilities, or social service work in varied settings. This option involves coursework, internships, and a capstone integrative project.

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

### Strengths

- High quality faculty members as evidenced by active research programs and strong teaching evaluations.
- Full-tuition award for Canadian citizens and permanent residents who study full-time.
- Students bring diverse experiences to the program in terms of religious backgrounds, fields of previous academic study, areas of interest, age and life-stage, and educational goals.
- The several institutional affiliations developed by the MTS program grants students flexibility in tailoring their own course of study, pursuing particular interests, and accommodating other commitments like work and family.
- The strong full-time student body has led to a strong sense of cohort in recent years. Students get to know each other well and have good conversations outside of class.
- Positive and engaged faculty participation in informal settings, such as eating lunch in the dining room with students. There are good relationships between faculty members and students.
- Graduates are working successfully in the church, both in Mennonite congregations and those of other Christian traditions.
- The MTS program has a good word-of-mouth reputation. Often students are applying to the program because they heard about it from someone who had a good experience.

### Challenges

- The program is highly dependent on its conjoint affiliation with the University of Waterloo, and thus on both University and Government of Ontario policies about grants to graduate programs.
- Recruiting students is an ongoing concern and priority.
- Increasing the ethnic/racial diversity of the student body is challenging—it is unclear which strategies will advance this objective.
- The program relies on the full-time tuition award to a great extent to recruit students.
- The perception of theology on campus creates a (perceived) constant need to validate the program.
- Changing employment landscape, especially in church settings.
- A perception that fewer Mennonite students are enrolling in the program. What does the Mennonite identity of a program mean if there are few Mennonites in the program?
- Increased marketing and program offerings from competitors, e.g. online programs, and potential market saturation.

## **Weaknesses**

- Because students can take courses at other institutions, some may not be on campus very often. It is possible for students to be in the program and not interact with other students very much.
- Students have a lot of flexibility in how they put their program together, but this may mean that they are not be well-prepared for some professional positions they do get.
- Students with a three-year degree in theological studies cannot be admitted directly into the program, whereas they can do at most of our competitors, including institutions affiliated with public Ontario Universities. Such students are often well-prepared for the MTS, but at best can be offered admission to the Qualifying program.
- While the program provides a well-rounded education in theological studies, it may not do all of the disciplines justice. For example, students are able to avoid practical courses completely and/or avoid Biblical Studies courses other than the two core courses.
- Sabbatical cycles impact course offerings and sequencing. For example, TS 600 is designed to prepare students for the program (i.e., basic research methods), but it may be offered in the second semester if instructor is on sabbatical in Fall. Course offerings are further limited because most TS faculty members teach in the program on a part-time basis.
- There are limited opportunities for cross-cultural engagement within the program.
- The program does not offer biblical language courses. Introductory level courses do not currently count towards total course requirements. It can be difficult to find suitable courses that are proximate and/or affordable.

## **Summary of key findings from the external reviewers**

“We find the program in overall good standing. Students are closely supervised and mentored throughout the program to ensure that the desired learning outcomes are met. The MTS clearly provides a valuable education for the students in the program through a great deal of flexibility and accommodation to each student’s needs.” “The five full-time faculty teaching in the program are fully qualified and publish well received work in their respective sub-fields.”

## **Program Response to External Reviewers’ Recommendations**

1. CG provides clearer communication to students about the nature and need for reading courses (that is, they are rare and only when necessary to address a lacuna in a student’s program).

### **Response**

MTS agreed and completed this recommendation. A message was sent to all students in June 2019 informing them of changes to the procedures for reading courses along the lines suggested above. The TS Handbook was also updated to reflect the changes.

2. CG continues on trajectory toward limiting courses taken at other institutions.

**Response**

MTS is unclear about whether the reviewers' concern is financial or curricular. As the reviewers note, some of the financial concerns have been addressed by excluding courses taken at other institutions from the full-time tuition scholarship. From a curricular perspective, there are good reasons for students to take courses elsewhere (e.g., counselling courses from Martin Luther University College). There is a tension between this recommendation and comments throughout encouraging a greater variety of course offerings.

While the program does forego some tuition when students take a course elsewhere, this can be less expensive than hiring additional adjunct instructors.

MTS will act on this recommendation through the following strategies. The program will ensure that students understand that taking courses at other institutions is not a "right", but rather a possibility for which clear pedagogical rationale must be given. Students will need explicit approval of their advisor and the TS Director. Convenience should not be the primary rationale for taking such courses and permission will not normally be given if a similar course exists at Grebel. Proactively, the program will identify and promote very specific courses at other institutions that are consistent with our learning objectives and address clear lacunae in our offerings (such as courses in counselling at Martin Luther University College, online language courses at McMaster Divinity College, and courses in Christian Formation at Anabaptist Mennonite Biblical Seminary.)

The program does not believe that it should be a goal to have a measurable decline in the number of courses students take elsewhere.

3. CG continues developing the 2-1 relationship with Anabaptist Mennonite Biblical Seminary (AMBS) so that students in the ministerial track complete a Masters of Divinity (MDiv) degree. It could be worthwhile establishing a 2-1 relationship with other local seminaries.

**Response**

There is agreement that this is something that should be pursued, and the program will continue to promote the AMBS MDiv program as a good option for its graduates. Responsibility for promotion and communication rests primarily with the Coordinator of Applied Studies, the faculty member who serves as advisor to all students in the Applied Option. The program believes graduates should be informed and supported should they be interested in this option, but we do not believe the program should be held accountable for whether or not a percentage of students, let alone all students, in the Applied option pursue

a particular degree after their MTS. On one level, such a message would undercut the program; the program does not want to communicate to potential students that they need three years of study, but the program only provides them two. This is not an MDiv program but rather than portray this as a weakness, the program believes it is a strength and an opportunity. Students study in a university environment and also gain practical skills which surveys indicate are good preparation for professional work. The reality is that many graduates are not interested in a three-year degree which may be one reason why they enrolled in this program in the first place. Some may come to recognize a need for further studies, either further professional studies (such as M.Div.) or further research-based study (Ph.D). But the program also believes that the MTS stands on its own as a valuable degree.

However, in terms of exploring new connections, programs that are assessed by Ontario Universities' Quality Assurance process will not be able to accept transfer credits for courses for which a degree has been awarded. However, this may be possible for institutions accredited by the Association of Theological Schools. MTS will explore the possibility of an arrangement with Canadian Mennonite University in Winnipeg that offers numerous "streaming" courses, as well as other programs in Ontario.

4. CG strengthens the coordination with faculty and courses in CG's other programs as well as the Religious Studies Graduate Program.

### **Response**

There are possibilities for MTS to increase its coordination with Music and with Peace and Conflict Studies (PACS). Katherine Steiner, a recently hired faculty member in Music and Director of the Church Music and Worship program, has already participated in an MTS administrative group discussion about potential points of intersection. The program is currently exploring what a joint MTS and MPACS course would entail with the PACS department. There are possibilities for curricular and extra-curricular collaboration between these programs regarding Indigenous-Settler relations.

The UW Religious Studies graduate program is doctoral-level only and for that reason their courses may not be suitable for some of our students. However, in its focus on religious diversity in Canada, there are points at which greater connection and coordination may be possible. The primarily sociological approach to religion may be a welcome complement to MTS's primarily textual approach. One MTS student has taken a graduate RS course for MTS credit and so the precedent for this has been established.

There is potential for collaboration with the UW Department of Classical Studies around the teaching of New Testament Greek. The Directors of MTS and St. Jerome's University's Master of Catholic Thought (MCT) meet regularly in order to discuss their programs and ways of collaborating. The program also sees potential for a closer relationship with the Toronto

School of Theology especially regarding students from one institution taking courses at the other.

5. CG becomes more prescriptive and strategic about elective offerings and increase the core requirements.

### **Response**

This refers to both what courses are offered, and how students are advised. The program agrees that they should be strategic about what courses are offered, and with what frequency, and has already been moving in this direction. All required courses (core and required applied courses) are offered every year. As noted in the self-study, the following courses were identified as highly recommended for students in Applied Studies:

- Pastoral Care
- Worship Ritual and Ministry
- Preaching
- Christian Ethics

Since 2015-16, these courses have been offered every two years and the program has concrete plans to continue doing so (including plans to request that the faculty position in Practical Theology become a tenure-track position).

The program consistently offers at least two Bible electives and two theology electives each year. Other courses which are in the rotation, and which are planned to be offered every two or three years include:

- Teaching the Bible (offered Winter 2018, Winter 2020)
- Personal Spirituality (offered Fall 2018, Fall 2020)
- Indigenous Theologies and Methodologies (offered Spring 2018, Spring 2020)

MTS will continue to be intentional about how these courses are scheduled and be more prescriptive in terms of advising.

The reviewers have not specified *how* the core requirements should be increased, nor whether the increase should apply to all options or just to one option such as Applied. Without further information, the program is unsure about how to proceed with this particular recommendation. If core requirements were to be increased in the Applied option, the program feels that the Pastoral Care course would be a candidate. However, if this meant offering the course every year, that would reduce the number of other electives that could be made available. There would also be concern that mandating more courses may have the effect of deterring some students from the Applied option who, perhaps for reasons of schedule or interest, may not want to take an increased number of required courses.

The program compiled a list of requirements for other MTS programs in Canada and the U.S. and noted that while a few have as many requirements than this program, most have fewer requirements than the Applied option (for which 8 of 16 courses are requirements). In her covering letter to the Associate Vice-President of GSPA, the Dean of Arts wrote: "Increasing core requirements and reducing flexibility is the opposite of the strategy I am currently recommending to our graduate programs, so I'm pleased to see that MTS is not inclined to make this change."

At this point, the program is not inclined to make changes to the course requirements. The strategy is to provide appropriate course options and be proactive in the advising process.

6. CG develops the curriculum map as a tool, particularly for adjuncts, and incorporate the learning outcomes that should be met in electives. Course syllabi could be linked to the map so that potential overlap and lacunae among courses become more visible.

#### **Response**

In the self-study, Appendix 4 was a map linking the Graduate Degree Level Expectations with the MTS Learning Objectives, and Appendix 5 was a map linking the MTS Learning Objectives with the requirements for each of the three program options, as well as the strongly recommended courses in Applied, and elective courses considered collectives. The program interprets the recommendation to be the extension of those existing maps to more courses. The program agrees that more could be done to orient adjuncts to our learning expectations, though this is a large administrative task. Regular and adjunct faculty will also be expected to make the connections to learning objectives clearer in their own syllabi. The TS-AG will then compile the results and note any gaps.

7. CG institutes systematic preparatory work for students without a related degree to be undertaken in the summer prior to entry in the program and substitution for the Old Testament and New Testament courses be allowed when incoming students demonstrate competency.

#### **Response**

The MTS program is not planning to offer any formal systematic preparatory work in the summer for students entering the program. The MTS does not require that students have previous degrees in theology or religious studies. The four core courses (in all options) plus TS 677 (for Applied option) are designed to provide the foundations necessary for the degree. Practically speaking, there are not the faculty resources to support additional summer instruction. Requiring formal summer study for some students would mean they would need to be admitted for the Spring term, a change in the basic design of the program that the program does not believe is warranted.

Several years ago, the program developed a reading list that is sent to incoming students over the summer. This list is especially for those who have not studied theology or biblical studies in formal academic settings. This list will be reviewed and enhanced.

MTS indicates that it would be helpful to know more about what kind of preparatory work is most needed or if there are some students who should not have been admitted in the first place. In the survey of current students included in the self-study, only one of 13 indicated that their previous studies did not adequately prepare them for the program. Core courses associated with the program have been designed in such a way to introduce students to graduate studies as well as to the practices of research and writing, the critical study of the Bible and theology and history, and to other specific content. Even though students are recommended to take core courses as early as possible, for reasons of student schedule or term of admission, sometimes the sequencing is off.

The program has a procedure in place for granting advanced standing for any of the four core courses. Advanced standing means being exempt from one or more core courses, though not reducing the total number of courses required in the program. The program will review these procedures, and consider the possibility of a competency exam. MTS will also revisit the question of whether the onus is on the student to initiate the process (as it is currently) or whether advisors should be proactive in suggesting that students consider this opportunity.

8. CG institutes policies or procedures around the hiring of sessional and adjunct faculty that is driven by the curriculum rather than by individuals.

### **Response**

[Note on terminology: MTS has regular faculty members (typically full-time and often though not always tenure-track) and adjunct faculty members who are hired for one course at a time. They do not use the language of sessional faculty.]

Currently, the hiring of adjunct faculty members is driven by the curricular needs of the program. Program needs are determined first (often with the assistance of student surveys), and then appropriate teaching resources sought. One of the ongoing challenges is that course planning happens over a year in advance and the needs and interests of particular cohorts can be quite different from year to year. Thus, MTS recognizes that course offerings do not always meet the needs and interests of students in a given term.

In consultation with the Dean and other program units at Grebel, the program will develop written procedures for the hiring and re-hiring of adjunct course instructors.

9. CG lays out clearer expectations for the community service load for full-time faculty members and that it be both strategic and limited to helping with student recruitment.

**Response**

The program appreciates the recognition that running a program such as this requires a significant commitment on the part of all faculty and staff involved. It is also noted that while speaking in church constituencies is service work that all TS faculty members do, it is only one aspect. Within the TS program, faculty members are also involved in shared governance, leading extra-curricular workshops, participating in admissions interviews, and administrative work over and above what might be directly compensated through course releases. In addition, as is noted, there are service expectations in relation to Conrad Grebel as a whole, as well as to other units within the University. Faculty are also involved in service to the guild through editorial boards, professional associations, and peer-review requests. Since MTS students come from a wide range of Christian traditions, it is not clear to the program as to how they would implement service expectations that were *limited* to MTS student recruitment. Direct recruitment, through visits to other post-secondary schools and one-on-one conversations with potential applicants, is already assigned administratively. If this were the lens through which MTS understood all of their speaking and teaching activities in churches, this may actually increase rather than decrease service expectations.

Regular faculty members at Conrad Grebel are accountable to the Dean for their research, teaching and service. Overall service expectations of faculty members are thus the responsibility of the Dean to whom we defer for a response to the recommendation.

The program will request of the Dean that the position of Director of Theological Studies be compensated annually with two course releases (as is common for the Chairs of departments) rather than the current one course release. The Director of TS is responsible for the MTS program, as well as oversight of the Toronto Mennonite Theological Centre and the Anabaptist Learning Workshop.

10. CG becomes more intentional about hiring sessional lecturers that will diversify the teaching component in the program.

**Response**

MTS plans to be more intentional about hiring sessional lecturers. In the last two academic years, three of ten adjunct-taught courses were led by instructors who are not white. The program plans to continue to engage those particular instructors if they are available (one has since been hired into a tenure-track position elsewhere) and to actively identify and approach other candidates to teach in the program.

11. CG students with U of W degrees serve as guides and mentors to those unfamiliar with the campus. We strongly encourage that a way of facilitating MTS students' identification with the U of W graduate program and students be found.

**Response**

MTS views this as a good idea. The program can collaborate with MPACS to advance this recommendation, and engage in conversation with current students who are UW grads in order to get a better sense of how this might be implemented.

The program wants to be modest in expectations of how much students will identify with the University of Waterloo as a whole and ensure that such efforts do not diminish connections to the graduate community at Conrad Grebel. There is a strong identification with Conrad Grebel and its community, which is seen as a strength of the program. Such identification mitigates against the isolation, which is a danger for many in graduate programs.

12. CG develops an instrument that allows measurement of development of such things as professional identity and intercultural competence.

**Response**

Existing instruments will be explored to consider how they might be integrated into the program. Given that students in the Applied Studies option typically take TS 677 Church and Ministry in their first term and TS 783 Integration Seminar in the last or second to last term, these courses may provide opportunities for measuring one kind of professional identity. There may be other ways that such instruments could be integrated in the required courses for all students or as an option for those who are interested. Adding a milestone requirement may be way to ensure that students engage with such instruments.

## Implementation Plan

	Recommendations	Proposed Actions	Responsibility for Leading and Resourcing (if applicable) the Actions	Timeline for addressing Recommendations
1.	Conrad Grebel (CG) provides clearer communication to students about the nature and need for reading courses (that is, they are rare and only when necessary to address a lacuna in a student's program).	Program guidelines have been updated and communicated to students	TS Director	Completed
2.	CG continues on trajectory toward limiting courses taken at other institutions.	It is unclear whether the concern is financial or programmatic. The program will continue to monitor. There are programmatic reasons for students to take courses elsewhere and this possibility was built into the structure of the program.	TS Director	Ongoing
3.	CG continues developing the 2-1 relationship with AMBS so that students in the ministerial track complete an MDiv. It could be worthwhile establishing a 2-1 relationship with other local seminaries.	The program will continue to promote the AMBS MDiv option with graduates; and will explore a similar arrangement with a Canadian institution.	TS Director	Ongoing; one additional seminary relationship clarified by Spring 2021
4.	CG strengthens the coordination with faculty and courses in CG's other programs as well as the Religious Studies graduate program.	The program will make connections with RS graduate programs (though differences in level [doctoral] as well as focus will limit these opportunities), as well as Music, Peace and Conflict Studies, Catholic Thought, and Classical Studies.	TS Director	Ongoing
5.	CG becomes more prescriptive and strategic about elective offerings and increase the core requirements.	There is lack of clarity about which core requirements should be increased. The program has already identified four	TS Director	Completed; ongoing

		highly recommended courses for Applied Option and committed to offering them every two years.		
6.	CG develops the curriculum map as a tool, particularly for adjuncts, and incorporate the learning outcomes that should be met in electives. Course syllabi could be linked to the map so that potential overlap and lacunae among courses become more visible.	All regular and adjunct faculty will be reminded of program learning objectives and expected to incorporate them into their syllabi.	TS Director	Spring 2020
7.	CG institutes systematic preparatory work for students without a related degree to be undertaken in the summer prior to entry in the program and substitution for the Old Testament and New Testament courses be allowed when incoming students demonstrate competency.	The program does not propose remedial workshops for incoming students. The program will review how research, writing, and other skills are covered in our core courses, as well as review and enhance the “summer reading” list. Substitution (advanced standing) for core courses, including Old Testament and New Testament, is already allowed. The existing procedures for this will also be reviewed.	TS Director	Spring 2020
8.	CG institutes policies or procedures around the hiring of sessional and adjunct faculty that is driven by the curriculum rather than by individuals.	A procedures document will be developed together with other academic units at Grebel.	TS Director, and Dean of Conrad Grebel	Spring 2021
9.	CG lays out clearer expectations for the community service load for full-time faculty members and that it be both strategic and limited to helping with student recruitment.	Faculty members are accountable to the Dean, not the program director, for service expectations. A two-course release for program director will be requested.	TS Director, and Dean of Conrad Grebel	Ongoing; request for course release will be made in Spring 2019

10.	CG becomes more intentional about hiring sessional lecturers that will diversify the teaching component in the program.	The program will be more intentional about this.	TS Director	Ongoing
11.	CG students with U of W degrees serve as guides and mentors to those unfamiliar with the campus. We strongly encourage that a way of facilitating MTS students' identification with the U of W graduate program and students be found.	UW grads currently enrolled in the program will be consulted about how best to do this.	TS Director	Winter 2020
12.	CG develops an instrument that allows measurement of development of such things as professional identity and intercultural competence.	The program will examine existing instruments and how these might be incorporated in required courses and/or as options for those interested.	TS Director	Spring 2021

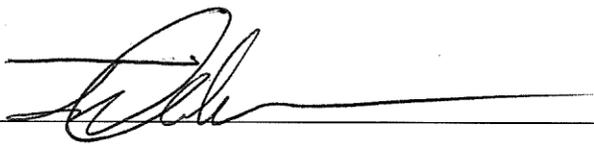
The Department Chair/Director, in consultation with the Dean of the Faculty shall be responsible for the Implementation Plan.

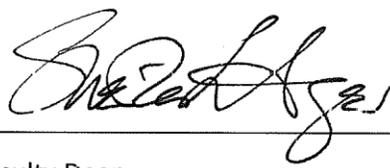


Date of next program review \_\_\_\_\_ 2025-2026 \_\_\_\_\_  
Date

Signatures of Approval

  
Chair/Director \_\_\_\_\_ Jan 20, 2020 \_\_\_\_\_  
Date

  
AFIW Administrative Dean/Head (For AFIW programs only) \_\_\_\_\_ January 20, 2020 \_\_\_\_\_  
Date

 *Please see separate decanal response*  
Faculty Dean \_\_\_\_\_ Jan 26 / 20 \_\_\_\_\_  
Date

**Note:** AFIW programs fall under the Faculty of ARTS; however, the Dean does not have fiscal control nor authority over staffing and administration of the program.

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

  
December 18, 2019

Associate Vice-President, Graduate Studies and Postdoctoral Affairs \_\_\_\_\_  
(For graduate and augmented programs) \_\_\_\_\_  
Date

**Final Assessment Report: Theological Studies (MTS) December 2019**

**Name of Reviewer: Adam Kolkiewicz**

**Date: 8/21/2020**

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**Does the Final Assessment Report:**

1. Include a credible implementation plan that not only addresses the substantive issues identified from the program review process, but also clearly identifies:
  - The actions that will follow from specific recommendations?  **Yes**  **No**
  - Those who will be responsible for acting on those recommendations?  **Yes**  **No**
  - Those who will be responsible for providing resources?  **Yes**  **No**
  - Priorities for implementation and realistic timelines for initiating and monitoring actions?  **Yes**  **No**
2. Provide rationales for any recommendations that have not been pursued?  **Yes**  **No**

**General Comments**

**My comments and suggested revisions have been addressed to my satisfaction, and overall the proposed implementation plan is credible and meets the required criteria.**

**Final Assessment Report: Theological Studies (MTS)**

**Name of Reviewer: Bernard Duncker**

**Date: 8/26/2020**

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**Does the Final Assessment Report:**

1. Include a credible implementation plan that not only addresses the substantive issues identified from the program review process, but also clearly identifies:
  - The actions that will follow from specific recommendations?  **Yes**  **No**
  - Those who will be responsible for acting on those recommendations?  **Yes**  **No**
  - Those who will be responsible for providing resources?  **Yes**  **No**
  - Priorities for implementation and realistic timelines for initiating and monitoring actions?  **Yes**  **No**
2. Provide rationales for any recommendations that have not been pursued?  **Yes**  **No**

**General Comments**

**I'm fully satisfied with the responses provided by those administering the Theological Studies Program to both the external reviewers and me.**

# ARTS GRADUATE STUDIES

August 11, 2020

TO: Members, Senate Graduate and Research Council  
FROM: Rita Cherkewski, Graduate Studies and Research Officer  
RE: Graduate Affairs Group Reports

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The attached Arts Graduate Affairs Group reports were approved by the Arts Faculty Council meeting on June 16, 2020 and are now being submitted for approval by the Senate Graduate and Research Council on September 14, 2020.



Rita Cherkewski

Attach.

**Arts Faculty Council Report  
to Senate Graduate and Research Council**

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**CURRICULAR ITEMS for approval [bottom right pagination]**

- I. **Classical Studies** – *program revision*: Addition of two courses, GRK 602 and LAT 602. [1-2]
- II. **Classical Studies** – *new courses*: GRK 602: Introductory Greek for Graduate Students; LAT 602: Introductory Latin for Graduate Students. [3-6]
- III. **Psychology** – *course revision*: New course description for PSYCH 888: Negotiation, Conflict Management, and Teamwork: Theory and Practice. [7]
- IV. **English** – *program revision*: Add ENGL 702 as a required course for MA, RCD and MA Co-op, RCD. [8-13]
- V. **English** – *new course*: ENGL 702: Rhetorical Research Methods. [14-15]
- VI. **Economics** – *new courses*: ECON 526: Fundamentals in programming for big data analysis and ECON 626: Machine learning for economists. [16-17]

Prior to form submission, review the [content revision instructions](#) and information regarding [major/minor modifications](#). For questions about the form submission, contact [Trevor Clews](#), Graduate Studies and Postdoctoral Affairs (GSPA).

**Faculty:** Arts

**Program:** Master of Arts (MA) in Classical Studies

**Program contact name(s):** Craig Hardiman

**Form completed by:** Brigitte Schneebeli

[Description of proposed changes:](#)

Addition of 2 new courses which will change the description of the number of courses needed for both the thesis and master's research paper options.

**Is this a [major modification](#) to the program?** No

**Rationale for change(s):**

There is an increasing demand from graduate students in a number of units, who realize they need the basics of Latin/Greek language for their research, to offer an intensive course for graduate credit. This course will allow graduate students to receive accelerated instruction in the language and complete the equivalent of three terms worth of Latin and/or Greek in two terms.

**Proposed effective date:** Term: Winter Year: 2021

**Current [Graduate Studies Academic Calendar \(GSAC\)](#) page**

<https://uwaterloo.ca/graduate-studies-academic-calendar/arts/department-classical-studies/master-arts-ma-classical-studies>

<b>Current Graduate Studies Academic Calendar content:</b>	<b>Proposed Graduate Studies Academic Calendar content:</b>
<p><a href="#">Degree requirements</a></p> <p>Thesis option:</p> <ul style="list-style-type: none"> <li>• Courses               <ul style="list-style-type: none"> <li>○ Students must complete 4 one-term graduate level courses in Classical Studies (CLAS, GRK or LAT), including CLAS 600 Research Methods in Classical Studies.</li> </ul> </li> </ul>	<p><b>Degree requirements</b></p> <p><b>Thesis option:</b></p> <ul style="list-style-type: none"> <li>• Courses               <ul style="list-style-type: none"> <li>○ Students must complete 4 one-term graduate level courses in Classical Studies (CLAS, GRK or LAT), including CLAS 600 Research Methods in Classical Studies.</li> </ul> </li> </ul>

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:
<p>Master's Research Paper option:</p> <ul style="list-style-type: none"> <li>• Courses <ul style="list-style-type: none"> <li>○ Students must complete 6 one-term graduate level courses in Classical Studies (CLAS, GRK or LAT), including CLAS 600 Research Methods in Classical Studies.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>○ <u>GRK 602 and LAT 602 cannot be counted toward the number of required courses taken in the thesis option.</u></li> </ul> <p><b>Master's Research Paper option:</b></p> <ul style="list-style-type: none"> <li>• Courses <ul style="list-style-type: none"> <li>○ Students must complete 6 one-term graduate level courses in Classical Studies (CLAS, GRK or LAT), including CLAS 600 Research Methods in Classical Studies.</li> <li>○ <u>2 of the 6 one-term graduate courses can be substituted with either GRK 602 or LAT 602.</u></li> </ul> </li> </ul>

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

Currently registered students will be allowed to take these new courses as per the requirements outlined above. This will give our students more options.

**Department/School approval date** (mm/dd/yy):

**Reviewed by GSPA** (for GSPA use only)  date (mm/dd/yy): 04/20/2020

**Faculty approval date** (mm/dd/yy): 06/16/20

**Senate Graduate & Research Council (SGRC) approval date** (mm/dd/yy):

**Senate approval date** (mm/dd/yy) (if applicable):

Faculty: Arts

Effective term: Term/Year Winter 2021

Course  New  Revision  Inactivation  Milestone

New  Revision New  Inactivation  milestone title:

Choose an item.

For course revisions, indicate the type(s) of changes:

(e.g. consent, description, title, requisites)

Course Subject code: GRK Choose an item. Course number: 602

Course Title (max. 100 characters incl. spaces): Introductory Greek for Graduate Students

Course Short Title (max. 30 characters incl. spaces): Introductory Greek

Grading Basis: NUMERICAL

Course Credit Weight: 1.00

Course Consent Required:  Department

Course Description:

A course designed for graduate level students beginning the study of Ancient Greek. This course will teach the foundational grammar, syntax and vocabulary in an accelerated way, while also training students in graduate level interpretation of texts in the original language. The student will also meet individually with the professor for advanced work, so that the student will have completed the equivalent of up to GRK 201 by the end of the course.

New course description (for revision only):

Meet Type(s): Seminar Choose an item. Choose an item. Choose an item.

Primary Meet Type: Seminar

Anti-requisites: GRK 101, GRK 102, GRK 201, RS 101, RS 102, RS 223

Special topics course: Yes  No

Cross-listed: Yes  No

Course Subject(s) to be cross-listed with and approval status:

Sections combined/held with: Will most times be held with GRK/RS 101, and GRK/RS 102, but can be offered as stand alone when those are not being offered (i.e. spring term)

**Rationale for request:** There is an increasing demand from graduate students, in a number of units, who realize they need the basics of the Ancient Greek language for their research, to offer an intensive course for graduate credit. This course will allow graduate students to receive accelerated instruction in the language and complete the equivalent of three terms worth of undergraduate Ancient Greek instruction in two terms. This course will normally be held with GRK/RS 101-2



Faculty: Arts

Effective term: Term/Year Winter 2021

Course  New  Revision  Inactivation

Milestone  New  Revision  Inactivation

New milestone title: Choose an item.

For course revisions, indicate the type(s) of changes:  
(e.g. consent, description, title, requisites)

Course Subject code: LAT Choose an item. Course number: 602

Course Title (max. 100 characters incl. spaces): Introductory Latin for Graduate Students

Course Short Title (max. 30 characters incl. spaces): Introductory Latin

Grading Basis: NUMERICAL

Course Credit Weight: 1.00

Course Consent Required:  Department

Course Description:

A course designed for graduate level students beginning the study of Latin. This course will teach the foundational grammar, syntax and vocabulary in an accelerated way, while also training students in graduate level interpretation of texts in the original language. The student will also meet individually with the professor for advanced work, so that the student will have completed the equivalent of up to LAT 201 by the end of the course.

New course description (for revision only):

Meet Type(s): Seminar Choose an item. Choose an item. Choose an item.

Primary Meet Type: Seminar

Anti-requisite: LAT 101, LAT 102, LAT 201

Special topics course: Yes  No

Cross-listed: Yes  No

Course Subject(s) to be cross-listed with and approval status:

Sections combined/held with: Will most times be held with LAT 101, and LAT 102, but can be offered as stand alone when those are not being offered (i.e. spring term)

**Rationale for request:** There is an increasing demand from graduate students, in a number of units, who realize they need the basics of the Latin language for their research, to offer an intensive course for graduate credit. This course will allow graduate students to receive accelerated instruction in the language and complete the equivalent of three terms worth of undergraduate Latin instruction in two terms. This course will normally be held with LAT 101-2.



Faculty: Arts

Effective term: Term/Year Winter 2021

Course  New  Revision  Inactivation

Milestone  New  Revision  Inactivation

New milestone title: Choose an item.

For course revisions, indicate the type(s) of changes: Title, description  
(e.g. consent, description, title, requisites)

Course Subject code: PSYCH Course number: 888

Course Title (max. 100 characters incl. spaces): Negotiation, Conflict Management, and Teamwork: Theory and Practice

Course Short Title (max. 30 characters incl. spaces): Negotn, Conflict Mgt, Tmwrk

Grading Basis: OPTIONAL

Course Credit Weight: 0.50

Course Consent Required:  Department Consent.

Course Description: *Negotiation: Theory and Practice* addresses planning, motivation, communication, information exchange, influence, relationships, emotion, and reaching objectives in the diverse array of interdependent decision-making contexts faced by managers. Topics include distributive and integrative negotiations, coalitions, negotiating on teams, dispute resolution, and multi-party negotiations. Mandatory first class attendance.

New course description (for revision only): This course addresses interdependent decision making in the workplace and covers social motivation, cognitive biases, communication and influence strategies, brainstorming and idea generation, managing emotion, and reaching objectives in a diverse array of interdependent work contexts. Topics include distributive and integrative negotiations, working in teams, conflict management, and dispute resolution. Mandatory first class attendance.

Meet Type(s): Seminar Choose an item. Choose an item. Choose an item.

Primary Meet Type: Seminar

[Requisites:](#)

Special topics course: Yes  No

Cross-listed: Yes  No

Course Subject(s) to be cross-listed with and approval status:

Sections combined/heldwith:

**Rationale for request:** We are updating the title of this course from Negotiation: Theory and Practice to Negotiation, Conflict Management, and Teamwork: Theory and Practice. Changes to the course description reflect the current course.

Prior to form submission, review the [content revision instructions](#) and information regarding [major/minor modifications](#). For questions about the form submission, contact [Trevor Clews](#), Graduate Studies and Postdoctoral Affairs (GSPA).

**Faculty:** Arts

**Programs:** 1) Master of Arts (MA) in English – Rhetoric and Communication Design  
2) Master of Arts (MA) in English – Rhetoric and Communication Design – Co-operative Program

**Program contact name(s):** Marcel O’Gorman

**Form completed by:** Jennifer Clary-Lemon and Ashley Mehlenbacher

[Description of proposed changes:](#)

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

*Add ENGL 702 to the list of required courses to the MA in English - RCD programs, decreasing elective courses by 1.*

**Is this a [major modification](#) to the program?** No

**Rationale for change(s):**

*Students in the MA in English - RCD programs are currently required to enroll in ENGL 700: Rhetorical Studies, which is a foundational course in rhetorical theory. Given that there is no partner course to support research practices specific to the field of Rhetoric, Communication Design, and Writing Studies, we would like them to enroll in a partner methods course ENGL 702: Rhetorical Research Methods. This would decrease thesis option students’ elective courses from 1 to 0, decrease Major Research Project (MRP) option students’ Rhetoric and Communication Design RCD course requirements from 3 to 2, and decrease coursework option students’ electives from 3 to 2. This change better prepares students for the learning objectives of the program, particularly as MRP and thesis students are required to design and deliver a substantial research project. It also supports parallel programming in the MA in English - Experimental Digital Media (XDM) programs, which requires a Critical Design Methods course (ENGL 701).*

**Proposed effective date:** Term: Winter Year: 2021

**Current [Graduate Studies Academic Calendar \(GSAC\)](#) page** (include the link to the web page where the changes are to be made):

<https://uwaterloo.ca/graduate-studies-academic-calendar/arts/departments/english-language-and-literature/master-arts-ma-english-rhetoric-and-communication-design>

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:
<p>Degree requirements</p> <p>Master's Research Paper option:</p> <ul style="list-style-type: none"> <li>• <b>Courses</b> <ul style="list-style-type: none"> <li>○ Students must complete the following 6 courses:           <ul style="list-style-type: none"> <li>▪ ENGL 700 Rhetorical Studies</li> <li>▪ 3 courses designated as Rhetoric and Communication Design</li> <li>▪ 1 course designated as Literature</li> <li>▪ 1 elective</li> </ul> </li> <li>○ Students may include 1 extra-departmental graduate courses in their degree requirements, but these courses must be approved by the Graduate Committee. For a course outside the University of Waterloo, the Ontario Visiting Graduate Student (OVGS) form must be completed. For a course inside the University, the Departmental Graduate Studies Committee must approve. In either case, the Department's Graduate Office must be supplied with a syllabus in electronic form and the course must be approved before the beginning of the term in which it is scheduled to run.</li> <li>○ Reading courses may supplement regular offerings in the program, although it is understood that they will be given only in exceptional circumstances. Students are permitted to take only 1 reading course as part of the degree. If students can demonstrate that a reading course is necessary to their overall program, they may petition the Departmental Graduate Studies Committee to allow such an independent course. Directed reading courses must be designed and submitted to the Graduate Committee by the instructor in consultation with the student, and the course outline (with rationale, reading list,</li> </ul> </li> </ul>	<p>Degree requirements</p> <p>Master's Research Paper option:</p> <ul style="list-style-type: none"> <li>• <b>Courses</b> <ul style="list-style-type: none"> <li>○ Students must complete the following 6 courses:           <ul style="list-style-type: none"> <li>▪ ENGL 700 Rhetorical Studies</li> <li>▪ <u>ENGL 702 Rhetorical Research Methods</u></li> <li>▪ 2 courses designated as Rhetoric and Communication Design</li> <li>▪ 1 course designated as Literature</li> <li>▪ 1 elective <u>course from either within or outside the Department</u></li> </ul> </li> <li>○ Students may include 1 extra-departmental graduate course in their degree requirements, but these courses must be approved by the Graduate Committee. For a course outside the University of Waterloo, the Ontario Visiting Graduate Student (OVGS) form must be completed. For a course inside the University, the Departmental Graduate Studies Committee must approve. In either case, the Department's Graduate Office must be supplied with a syllabus in electronic form and the course must be approved before the beginning of the term in which it is scheduled to run.</li> <li>○ Reading courses may supplement regular offerings in the program, although it is understood that they will be given only in exceptional circumstances. Students are permitted to take only 1 reading course as part of the degree. If students can demonstrate that a reading course is necessary to their overall program, they may petition the Departmental Graduate Studies Committee to allow such an independent course. Directed reading courses must be designed and</li> </ul> </li> </ul>

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:
<p>assignments and schedule) must be approved by the Graduate Committee in the term prior to the one in which the course is to be run.</p> <ul style="list-style-type: none"> <li>○ In order to graduate, candidates must receive an average of at least 75% in their courses. If a student receives one failing grade or two grades lower than 70%, the Departmental Graduate Studies Committee will review their standing in the program and the student may be asked to withdraw from the program.</li> </ul> <p>Thesis option:</p> <ul style="list-style-type: none"> <li>• <b>Courses</b> <ul style="list-style-type: none"> <li>○ Students must complete the following 4 courses: <ul style="list-style-type: none"> <li>▪ ENGL 700 Rhetorical Studies</li> <li>▪ 1 course designated as Rhetoric and Communication Design</li> <li>▪ 1 course designated as Literature</li> <li>▪ <b>1 elective</b></li> </ul> </li> <li>○ <del>Students may include 1 extra-departmental graduate courses in their degree requirements, but these courses must be approved by the Graduate Committee. For a course outside the University of Waterloo, the Ontario Visiting Graduate Student (OVGS) form must be completed. For a course inside the University, the Departmental Graduate Studies Committee must approve. In either case, the Department's Graduate Office must be supplied with a syllabus in electronic form and the course must be approved before the beginning of the term in which it is scheduled to run.</del></li> <li>○ Reading courses may supplement regular offerings in the program, although it is understood that they will be given only in exceptional circumstances. Students are permitted to take only 1 reading course as part of the degree. If students can demonstrate that a reading course is necessary to their</li> </ul> </li> </ul>	<p>submitted to the Graduate Committee by the instructor in consultation with the student, and the course outline (with rationale, reading list, assignments and schedule) must be approved by the Graduate Committee in the term prior to the one in which the course is to be run.</p> <ul style="list-style-type: none"> <li>○ In order to graduate, candidates must receive an average of at least 75% in their courses. If a student receives one failing grade or two grades lower than 70%, the Departmental Graduate Studies Committee will review their standing in the program and the student may be asked to withdraw from the program.</li> </ul> <p>Thesis option:</p> <ul style="list-style-type: none"> <li>• <b>Courses</b> <ul style="list-style-type: none"> <li>○ Students must complete the following 4 courses: <ul style="list-style-type: none"> <li>▪ ENGL 700 Rhetorical Studies</li> <li>▪ <u>ENGL 702 Rhetorical Research Methods</u></li> <li>▪ 1 course designated as Rhetoric and Communication Design</li> <li>▪ 1 course designated as Literature</li> </ul> </li> <li>○ Reading courses may supplement regular offerings in the program, although it is understood that they will be given only in exceptional circumstances. Students are permitted to take only 1 reading course as part of the degree. If students can demonstrate that a reading course is necessary to their overall program, they may petition the Departmental Graduate Studies Committee to allow such an independent course. Directed reading courses must be designed and submitted to the Graduate Committee by the instructor in consultation with the student, and the course outline (with rationale, reading list, assignments and schedule) must be approved by the Graduate Committee in the term prior to the one in which the course is to be run.</li> </ul> </li> </ul>

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:
<p>overall program, they may petition the Departmental Graduate Studies Committee to allow such an independent course. Directed reading courses must be designed and submitted to the Graduate Committee by the instructor in consultation with the student, and the course outline (with rationale, reading list, assignments and schedule) must be approved by the Graduate Committee in the term prior to the one in which the course is to be run.</p> <ul style="list-style-type: none"> <li>○ In order to graduate, candidates must receive an average of at least 75% in their courses. If a student receives one failing grade or two grades lower than 70%, the Departmental Graduate Studies Committee will review their standing in the program and the student may be asked to withdraw from the program.</li> </ul> <ul style="list-style-type: none"> <li>● <b>Master's Thesis</b> <ul style="list-style-type: none"> <li>● <b>The thesis will be 80-100 pages long, or the equivalent in other media. It will be an in-depth inquiry into a problem in an area of Rhetoric and Communication Design. It will involve thorough research, and proficiency in the technology of the medium chosen. It will be supervised by a member of the Faculty and have a second reader who is also a member of faculty, but who may belong to a different academic unit than English.</b></li> <li>● <b>Students planning to complete their degree through this option should arrange a supervisor and a second reader and prepare a proposal and working bibliography for the approval of the Departmental Graduate Studies Committee before the end of the second academic term.</b></li> </ul> </li> </ul> <p>Coursework option:</p> <ul style="list-style-type: none"> <li>● <b>Courses</b></li> </ul>	<ul style="list-style-type: none"> <li>○ In order to graduate, candidates must receive an average of at least 75% in their courses. If a student receives one failing grade or two grades lower than 70%, the Departmental Graduate Studies Committee will review their standing in the program and the student may be asked to withdraw from the program.</li> </ul> <ul style="list-style-type: none"> <li>● <b>Master's Thesis</b> <ul style="list-style-type: none"> <li>● The thesis will be 80-100 pages long, or the equivalent in other media. It will be an in-depth inquiry into a problem in an area of Rhetoric and Communication Design. It will involve thorough research, and proficiency in the technology of the medium chosen. It will be supervised by a member of the Faculty and have a second reader who is also a member of faculty, but who may belong to a different academic unit than English.</li> <li>● Students planning to complete their degree through this option should arrange a supervisor and a second reader and prepare a proposal and working bibliography for the approval of the Departmental Graduate Studies Committee before the end of the second academic term.</li> </ul> </li> </ul> <p>Coursework option:</p> <ul style="list-style-type: none"> <li>● <b>Courses</b> <ul style="list-style-type: none"> <li>○ Students must complete the following 8 courses: <ul style="list-style-type: none"> <li>▪ ENGL 700 Rhetorical Studies</li> <li>▪ <u>ENGL 702 Rhetorical Research Methods</u></li> <li>▪ 3 courses designated as Rhetoric and Communication Design</li> <li>▪ 1 course designated as Literature</li> <li>▪ <u>2 elective courses from either within or outside the Department</u></li> </ul> </li> <li>○ Students may include 1 extra-departmental graduate courses in their elective degree requirements, but these courses must be approved by the Graduate Committee. For a</li> </ul> </li> </ul>

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:
<ul style="list-style-type: none"> <li>○ Students must complete the following 8 courses: <ul style="list-style-type: none"> <li>▪ ENGL 700 Rhetorical Studies</li> <li>▪ 3 courses designated as Rhetoric and Communication Design</li> <li>▪ 1 course designated as Literature</li> <li>▪ 3 elective courses</li> </ul> </li> <li>○ Students may include 1 extra-departmental graduate courses in their degree requirements, but these courses must be approved by the Graduate Committee. For a course outside the University of Waterloo, the Ontario Visiting Graduate Student (OVGS) form must be completed. For a course inside the University, the Departmental Graduate Studies Committee must approve. In either case, the Department's Graduate Office must be supplied with a syllabus in electronic form and the course must be approved before the beginning of the term in which it is scheduled to run.</li> <li>○ Reading courses may supplement regular offerings in the program, although it is understood that they will be given only in exceptional circumstances. Students are permitted to take only 1 reading course as part of the degree. If students can demonstrate that a reading course is necessary to their overall program, they may petition the Departmental Graduate Studies Committee to allow such an independent course. Directed reading courses must be designed and submitted to the Graduate Committee by the instructor in consultation with the student, and the course outline (with rationale, reading list, assignments and schedule) must be approved by the Graduate Committee in the term prior to the one in which the course is to be run.</li> <li>○ In order to graduate, candidates must receive an average of at least 75% in their courses. If a student receives one failing grade or two grades lower than 70%, the Departmental Graduate Studies Committee will review their</li> </ul>	<p>course outside the University of Waterloo, the Ontario Visiting Graduate Student (OVGS) form must be completed. For a course inside the University, the Departmental Graduate Studies Committee must approve. In either case, the Department's Graduate Office must be supplied with a syllabus in electronic form and the course must be approved before the beginning of the term in which it is scheduled to run.</p> <ul style="list-style-type: none"> <li>○ Reading courses may supplement regular offerings in the program, although it is understood that they will be given only in exceptional circumstances. Students are permitted to take only 1 reading course as part of the degree. If students can demonstrate that a reading course is necessary to their overall program, they may petition the Departmental Graduate Studies Committee to allow such an independent course. Directed reading courses must be designed and submitted to the Graduate Committee by the instructor in consultation with the student, and the course outline (with rationale, reading list, assignments and schedule) must be approved by the Graduate Committee in the term prior to the one in which the course is to be run.</li> <li>○ In order to graduate, candidates must receive an average of at least 75% in their courses. If a student receives one failing grade or two grades lower than 70%, the Departmental Graduate Studies Committee will review their standing in the program and the student may be asked to withdraw from the program.</li> </ul>

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:
standing in the program and the student may be asked to withdraw from the program.	

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

Current students will not be required to take ENGL 702. But they can take it as an elective.

**Department/School approval date ( ):**

**Reviewed by GSPA** (for GSPA use only)  date (mm/dd/yy): 05/11/2020

**Faculty approval date** (mm/dd/yy): 06/16/20

**Senate Graduate & Research Council (SGRC) approval date** (mm/dd/yy):

**Senate approval date** (mm/dd/yy) (if applicable):

Faculty: Arts

Effective term: Term/Year Winter 2021

Course  New  Revision  Inactivation

Milestone  New  Revision  Inactivation

New milestone title: Choose an item.

For course revisions, indicate the type(s) of changes:  
(e.g. consent, description, title, requisites)

Course Subject code: ENGL Course number: 702

Course Title (max. 100 characters incl. spaces): Rhetorical Research Methods

Course Short Title (max. 30 characters incl. spaces): Rhetorical Research Methods

Grading Basis: NUMERICAL

Course Credit Weight: 0.50

Course Consent Required:  Choose an item.

Course Description:

This course is an introduction to research methods used in rhetoric, communication design, and writing studies. Emphasis is placed on research ethics, the fit of method to research design, the interdisciplinary scope of research methods, the emergence of new research methods, and the development of research proposals. Students will become familiar with a range of methods, including methods in technical and professional communication, mixed methods, and rhetorical field methods, among others. This course suggests method as a practice as well as an object of study, connecting well-known traditional methods in rhetoric, communication design, and writing studies to those that are emergent, new, and mixed. This course allows students to map a variety of methods while understanding the relationship between practices (methods) and theoretical frameworks (methodologies), allowing students to pair appropriate methods to their own research questions. Outcomes of this course are an understanding of how to design a research project and how to support it with methods that are appropriate, feasible, flexible, and ethical.

New course description (for revision only):

Meet Type(s): Seminar Choose an item. Choose an item. Choose an item.

Primary Meet Type: Seminar

[Requisites](#): ENGL Grad Students only

Special topics course: Yes  No

Cross-listed: Yes  No

Course Subject(s) to be cross-listed with and approval status:

Sections combined/heldwith:

**Rationale for request:**

Students in the MA in English - Rhetoric and Communication Design (RCD) program currently take a required ENGL 700 (Rhetorical Studies), a foundational course in rhetorical theory, and many choose the Major Research Project (MRP) option to complete their degree requirements. While many RCD courses contain a small methodological component, none prepare RCD students to undertake a large research project, inclusive of thinking through its design and choosing methods from a suite available. This often places an extra burden on faculty who choose to supervise MRP or Thesis students, as they take on the added task of preparing students for methodological decision-making and explanation. Whether students choose the MRP, thesis option, or go on to a PhD, they are under-resourced to theoretically, practically, and strategically think about choosing research methods appropriate to their discipline, one that differs significantly from either traditional literary methods or contemporary media design methods. This positions our RCD MA graduates as having less preparation for careers in industry than their peers coming out of similar institutions (i.e., WLU's Communication program). A required course in methods for RCD students pursuing the MRP or Thesis, offered in the first year of study, will prepare them for a variety of paths ahead, whether undertaking a major research project, applying to PhD programs in other institutions, working in professional and technical communication fields, choosing an alt-ac path with a significant research and writing component, or completing their PhD at Waterloo.

---

Prepared by: Jennifer Clary-Lemon and Ashley Mehlenbacher

Date: 1-Jan-20

Faculty: Arts

Effective term: Term/Year Winter 2021

Course  New  Revision  Inactivation

Milestone  New  Revision  Inactivation

New milestone title: Choose an item.

For course revisions, indicate the type(s) of changes:  
(e.g. consent, description, title, requisites)

Course Subject code: ECON Course number: 526

Course Title (max. 100 characters incl. spaces): Fundamentals in programming for big data analysis

Course Short Title (max. 30 characters incl. spaces): Fund program big data analysis

Grading Basis: NUMERICAL

Course Credit Weight: 0.50

Course Consent Required:  Department

Course Description: This course covers fundamental skills in programming that are essential for the analysis of big data sets. In addition to teaching the basics of programming using languages such as R, Python and SQL, the course provides an introduction to techniques including parallel programming and cloud computing. An overview of key data visualization techniques will also be presented.

New course description (for revision only):

Meet Type(s): Lecture Choose an item. Choose an item. Choose an item.

Primary Meet Type: Lecture

[Requisites:](#)

Special topics course: Yes  No

Cross-listed: Yes  No

Course Subject(s) to be cross-listed with and approval status:

Sections combined/heldwith:

**Rationale for request:** This course is one of two that will be offered by Economics as part of the Faculty of Arts, Graduate Diploma in Computational Data Analytics for the Social Sciences & Humanities (CDASH).

Prepared by: Pat Shaw

Date: 25-Jun-19

Faculty: Arts

Effective term: Term/Year Winter 2021

Course  New  Revision  Inactivation

Milestone  New  Revision  Inactivation

New milestone title: Choose an item.

For course revisions, indicate the type(s) of changes:  
(e.g. consent, description, title, requisites)

Course Subject code: ECON Course number: 626

Course Title (max. 100 characters incl. spaces): Machine learning for economists

Course Short Title (max. 30 characters incl. spaces): Machine learning for econ

Grading Basis: NUMERICAL

Course Credit Weight: 0.50

Course Consent Required:  Instructor

Course Description: This course explores a variety of machine learning methods used to analyze complex economic data and inform policy decisions. The course introduces students to predictive methods and exploratory data analysis for high-dimensional data. These methods, such as decision trees and neural networks, are applied to observational data with an emphasis on the analysis of large and/or complex datasets of interest to social scientists and policy makers.

New course description (for revision only):

Meet Type(s): Lecture Choose an item. Choose an item. Choose an item.

Primary Meet Type: Lecture

[Requisites](#): ECON 526 or Instructor Consent

Special topics course: Yes  No

Cross-listed: Yes  No

Course Subject(s) to be cross-listed with and approval status:

Sections combined/heldwith:

**Rationale for request:** This course is one of two that will be offered by Economics as part of the Faculty of Arts, Graduate Diploma in Computational Data Analytics for the Social Sciences & Humanities (CDASH).

## Memorandum

**To:** Members  
Senate Graduate and Research Council

**From:** Julie Joza  
Director, Research Ethics

**Date:** August 31, 2020

**Subject:** Membership on the Clinical and Human Research Ethics Boards

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This memo outlines several membership changes that will be taking place on the Clinical Research Ethics Board (CREB) and the Human Research Ethics Board (HREB). These changes are for consideration and approval by the Senate Graduate and Research Council.

### **Membership changes on CREB**

#### **Member Renewals:**

Shekhar **Pandey**, MD, FRCPC, ABIM, CBNC, is renewing his term for three years in the role of a member with expertise as a clinical physician, cardiology, and clinical trials. Shekhar's new term will begin October 1, 2020 and continue through to September 30, 2023. See attached CV.

Joan **Moller**, BSc, PT, will renew her term for three years in the role of community member. Joan will begin a new three-year term on October 1, 2020 and continue through to September 30, 2023. See attached CV.

#### **New Member:**

Dianna **Fong-Lee**, BSc, OT, MA, is joining CREB for a one-year period as the alternative community member starting September 1, 2020 and continuing through until August 31, 2021. Dianna also serves as a community member on HREB and has agreed to provide support to CREC for this one-year period. See attached CV.

#### **Role Change:**

Mathieu Doucet, PhD, Associate Professor, Philosophy, will move into the role of Vice-Chair starting September 1, 2020. Mathieu has expertise in bioethics and has been a member of the CREB since October 2015. Over the past year, Mathieu served as Acting-Chair, while Kelly Grindrod, PhD, Associate Professor, Pharmacy, was on sabbatical.

## **Membership changes on HREB**

### **Member Renewal:**

Elizabeth **Fritz**, BSc, MBA, will renew her term for three years in the role of community member. Elizabeth's second term will begin September 1, 2020 and continue through to August 31, 2023. See attached CV.

### **New Members:**

Paolo **Dominelli**, PhD, Assistant Professor, Kinesiology, will begin a three-year term starting September 1, 2020 and continue through to August 31, 2023. Paolo will provide expertise in human movement. See attached CV and expression of interest.

Daniel **Martel**, MSc, will begin a one-year term starting September 1, 2020 and continue through to August 31, 2021. Daniel will serve as one of the two student representatives. See attached CV and expression of interest.

Hannah **Tait Neufeld**, PhD, Assistant Professor, School of Public Health and Health Systems, will begin a three-year term starting September 1, 2020 and continuing through to August 31, 2023. Hannah will provide expertise in qualitative methodologies. See attached CV and expression of interest.

Sean **Peterson**, PhD, Associate Professor, Mechanical and Mechatronics Engineering, will begin a three-year term starting October 1, 2020 and continuing through to September 30, 2023. Sean will provide expertise on the processes used in engineering and in technology research with human participants. See attached CV and expression of interest.

Britt **Anderson**, MD, PhD, Associate Professor, Psychology, will begin a three-year term starting September 1, 2020 to August 31, 2023. Britt will also serve as a member of the Delegated Ethics Review Committee (DERC) in the Department of Psychology. Please refer to the attached CV and letter of interest.

Evan **Risko**, PhD, Associate Professor, Psychology, will begin a three-year term starting September 1, 2020 to August 31, 2023. Dr. Risko will also serve as a member of the Delegated Ethics Review Committee (DERC) in the Department of Psychology. Please refer to the attached CV and letter of interest.

### **Role Change:**

Joel Dubin, PhD, Associate Professor, Statistics and Actuarial Science, will move into the role of Vice-Chair starting September 1, 2020. Dr. Dubin has been a member of HREB since August 2012 and provides expertise in statistical methodologies.

### **For Information:**

David McLean has been hired into the role of Research Experiences Group (REG) Coordinator and Ethics Administrator for DERC in the Department of Psychology. David replaces Michelle Manios who is retiring on September 21, 2020. David will be an ex-officio member of HREB.



August 31, 2020

TO: Kathy Winter, Assistant University Secretary and Privacy Officer, Senate Graduate and Research Council

FROM: Heidi Mussar, Associate Director, Graduate Financial Aid & Awards

RE: Agenda items for Senate Graduate & Research Council – September 2020

Items for Approval

a) Mathematics International Master's Award of Excellence – operating

The Mathematics International Master's Award of Excellence, valued at \$2,500 per term for a maximum of five full-time terms within allowable program time limits, will be awarded to eligible international master's students normally entering a research-based graduate program at the University of Waterloo. The Faculty of Mathematics will automatically nominate eligible students; selection will be based on academic excellence as demonstrated through their application for admission to the graduate program.

*Criteria and terms will follow the basic principles outlined in the International Master's Award of Excellence (IMAE) administered by GSPA, originally approved at SG&RC in October 2018. Any major changes to criteria in the central IMAE program (or cancellation of the program) will result in the Math-IMAE terms needing to be revised or the award being cancelled as appropriate.*

b) Mark Zanna Graduate Scholarship in Psychology – endowment

A scholarship, valued at up to \$1,500, will be awarded annually to a graduate student registered full time in the Social Area in the Department of Psychology in the Faculty of Arts. Selection is based on academic excellence (minimum 80% cumulative average) combined with a demonstrated interest in conducting basic research relevant to pressing social issues. Interested students should submit an application by May 15<sup>th</sup> to the Department of Psychology who will make the selection of a recipient in the Spring. This fund is made possible by a donation from the family and friends to honour Mark's memory and to continue to foster the type of basic research with real-world implications and impact that animated his career.

The value of the award will be determined by the income generated by the Fund each year. The goal is to provide at least one award valued at \$1,500 annually. The value and/or number of awards may change from year to year. The first award will be paid from the endowment when the Fund can sustain an award of \$1,000.

Goal of endowment value = \$50,000

c) Pella Awards – trust

Several awards will be presented annually to full-time undergraduate students in Year Two, Three or Four and/or Master's students in the School of Architecture. Selection is based on submission and review of a project that demonstrates excellence in sustainable design, and that exemplifies careful consideration of materials, details, placement, and orientation of fenestration. First place will be awarded \$3,000, second place \$2,000 and third place \$1,000. Interested students may apply by submitting their project to the Director of the School of Architecture by May 1. This fund is made possible by a donation from Pella to support student success and innovation in fenestration.

Gift: total of \$18,000 between December 2020 and December 2022

d) School of Accounting and Finance Doctoral Award – trust

An award will be provided annually to a graduate student registered full time in the doctoral program in the School of Accounting and Finance in the Faculty of Arts at the University of Waterloo. Selection will be based on demonstrated academic excellence (i.e. minimum cumulative average of 80%) and research potential. Depending on funds available, the SAF PhD Policy Committee will select a recipient annually in the fall term.

The goal will be to provide an award annually in the fall term of at least \$500; however, the value could be less depending on funds available.

This award is supported through donations from faculty, staff, alumni, and friends to support graduate students in SAF. The lead donor, Prof. Patricia O'Brien, donated a gift to start off the scholarship.

e) Iranian Student Memorial Engineering Graduate Scholarship – endowment

A scholarship, valued at up to \$1,700, will be awarded annually to a full-time international graduate student enrolled in the doctoral program in the Faculty of Engineering. Selection is based on academic excellence (minimum 80% cumulative average) in their current program and an assessment of the student's Fall term activity report. Each department in the Faculty of Engineering will nominate students annually for this award. This fund is made possible by a donation from several donors in honour of Waterloo Engineering students and alumni who lost their lives in the Ukraine International Flight PS752 plane crash.

f) University Professor Garry L. Rempel Memorial Graduate Scholarship – endowment

A scholarship valued at up to \$1,500 will be provided annually to a full-time graduate student registered in the first year of the doctoral program in the Department of Chemical Engineering in the Faculty of Engineering. Selection is based on academic achievement (minimum 80% cumulative average or equivalent). Selection will be made by the Department of Chemical Engineering Graduate Review Committee annually in the Spring term based on the student's application for admission to the program. This fund is made possible by a donation from Prof. Rempel's wife, University Prof. Flora T.T. Ng in his loving memory.

The first award will be paid from the endowment when the fund can sustain an award of \$1,000.

Amount of gift = ~\$56k

#### Items for Information

g) J. Frank Brookfield Memorial Graduate Scholarship – endowment

A scholarship, valued at up to \$3,750, will be awarded annually to a graduate student registered full time in a master's or doctoral program in the Department of Biology, who is conducting research in zoology. Selection is based on academic achievement (minimum cumulative average of 80% or equivalent) over the last two full-time academic years. The Department of Biology will identify and select a recipient annually in the Winter term. This fund is made possible by a donation from the J. Frank Brookfield Trust to support exceptional students studying zoology.

Total endowment = \$125,000

#### Items for Information

h) Rotary Peace Scholarship – trust

Originally approved at SG&RC in September 2013, the original agreement has come to an end. The KW Rotary Cluster is committed to the continuation of this scholarship, however, as a service club, the Rotary Clubs will not sign a multiyear agreement; they have, however, committed to supporting at least one award per year for the foreseeable future. Below is the updated description:

A scholarship of \$5,000 will be awarded annually to a full-time student entering their first year in the Master's of Arts in Global Governance program at the University of Waterloo. The scholarship will be awarded on the basis of academic excellence; candidates must be intending to conduct research that focuses broadly on questions of peace and they must have a demonstrated record of service to the cause of peace. Recipients will be selected based on their application for admission to the program by the program Director following consultation with the admissions committee.

i) Phyllis Young Forsyth Graduate Scholarship in Classical Studies – trust

Originally approved in 2009 as an annual award, valued at \$1,000, for the period September 2009 – September 2013. The gift was renewed in 2017 for 5 years to allow the award to increase to \$2,000

The donor has again renewed her scholarship with a gift of \$12,500 pledged over 5 years to continue supporting this graduate scholarship for students registered full time in the master's program in the Department of Classical Studies. The award value is being increased to \$2,500. Selection continues to be based on highest academic standing upon entry into the graduate program in Classical Studies.

j) Graduate Student Thesis Completion Award – trust, operating

The Graduate Student Thesis Completion Award was established to support graduate students whose research work has been disrupted by COVID-19 such that existing funding sources have been expended or discontinued. This award will support research-based graduate students who are within their last two terms of program completion (term of award plus one additional term) and will allow them to focus on completing their thesis. This award is made possible through a joint initiative between the Graduate Studies Endowment Fund (GSEF), the Graduate Student Association and UW, for a total of \$90,000.

It will be used to support nine doctoral awards of \$5,000 each and 15 master's awards at \$3,000 each. This award will be provided to recipients in the spring 2020 and fall 2020 terms only.

k) Academic Readiness Bursary – trust

The Academic Readiness Bursary was created to help support our students who find themselves with additional unexpected costs particularly related to an online form of study.

This bursary was created with significant support from the University of Waterloo as well as the support of many donors who have contributed to the COVID Student Emergency Support Fund.

Up to \$500 is available to all registered students (full/part-time, domestic, international, undergraduate, graduate) enrolled in the Fall 2020 term. An additional \$250 may be given to students who have dependents.

- l) Math Domestic Graduate Student Award – operating  
Originally approved in 2015, the Faculty of Mathematics would like to amend the terms of reference by changing one section of the eligibility criteria to allow master's co-op students to be eligible for the award during their final term of the program. The award description will be updated as follows:

The goal of this award is to support domestic graduate students in the Faculty of Mathematics, who are engaged in research-based (thesis) programs. It is also aimed at reducing RA funding requirements from supervisors to encourage greater capacity for domestic graduate students, and at encouraging students and supervisors to work together to ensure timely completion of their programs. Students in a thesis-based master's program must be within the first six terms of their program, or seven terms if in the co-op program.

Prior to form submission, review the [new graduate program instructions](#). For questions about the form submission, contact [Trevor Clews](#), Graduate Studies and Postdoctoral Affairs.

**Faculty:** Arts

**Program:** Graduate Diploma (GDip) in Computational Data Analytics for the Social Sciences and Humanities

**Program contact name(s):** Anindya Sen

**Form completed by:** Anindya Sen

**Note:** new courses and milestones also require the completion/submission of the SGRC Course/Milestone-New/Revision/Inactivation form ([PC docx version](#)).

**Proposed effective date:** Term: Winter Year: 2021

**[Graduate Studies Academic Calendar \(GSAC\)](#) section** (include the link to the section (web page) where the new program will be located):

*<https://uwaterloo.ca/graduate-studies-academic-calendar/arts/departments/economics>*

**Proposed Graduate Studies Academic Calendar content:**

**GRADUATE DIPLOMA (GDIP) IN COMPUTATIONAL DATA ANALYTICS FOR THE SOCIAL SCIENCES AND HUMANITIES**

**Program information**

- **Delivery mode**
  - On-campus
- **Program type**
  - Diploma
- **Study option(s)**
  - Coursework

**Admission requirements**

- **Minimum requirements**
  - The GDip in Computational Data Analytics for the Social Sciences and Humanities is offered in conjunction with any University of Waterloo master's or doctoral program.
  - Students may apply by completing an online application form, available from the Department of Economics website. The application must identify the courses that students would like to take in fulfillment of the GDip requirements. Students will receive an admission decision from the Program Director.
  - Students must be in good standing in their home master's or doctoral program to take courses for the GDip in Computational Data Analytics for the Social Sciences and Humanities.
  - Students must maintain an average of 70% across courses for this Diploma.

## Proposed Graduate Studies Academic Calendar content:

### Degree requirements

#### Coursework option:

- **Courses**

- In order to obtain the GDip in Computational Data Analytics for the Social Sciences and Humanities, students must successfully complete 3 graduate level courses (0.50 unit weight) in addition to the degree requirements of their home master's or doctoral program. There can be no double counting of courses for different degrees/diplomas.
- Students must complete 3 of the following 12 courses (or other courses that fit with the goals of this GDip, as approved by the Program Director):
  - ANTH xxx Critical Data Studies: Making and Using Data in Society (*pending development/approval*)
  - ECON 526 Fundamentals in Programming for Big Data Analysis (*pending SGRC approval*)
  - ECON 625 Numerical Methods for Economists
  - ECON 626 Machine Learning for Economists (*pending SGRC approval*)
  - GEOG 606 Introduction to Geographic Information Systems
  - HIST 640 Digital History
  - INTEG 640 Computational Social Science
  - INTEG 641 Hard Decisions and Wicked Problems
  - PS 699 Special Topics: Topic 3 Coding and Programming
  - PS xxx Data Mining and Machine Learning
  - PSYCH 640 Special Topics in Psychology: Topic 10 Data Analysis & Graphing in R
  - SOC xxx The Politics & Practices of Big Data (*pending development/approval*)

- **Link(s) to courses**

- Graduate course search

### Diploma website

**Departmental approval date** (mm/dd/yy):

**Reviewed by GSPA** (for GSPA use only)  date (mm/dd/yy): 05/07/2020

**Faculty approval date** (mm/dd/yy):

**Senate Graduate & Research Council (SGRC) approval date** (mm/dd/yy):

**Senate approval date** (mm/dd/yy) (if applicable):

UNIVERSITY OF  
**WATERLOO**



**GRADUATE EXPEDITED PROPOSAL**  
**OF THE**  
**GRADUATE DIPLOMA (GDIP) IN COMPUTATIONAL**  
**DATA ANALYTICS FOR THE SOCIAL SCIENCES &**  
**HUMANITIES**  
**(CDASH)**  
**BY THE**

**DEPARTMENT OF ECONOMICS**

**Submitted to the**  
**Ontario Universities Council on Quality Assurance**

**VOLUME I - PROPOSED BRIEF**

MAY 2020

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## 1. Introduction

The Big Data/Machine Learning revolution is occurring at a rapid pace and is extremely relevant to students in social sciences and humanities (SSH), especially at the graduate level. Big Data refers to large volumes of data, structured and unstructured that can be measured in terabytes.<sup>1</sup> In an age where every Facebook, Twitter, and Instagram post is a data observation that can be archived, and at some point becomes a part of a historical dataset, there is a significant demand for employees who can scrape, collect, aggregate and analyze such large information sets through advanced statistical methods, such as Machine Learning – which is the use of algorithms and statistical models employed by computer systems use to execute tasks without using explicit instructions – in a meaningful manner and deliver key insights. These skills are not exclusively relevant to social media platforms – they are important in any context where digital technology is enabling the collection of terabytes of data. There is a need for courses that not only teach students how to analyze such large datasets, but are also couched in behavioral theories that are required to interpret and understand collective behavior and choices made by individuals. Perhaps most important, this training will produce students who are well versed on how to assess societal impacts of massive data collection, associated privacy issues, election manipulation, and appropriate government policy. This is critical given current public concerns on such issues.

The University of Waterloo seeks to establish a Type 2 Graduate Diploma (GDip) in Computational Data Analytics for the Social Sciences & Humanities (CDASH) that will expose students to some of these methods and teach contemporary computational and data analytics skills that can be employed to analyze and study Big Data. The GDip in CDASH will be hosted by the Department of Economics, with support from the Departments of Anthropology, Economics, History, Psychology, Sociology and Legal Studies, Geography, and Knowledge Integration. In order to obtain the GDip in CDASH, students must take three courses over and above course requirements for their home degree/program. All courses will be delivered in-person on campus.

The Learning Outcomes and skills that we expect students to acquire from the GDip include: (1) core technical competencies such as statistical and computational methods for accessing and analyzing data including commercial software tools like R, Python, Tableau, SQL knowledge that can be applied to machine learning and other computational methods; (2) training in programming languages such as R, Python, Tableau, SQL; (3) tools to assess societal impacts of data collection and coding practices employed by both the private and public sectors; and (4) the ability to extract narratives from data analysis and creating summaries for stakeholders.

<sup>1</sup>A Terabyte is a unit used for measuring the amount of information that a computer can store and consists of 1,000 gigabytes.

Graduate students in the humanities and social sciences will benefit from training in computational methods that will allow them to analyze decision making, choices, and other facets of human behaviour based on data culled from the internet and social media. These skills are in high demand and will considerably increase the public and private sector employability of graduate students in the Social Sciences and Humanities.

While there is a rich tradition of statistics in the humanities and social sciences, Big Data analysis often requires Machine Learning and other tools/techniques, which are not as common in SSH programs. The unique feature of the GDip in CDASH courses is that they will be embedded with examples and learning methods that are geared towards students in the social sciences and humanities, so that the skills can be immediately applied in a real world setting or to research pursued by such graduate students. In this respect, there is an increasing recognition that Big Data methods/Machine Learning need to be a part of the toolkit for researchers in the social sciences and humanities. Considered to be among the prominent economists of her generation, Susan Athey of Stanford University states that: “I believe that machine learning (ML) will have a dramatic impact on the field of economics within a short time frame.”<sup>2</sup> However, the emerging importance of Big Data and Machine Learning methods is not restricted to Economics. A recent special issue of *Psychological Methods* edited by Harlow and Oswald (2016) consists of papers based on Big Data in Psychology, some of which look at the availability of large datasets from Twitter, Facebook, and other social media platforms that can be harnessed to investigate attitudes and behaviors.<sup>3</sup> While advocating caution and the need to ensure that big data methods like machine learning do not make theoretical work redundant, as well as the inherent bias in social media data (self-selection from the data being dependent on who uses the social media platform), McFarland, Lewis, and Goldberg (2015) acknowledge that the use of Big Data and Machine Learning methods can be of immense value to sociologists interested in studying human systems, behavior, and social networks.<sup>4</sup>

In a similar vein, Lazer and Radford (2017) discuss how much easier conducting natural experiments have become with appropriate Big Data methods. In terms of sociologists actively using Big Data, Desmond Patton of Columbia University harnesses Twitter data to study dynamics of violent gangs in Chicago.<sup>5</sup> His research looks at the use of digital platforms by marginalized youth as a mechanism for finding peer communities where they can try to

<sup>2</sup> Susan Athey (2019), ‘The Impact of Machine Learning on Economics’, book chapter in ‘The Economics of Artificial Intelligence: An Agenda’, edited by Ajay Agrawal, Joshua Gans, and Avi Goldfarb, published by the University of Chicago Press

<sup>3</sup> Harlow, Lisa L. and Frederick L. Oswald (2016). ‘Big Data in Psychology: Introduction to Special Issue, *Psychol Methods* 21(4): 447–457.

<sup>4</sup> McFarland, D.A., Lewis, K. & Goldberg (2016) ‘Sociology in the Era of Big Data: The Ascent of Forensic Social Science’, *A. Am Soc* 47(12). <https://doi.org/10.1007/s12108-015-9291-8>.

<sup>5</sup> Patton, Desmond et al. (2017), ‘Gang violence on the digital street: Case study of a South Side Chicago gang member’s Twitter communication’, *New Media and Society* 19(7): 1000-1018.

exercise power through sharing of images of guns and/or violence, but also as a venue for expressing grief and a need for help.

Big Data and Machine Learning are beginning to appear in the humanities. A research team at the University of California at Berkeley has used feature frequency profiling (FFP) methods to investigate relationships between different types of text. A part of their research has employed text analysis to ascertain whether certain work attributed to Shakespeare is consistent with his style of writing in other plays that are more likely to have been written by him. Ian Milligan of the Department of History, University of Waterloo, is doing pioneering work in developing software and algorithms to help historians in using web archives for their research.

The above discussion clearly illustrates the type of research being conducted in different social sciences/humanities with Big Data and associated methods. Firms in the financial services, retail, wholesale, transportation, and hospitality sectors all require analysis of basic data trends in order to optimize delivery and find efficiencies. Graduates should also attract interest from consulting firms. Different levels of government are becoming aware of the need for computational methods and their relevance to public policy.

Another extremely important contribution that social sciences/humanities students are expected to make in the future, is to help craft and formulate discussions on societal implications stemming from Artificial Intelligence/Machine Learning methods used by firms. The massive amounts of data collected by Google, Facebook, Amazon, and Netflix have raised concerns on whether individual privacy is being adequately protected and whether private citizens are being sufficiently educated on how their own information is being used by these firms – the Facebook data breach and how data were then used to impact voting during the 2016 U.S. Presidential Election - being a prime example.<sup>6</sup> Further, such firms are examples of “first to the post – winner takes all” success stories, and as a result have become virtual monopolies with considerable resources and economic power, all stemming from their ability to collect and analyze data that no other economic entity has access to. In these regard, policymakers are grappling with how to construct appropriate regulation.

However, the ability to collect large amounts of data is not the only societal concern related to firm market power. The way that firms use their data might also raise concerns. For example, there is some emerging evidence that algorithms employed by financial services firms might have the unintended consequence of reducing credit access to minority groups. On the other hand, responsible data analytics results in better products, pricing, and innovation that benefits all of society. In summary, the GDip in CDASH seeks to offer a blend of skills that introduce graduate students to not only advanced statistical methods currently being used in industry and government but also critical reasoning on societal implications from the use of such methods and data collected from individuals.

<sup>6</sup> ‘Facebook-Cambridge Analytica: A timeline of the data hijacking scandal’, by Sam Meredith, published by CNBC on Tuesday April 10<sup>th</sup> 2018 and available at <https://www.cnbc.com/2018/04/10/facebook-cambridge-analytica-a-timeline-of-the-data-hijacking-scandal.html>.

To the best of our knowledge this will be the first GDip in computational data analytics hosted by a Faculty of Arts in Canada, and focused on the needs of students in the humanities and social sciences. This is important as Big Data/Machine Learning programs are typically housed in Departments of Mathematics & Statistics, Engineering, and Computer Science. These programs do not include social science/humanities theories and critical reasoning with respect to data analytics, nor are they accessible to most graduate students in Arts. Further, such programs also do not typically have courses that teach students the importance of societal impacts from data collection, storage, coding practices, and how data can be used to manipulate electoral outcomes. The establishment of the GDip in CDASH is a proactive approach as opposed to a reactive response to the rapid evolution of Big Data based data analytics that are becoming widespread, and for which students in the social sciences and humanities must be adequately prepared.

This brief was prepared after extensive consultations with faculty members in Arts and Environment, in order to elicit feedback, determine support for the diploma, and evaluate commitment towards teaching required courses across different departments. Surveys of graduate students in Arts were also carried out to elicit feedback and assess interest in the proposed diploma. Seventy percent of respondents indicated “a strong possibility in pursuing a graduate diploma in computational data analytics, if established”.

In its general meeting on March 29<sup>th</sup> 2019, the Department of Economics agreed to host the diploma.

## **2. Objectives of the Program ([QAF 2.1.1](#))**

The proposed program will offer a unique blend of advanced graduate training in the analysis, interpretation, and archiving of extremely large and complex datasets. However, as opposed to other Big Data/Machine Learning programs, there will also be an emphasis on showing students how their traditional skills in critical thinking and “storytelling” are particularly relevant in explaining observable trends in large datasets. They will also be trained to summarize findings that can be digested in a relatively non-technical manner and that result in actionable impacts in either a public or private sector setting. What is unique is that students will be taught Big Data methods from the perspective of different disciplines, which will result in an expansive skill set. Further, consistent with the University’s core strength in experiential education, courses will be focused on a teams-based learning approach, when possible, through which students from different disciplines will work together on projects and assignments, in order to simulate employment in the real world.

The GDip in CDASH will benefit graduate students and society in the following ways:

1. Graduate students in the humanities and social sciences need training in different coding/programming skills. Available courses from computer science/math/statistics have high technical prerequisites that most SSH students would not have. Students will obtain training in languages such as R, Python, Tableau, and SQL, that they will be able to use in text mining, the collection and analysis of structured and unstructured data,

and data visualization. They will also be exposed to advanced statistical methods such as machine learning and natural language processing. What is significant is that students will obtain the benefit of learning Big Data methods from the perspective of multiple disciplines in the social sciences and humanities. The GDip in CDASH will offer training in how to scrape, store, and analyze real time and historical data generated from websites and applications.

2. Through unique course offerings, the GDip in CDASH will harness the training that social science/humanities students have in evaluating the impacts of economic power on society and how data can be used to affect democratic outcomes. Therefore, students will be trained to contribute to contemporary problems on data collection, storage, and use, as well as appropriate regulation.
3. There will be an emphasis on training students to extract narratives from data analysis and creating informative summaries for stakeholders. There is a demand for students who are not only proficient in coding, but are also able to interpret analytics performed on the data and can tell stories based on behavioral theories which is valued by public and private sector employers. Most big data programs do not seem to be focused on data interpretation from a social science or humanities perspective. However, there is a need to train students with a program that is at the intersection of arts and technology, which some people think actually produces the best technology (See, for example, <http://www.fastcompany.com/3034947/the-future-of-work/why-top-tech-ceos-want-employees-with-liberal-arts-degrees>).
4. The private sector has made significant strides in harnessing returns from Big Data analytics. However, there is also a need for public sector employees to be able to effectively harness and analyze information on public attitude towards programs and policies. SSH students have a tendency to apply for government positions and this GDip will add value to their resumes.
5. The GDip will allow graduate programs in the University to offer another qualification with strong demand and linked to improved job prospects, at a relatively low cost.

In summary, the GDip in CDASH will train students in coding, data interpretation and visualization from a multi-disciplinary perspective that will enable them to work in teams and to communicate key findings to stakeholders in a manner that leads to actionable impacts. The GDip in CDASH will also give students different theoretical frameworks from the social sciences/humanities that will allow them to analyze societal issues relating to data collection and use by firms and governments. Appendix A contains some positions that could be relevant to graduates with this GDip.

There are many Canadian universities that now offer Master's level Big Data degrees from either a department in engineering, mathematics, computer science, or through a faculty of business. Degrees from a STEM faculty are in most cases focused on building on coding and programming skills that students learn from a corresponding undergraduate degree. On the other hand, programs available from business schools train students to be able to take knowledge from Big Data analysis and be able to unpack insights that can aid business intelligence and decision making. There is no current graduate level diploma or certificate program, which is focused on the needs of students in the humanities and social sciences.

In terms of other programs, York University's School of Continuing Education has started a Certificate in Big Data Analytics and a Certificate in Advanced Data Science and Predictive Analytics (<https://continue.yorku.ca/certificates/big-data-analytics-program/>), each of these certificates consisting of three 8 week courses. McMaster's DeGroot School of Business is also starting a Big Data Analytics Certificate consisting of five courses and a capstone course (<https://www.mcmastercce.ca/bigdata-course-descriptions>). Ryerson University also has started a Certificate in Data Analytics, Big Data, and Predictive Analytics (<https://ce-online.ryerson.ca/ce/default.aspx?id=3558>). All these diplomas/certificates are focused on some form of business intelligence. However, none of these programs are accessible to students in humanities or the social sciences because of advanced requirements in math and statistics.

Finally, the GDip in CDASH is consistent with the strategic commitments of the University of Waterloo's new Strategic Plan (2020-2025), one of which is: "Empower students to leverage diverse learning experiences by creating more flexible learning pathways", and one of its key objectives: "Stimulate opportunities for interdisciplinary research by developing more flexible graduate programs".<sup>7</sup> This GDip also echoes the Faculty of Art's emphasis on [the importance of multi-disciplinary learning](#). Further, the GDip in CDASH is closely aligned with both the University and Faculty Strategic Plans by providing an applied curriculum to prepare graduates to meet the evolving societal challenges posed by Big Data. It is also designed to address clear labour force needs and train students to seamlessly fit into positions and become valued and productive employees.

The GDip will be housed in the Department of Economics, and includes contributions from the Departments of Anthropology, Economics, Geography, History, Psychology, and Knowledge Integration. The required courses for the GDip in CDASH will include some existing courses; however, some new courses will need to be developed by the above departments. Any registered graduate students at the University of Waterloo will be eligible for the GDip in CDASH.

The Learning Outcomes of the GDip in CDASH have been mapped against the Ontario Council of Academic Vice-Presidents (OCAV) Graduate Degree Level Expectations (GDLEs) (see Section VI).

<sup>7</sup><https://uwaterloo.ca/strategic-plan/>.

### **3. Admission Requirements ([QAF 2.1.2](#))**

The GDip in CDASH will be open to students already accepted and enrolled in a University of Waterloo graduate degree program. Students will be required to complete an online form, which will be available from the Department of Economics website. The student will specify the courses they would like to take in fulfillment of the GDip requirements and will receive an admission notification from the Program Director. With respect to program completion/graduation, the Program Director and graduate administrators from the student's home department will review the student's record to ensure that the GDip requirements have been met and will provide confirmation to the Office of Graduate Studies and Postdoctoral Affairs. Students must be in good standing in their home master's or doctoral program to take courses for the GDip in Computational Data Analytics for the Social Sciences and Humanities.

### **4. Structure ([QAF 2.1.3](#))**

The GDip in CDASH will be administered by the Department of Economics. There will be a Program Director from the Department of Economics appointed by the Dean of Arts, in consultation with the Departmental Chair, who will be responsible for the administration of the program. These duties will include: ensuring that a sufficient number of relevant courses are available to students; that the courses meet student expectations; and communicate student progress with graduate administrators in home departments. The Director will be assisted on matters relating to academic curriculum and program design by a committee consisting of representatives from each participating department. The Program Director will be assisted by the Graduate Administrator of Economics. However, tracking students in completion of requirements and qualification for the GDip in CDASH will also be the responsibility of the Graduate Administrator of the students' home department.

In order to obtain the GDip in CDASH, students must successfully complete three graduate level courses (0.5 credit unit weight) over and above program requirements in their home graduate program. There can be no double counting of courses for different degrees/diplomas. The courses will be taught by faculty primarily from different departments in Arts. Students must maintain an average of 70% across courses for this Diploma.

### **5. Program Content ([QAF 2.1.4](#))**

Students must complete three of the following twelve courses from Economics, Knowledge Integration, Psychology, Sociology and Legal Studies, Geography, Anthropology, Public Service and History, or other courses that fit with the goals of this GDip, as approved by the Program Director. With the exception of the courses from Sociology and Legal Studies, and Anthropology, all courses have been approved. We expect the courses from Sociology and Legal Studies, and Anthropology to be ready no later than January 1, 2021. All courses have been designed and will be taught by professors who are considered experts in their fields.

None of these courses are mandatory. Students can choose any three of the twelve prescribed courses in order to fulfill the GDip in CDASH requirements.

Section VI maps the twelve courses against GDLEs. The courses are:

### **ECON 526 Fundamentals in Programming for Big Data Analysis**

This course covers fundamental skills in programming that are essential for the analysis of big data sets. In addition to teaching the basics of programming using languages such as R, Python and SQL, the course provides an introduction to techniques including parallel programming and cloud computing. An overview of key data visualization techniques will also be presented.

**Prerequisite:** An undergraduate statistics course that contains multivariate regression analysis and some exposure to a statistical software package. Examples of relevant course include ARTS 280 Statistics for Arts Students, ECON 221 Statistics for Economists, PSCI 314 Quantitative Analysis, PSCI 314 Quantitative Analysis.

### **ECON 626 Machine Learning for Economists**

This course explores a variety of machine learning methods used to analyze complex economic data and inform policy decisions. The course introduces students to predictive methods and exploratory data analysis for high-dimensional data. These methods, such as decision trees and neural networks, are applied to observational data with an emphasis on the analysis of large and/or complex datasets of interest to social scientists and policy makers.

**Prerequisite:** An undergraduate level advanced econometrics course equivalent to ECON 421

### **HIST 640 Digital History**

Digital history, the application of new and emerging technologies to the study of history, is an important field that has begun to reshape historical production and scholarship. This graduate level course introduces students to the literature on digital history, and then puts theory into practice by digitally collecting, publishing, and producing new historical knowledge with cutting-edge tools.

### **INTEG 640 Computational Social Science**

We are living in an age where digital information is being produced at an unprecedented rate. This explosion of digital data has the potential to revolutionize the way we learn about the world, and how we conduct research related to urgent social and political problems. This course focuses primarily on the knowledge and skills necessary for doing high-quality research with digital data. The course is divided into four core sections: (1) a research-oriented introduction to the programming language Python, (2) collecting, cleaning, and combining digital datasets, (3) analyzing digital datasets using tools from machine learning, text analysis, and social network analysis, and (4) privacy and confidentiality. There will be an emphasis on good research design throughout the course. Previous courses in research methods and / or statistics are an asset, but are not required.

### **GEOG 606 Introduction to Geographic Information Systems**

Introduction to GIS concepts and to their application in geographic studies using basic GIS software. This course is designed for students with little or no prior experience with GIS.

### **PSYCH 640 Special Topics in Psychology: Topic 10 Data Analysis & Graphing in R (or another topic as approved by the Program Director)**

This course aims to explore the following topics at the intersection of data and behavioral sciences:

- Exploration of supervised and unsupervised machine learning approaches for behavioral sciences
- Use of cross-validation for exploratory analyses of archival and experimental multivariate data with multiple predictors and dependent variables
- Utilization of Principal component, confirmatory factor analyses and cluster analyses for big data projects
- Scalable on-line experiments on social media platforms
- Forecasting-based analyses for social sciences: Tracking trajectories and patterns of socio-cultural change over time
- SEM trees at the intersection of structural equation models and Machine-learning based regression trees

A focus of this course will be on teaching students on how to manipulate data from different social media platforms and study individual choices and behavioural responses.

### **ECON 625 Numerical Methods for Economists**

The course covers important topics related to scientific computing through applications in either microeconomics, macroeconomics or economics. The topics include: floating point arithmetic, nonlinear equations, optimization, numerical derivatives and numerical integration, differential equations, and simulation of dynamic models.

Static and dynamic general equilibrium modelling; computation, calibration and simulation. Sensitivity analysis. Policy applications.

### **INTEG 641 Hard Decisions and Wicked Problems**

Every day, nuanced decisions are made at the personal level (what job offer to accept), an organizational level (whether to recall a faulty product), and in the form of public policy (when and where to develop renewable energy). This course introduces decision analytic tools for systematically structuring messy problems to identify trade-offs among different decisions and to explore them intelligibly. For public policy problems, the challenges of values conflicts and "truth decay" (i.e., the political polarization or outright rejection of facts) will be considered. Additional decision contexts that push the limits of traditional analytic approaches will also be addressed (e.g. wicked problems, deep uncertainty).

### **SOC xxx The Politics & Practices of Big Data**

There has been an explosive growth in the volume, velocity and variety of data production, sharing, and management. Our daily lives and the environments we inhabit - our homes, work spaces, and public spaces - are captured as data and mediated through data-driven technologies: mobile and distributed devices and sensors, cloud computing, and social media. The common assurances are that 'big data' will lead to better science and a more refined understanding of our world. This course explores the epistemological, ethical, material, political and economic dimensions of big data with particular attention paid to understanding big data in relation to questions of difference: race, gender, class, sexuality, and disability. Who decides what kind of data speaks and for whom? How do data shape our understanding of the world? How might we work towards a data literacy that seeks to foreground knowledge production and practices in science and technology? Data - small, medium, big - are not neutral, objective, and pre-analytic in nature. Rather, data shape and are shaped by the instruments, practices, contexts and knowledge used to generate, collect, process, analyse, and store them. Topics covered in the course may include: historicizing big data; data colonization; data profiling; security, privacy, and surveillance; data leaks and dumps; predictive policing; data infrastructures and materiality; data ethics

### **PS 699 Special Topics: Topic 3 Coding and Programming**

This course covers fundamental skills in programming that are essential for the analysis of large data sets that may be structured or unstructured. In addition to teaching the basics of programming using languages such as R, Python and SQL, the course provides an introduction to techniques including parallel programming and cloud computing. An overview of key data visualization techniques will also be presented. Applications will be presented through case studies based on Open Data.

### **PS xxx Data Mining and Machine Learning**

This course will consist of advanced applications of programming languages such as R, Python and SQL and introduce students to basic machine learning models. Students will learn how to apply learning algorithms to mining social media and conduct text analysis and natural language processing.

### **ANTH xxx Critical Data Studies: Making and Using Data in Society**

This course uses insights from anthropology, sociology, history and political sciences to probe critically into how data are made and used in society, how infrastructures matter, and how the quantitative/qualitative divide as well as classifications in their social, historical and political contexts guide the production and use of (big) data.

## **6. Mode of Delivery and Graduate Degree Level Expectations ([QAF 2.1.5](#))**

All courses will be taught on-campus in a traditional classroom setting with weekly lectures scheduled during the fall and winter terms. Students who wish to take the more computationally demanding courses such as: ECON 626 Machine Learning for Economists, ECON 625 Numerical Methods in Economics, PSYCH xxx Statistics and Big Data Experiments, and INTEG 440 / 640 Computational Social Science, would be advised to first take ECON 526

Fundamentals in Programming for Big Data Analysis as this course teaches fundamental skills in coding that are helpful for the other courses.

Although the completion of the GDip in CDASH does not lead to the awarding of a Masters degree, the program and its courses have been designed to address Masters Graduate Degree Level Expectations (GDLEs) to ensure a) that these courses deliver content appropriate to post-undergraduate training; and b) that these courses impart unique skills with respect to data analytics.

Table 1 lists the University of Waterloo’s Masters GDLEs, which are based directly on the Ontario Council of Academic Vice Presidents (OCAV) GDLEs 1-6 and the associated Learning Outcomes mapped to GDLEs for the CDASH GDip.

<b>Table 1 GDLEs and Learning Outcomes for the Graduate Diploma in Computational Data Analytics for the Social Science and Humanities (CDASH)</b>					
		Appropriately organize and transform structured and unstructured large data for analysis	Apply advanced computational and statistical methods to analyze large data from a Social Science and Humanities perspective	Communicate insightful narratives from data analysis to diverse audiences	Critically assesses the social consequences of data collection, storage and security
<b>GDLE</b>		<b>1, 3, 4</b>	<b>1, 2, 3, 4</b>	<b>4, 5</b>	<b>4, 6</b>
<b>Courses</b>	Fundamentals in Programming for Big Data Analysis	X	X		
	Machine Learning for Economists	X	X		
	Digital History	X	X	X	X
	Computational Social Science	X	X	X	X
	Introduction to Geographic Information Systems	X	X	X	X
	Special Topics in Psychology: Topic 10 Data Analysis & Graphing in R	X	X	X	X
	Numerical Methods for Economists	X	X		
	Hard Decisions and Wicked Problems	X	X	X	X
	The Politics & Practices of Big Data			X	X
	Special Topics: Topic 3 Coding and Programming	X	X		
	Critical Data Studies: Making and Using Data in Society			X	X
	Data Mining and Machine Learning	X	X	X	X

**7. Assessment of Teaching and Learning ([QAF 2.1.6](#))**

**Assessment of Teaching and Instructor Effectiveness**

The GDip in CDASH course evaluation plan will include collection and analysis of the following data: (1) Students are asked to complete course evaluations of online courses during the last two weeks of term using the University of Waterloo’s standard, online evaluation instrument. This instrument includes specific questions for both the course and instruction; (2) Instructors will have the ability to add individual feedback questions throughout the course content, assessing student satisfaction with content presentation, order, and effectiveness; (3) in addition to the University of Waterloo’s standard online evaluation form, the GDip in CDASH will implement exit surveys of students once they complete degree requirements and solicit their opinion on whether GDLE’s were successfully met and overall opinions on the value of the diploma; (4) contact will be maintained with alumni in order to solicit feedback on the usefulness and impact of skills obtained through the GDip in CDASH; (5) the program committee will meet on a regular basis to discuss overall student achievement and satisfaction in the program based on feedback from course evaluations, exit surveys, and alumni responses. The program committee will use this information to plan course development, improvements, and offerings.

**Assessment of Learning**

Each course has its own specific learning outcomes, consistent with the learning outcomes listed in Table 1. Each of the required courses will employ a number of different evaluation tools. Broadly speaking, students will be expected to demonstrate the knowledge they have gained through completion of written assignments, projects, possible short research papers, and presentations. There will be an emphasis on group work and team-based learning. There will also be effort in getting people in the real world who work actively with large datasets and computational methods, to give guest lectures. Table 2 lists the different methods that will be used for each course in order to meet GDLEs.

<b>Table 2 Assessing Learning</b>					
		Appropriately organize and transform structured and unstructured large data for analysis	Apply advanced computational and statistical methods to analyze large data from a Social Science and Humanities perspective	Communicate insightful narratives from data analysis to diverse audiences	Critically assess the social consequences of data collection, storage and security
	<b>GDLE</b>	<b>1, 3, 4</b>	<b>1, 2, 3, 4</b>	<b>4, 5</b>	<b>4, 6</b>
<b>Cours</b>	Fundamentals in Programming for Big Data Analysis	Individual and group assignments	Individual and group		

		assignments, tests, exams		
Machine Learning for Economists	Individual and group assignments	Individual and group assignments, tests, exams		
Digital History	Individual and group assignments	Individual and group assignments, tests	Individual and group assignments, presentations	Individual and group assignments, presentations
Computational Social Science	Individual and group assignments	Individual and group assignments, tests,	Individual and group assignments, presentations	Individual and group assignments, presentations
Introduction to Geographic Information Systems	Individual and group assignments	Individual and group assignments, tests	Individual and group assignments	Individual and group assignments
Special Topics in Psychology: Topic 10 Data Analysis & Graphing in R	Individual and group assignments	Individual and group assignments, tests,	Individual and group assignments, presentations	
Numerical Methods for Economists	Individual and group assignments	Individual and group assignments, tests, exams		
Hard Decisions and Wicked Problems	Individual and group assignments	Individual and group assignments, tests	Individual and group assignments, presentations	Individual and group assignments, presentations
Special Topics: Topic 3 Coding and Programming	Individual and group assignments	Individual and group assignments, tests	Individual and group assignments, presentations	
The Politics & Practices of Big Data			Individual and group assignments, presentations, tests, exams	Individual and group assignments, presentations, tests, exams
Critical Data Studies: Making and Using Data in Society			Individual and group assignments, presentations, tests, exams	Individual and group assignments, presentations, tests, exams
Data Mining and Machine Learning	Individual and group assignments	Individual and group assignments, tests	Individual and group assignments, presentations	Individual and group assignments, presentations

## 8. Resources for All Programs ([QAF 2.1.7](#))

No further physical resources are needed given that the diploma is based on existing courses that are already or planned to be offered, and therefore already includes access to information technology, classrooms, and regular support for both instructors and students, and the University of Waterloo Library's significant e-resources.

The Departments of Economics, Geography, Psychology, History, Knowledge Integration, Anthropology, and Sociology and Legal Studies have committed to ensuring that eligible courses will be made available to students and be taught by faculty members who are considered experts in their fields. A brief description of faculty research interests are given below.

**Britt Anderson**, Associate Professor of Psychology

(<https://uwaterloo.ca/psychology/people-profiles/britt-anderson>)

Dr. Anderson's research in cognition emphasizes mechanistically specific and computationally framed hypotheses combined with behavioral studies in normal subjects and people with focal brain injury. His current research focuses on attention and updating.

**Hilary Bergsieker**, Assistant Professor of Psychology

(<https://uwaterloo.ca/psychology/people-profiles/hilary-bergsieker>)

Dr. Bergsieker has expertise in trust formation and maintenance in diverse groups, social cognition, bias reduction, and network science. She has extensive experience teaching graduate-level statistics courses and employs a variety of advanced methods in her own research, including dyadic longitudinal data analysis, experience sampling, structural equation modelling, and social network analysis. Bergsieker is a Fellow in the Engendering Success in STEM research consortium and was recently named a Rising Star by the Association for Psychological Science.

**Joel Blit**, Associate Professor of Economics

(<https://uwaterloo.ca/scholar/jblit>)

Dr. Blit's research is on the economics of innovation. His work has examined, among other things, the role of multi-location firms as a channel for the geographic diffusion of knowledge, whether intellectual property rights promote innovation, and whether immigration increases innovation in Canada. His ongoing work is mapping technology space using machine learning to analyse patent documents.

**Pierre Chausse**, Associate Professor of Economics

(<https://uwaterloo.ca/economics/about/people/pchause>)

Dr. Chausse is an econometrician and studies generalized empirical likelihood models and is an expert on empirical applications using R software.

**Igor Grossman**, Associate Professor of Psychology

(<https://uwaterloo.ca/psychology/people-profiles/igor-grossmann>)

Dr. Grossmann aims to translate big ideas in social sciences ideas into concrete research. In particular, his work examines how sociocultural factors impact adaptive emotion regulation, wise reasoning and sound judgment in everyday life. His interdisciplinary work combines various methods, including big data analytics, archival studies, psychophysiology, virtual reality, diary surveys, and behavioral experiments to target complex social issues.

**Goetz Hoeppe**, Associate Professor of Anthropology  
(<https://uwaterloo.ca/anthropology/people-profiles/gotz-hoeppe>)

Dr. Hoeppe's research concentrates on the social lives of data and representations in scientific practice with a focus on the environment. He has begun a project funded by the Social Sciences and Humanities Research Council of Canada, considering how the sharing and reuse of open-access data is embedded in the social and material work of scientific laboratories. It focuses on how junior climate scientists are instructed to produce, use, and re-use digital data using diverse technologies and material probes. The project aims to contribute to improving the re-usability of climate science research data.

**John McLevey**, Assistant Professor of Knowledge Integration and Sociology  
(<https://www.johnmclevey.com/>)

Dr. McLevey is an expert in computational social science and network science, with substantive interests in the sociology of science and science policy and environmental social science. He runs a research lab called NETLAB which specializes in network science (e.g. statistical models for network data, measurement of relational and attribute similarity and diversity in networks structure and evolution of large-scale collaboration networks in science, the effects of diversity in scientific teams) and machine learning approaches to computational text analysis. NETLAB is funded by an Early Researcher Award from the Ontario Ministry of Research and Innovation and a variety of grants from SSHRC. McLevey teaches courses in research design and methods, computational social science, and data visualization. He is currently writing a methods book called *Doing Computational Social Science*, which is under contract with SAGE (UK). Students who have graduated from his research lab are currently employed in data science jobs in government and industry, or are pursuing further graduate degrees in data science.

**Ian Milligan**, Associate Professor of History  
(<https://ianmilligan.ca/>)

Dr. Milligan is Associate Professor in the Department of History at the University of Waterloo. His primary research focus is on how historians can use web archives. He teaches courses in historical methodology, postwar Canada, and digital history, and supervises graduate students in diverse areas including postwar Canadian history, video games, and childhood studies and is experienced in teaching text mining methods. In 2016, he was awarded the Canadian Society for Digital Humanities Outstanding Early Career Award. He also holds an Ontario Early Researcher Award. Milligan is principal investigator of the Web Archives for Historical Research group, which is supported by the Andrew W. Mellon Foundation, the Social Sciences and Humanities Research Council and the Ontario Ministry

of Research and Innovation. Between 2013 and 2018, Milligan has received over a million dollars as principal investigator in federal, provincial, and foundation funding.

**Lennart Nacke**, Associate Professor at the Department of Communication Arts  
(<https://uwaterloo.ca/communication-arts/people-profiles/lennart-nacke>).

Dr. Nacke is an Associate Professor at the Department of Communication Arts, the Associate Director Graduate Studies for Stratford campus, and the Director of the HCI Games Group at the University of Waterloo's Games Institute. Professor Nacke teaches User Experience, Human-Computer Interaction, and Game Design at the University of Waterloo. As part of the Games Institute, he is researching cognitive and emotional elements of player experience in video games, immersive virtual reality (VR) environments, and gameful applications, often using physiological measures together with surveys and player interviews. His research interests involving computational methods include applications to gamification, games user research, and social relationship-building games.

**Mikko Packalen**, Associate Professor of Economics  
(<https://sites.google.com/site/mikkopackalen/>)

Dr. Packalen's current research examines how demographics, geography, and institutions influence the adoption of new ideas by scientists and inventors, how new ideas develop into transformative ideas that improve health outcomes and facilitate economic growth, and how to measure the novelty of science and invention. He completed his undergraduate studies at the University of Helsinki and earned his PhD in economics from Stanford University. His current work has received funding from the National Institute of Aging and Amazon Web Services.

**Thomas Parker**, Assistant Professor of Economics  
(<https://uwaterloo.ca/economics/people-profiles/thomas-parker>)

Dr. Parker is an econometrician working on a variety of theoretical problems with empirical applications and is interested in the use of machine learning on economic problems.

**Chris Riddell**, Associate Professor of Economics  
(<https://uwaterloo.ca/economics/people-profiles/chris-riddell>)

Dr. Riddell's teaching and research are closely connected to the manipulation and analysis of data including in particular raw administrative records. Much of his research involves evaluating government programs and legislation as well as internal firm practices. The bulk of his research thus involves the cleaning, manipulation and analysis of raw, administrative records. On teaching, Professor Riddell typically teaches Program Evaluation at the graduate level along with Statistics for Economists and Econometrics at the undergraduate level. In all of these courses, the students make use of various data sets including important Statistics Canada surveys such as the Labour Survey and the Canadian Community Health Survey, along with influential policy experiments such as the US class size experiment Project STAR.

**Vanessa Schweizer**, Assistant Professor of Knowledge Integration  
(<https://uwaterloo.ca/knowledge-integration/people-profiles/vanessa-schweizer>)

Dr. Schweizer holds a Masters in Environmental Studies and a PhD in Engineering and Public Policy. She blends these interdisciplinary interests through her work on scenarios, which are common tools for collective decision-making. In a variety of contexts, collective decision-making includes many processes such as articulating aspirations and values, exercising foresight, confronting uncertainties and risks, and negotiating tradeoffs. She uses machine learning/big data methods in her research, an example being understanding the importance of cultural issues with respect to the implementation of climate change policies.

**Anindya Sen**, Professor of Economics

(<https://uwaterloo.ca/economics/people-profiles/anindya-sen>)

Dr. Sen is interested in the societal and market effects of data accumulation by large firms and the corresponding role of optimal regulation with respect to privacy and innovation.

**Jennifer Whitson**, Assistant Professor of Sociology

(<https://uwaterloo.ca/stratford-school-of-interaction-design-and-business/people-profiles/jennifer-r-whitson>)

Dr. Whitson is a sociologist who researches the secret life of software, the people who make it, and how both change our daily lives. Her current projects centre on digital media incubators, indie game makers, and on the surveillance implications of data-driven design, respectively

She's particularly interested in the shifting production models of the global game industry, and tracing how risk management practices, datamining, and digital distribution shape developers' creative work and the larger cultural role of games.

The design, deployment, and use of communication software is shaped by economic, social, technological and political concerns, which then create certain constraints and affordances in how people can use these technologies. For example, her work on gamification traces how governance and control are designed into games, smartphones, and websites, and how playful rationalities are used to shape user behaviour and thus govern through freedom and pleasure rather than fear and risk.

Most recently, she is conducting ethnographic work inside game studios and with developer communities to learn about the struggle for new media producers to find a balance between creative work and economic sustainability, asking "In a 'sharing' community where most digital products like games are low/cost free, how do what we love while still managing to pay the rent?"

## 9. **Resources for Graduate Programs (QAF 2.1.8)**

The GDip in CDASH is a Type 2 Graduate Diploma that is only open to graduate students currently registered at the University of Waterloo; therefore, they should already have financial support from home departments. Hence, the GDip does not offer any further financial assistance. In addition, students will not be writing a Master's level Major Research Paper or Thesis. Hence, faculty resources will not be required for any supervisory duties.

**10. Quality and Other Indicators ([QAF 2.1.10](#))**

The quality and experience of faculty is outlined in the CVs contained in Volume II of this Brief. As noted, faculty members come from a variety of disciplinary backgrounds and are considered experts in computational data analytics. The Curriculum Committee is committed to ensuring consistency and quality across the necessarily interdisciplinary courses. The initial Program Director will be Anindya Sen who has nearly a decade of experience in program administration, first as Associate Chair of Graduate Studies at the Department of Economics and then as the Director of the Master of Public Service program, which is an interdisciplinary program that consists of courses taught by faculty from Political Science, Economics, English, and Sociology. As a result, he has the necessary administrative expertise to ensure the smooth operation of an interdisciplinary program, which results in integrated learning outcomes for students. Professor Sen has extensive experience in conducting Big Data oriented research and has been funded on a variety of machine learning based projects. He is also a Research Fellow at the C.D. Howe Institute of Canada.

## Appendix A - Summary of Learning Outcomes Mapped to Courses

Program Outcome	Associated GDLE	Courses											
		ECON 526	ECON 626	HIST 640	INTEG 640	GEOG 606	PSYCH 640	ECON 625	INTEG 641	PS 699	SOC xxx	ANTH xxx	PS xxx
Appropriately organize and transform structured and unstructured large data for analysis	<b>1, 3, 4</b>	X	X	X	X	X	X	X	X	X			X
Apply advanced computational and statistical methods to analyze large data from a Social Science and Humanities perspective	<b>1, 2, 3, 4</b>	X	X	X	X	X	X	X	X	X			X
Communicate insightful narratives from data analysis to diverse audiences	<b>4, 5</b>		X	X	X	X	X	X	X	X	X	X	X
Critically assesses the social consequences of data collection, storage and security	<b>4, 6</b>			X	X	X	X		X		X	X	X

Course	Forum communication	Multi-part assignments	Quizzes/Tests	Written assignments/ arguments/policy briefs	Data interpretation, synthesis, visualization	Technical reports/plans	Video production	Slide Deck/Presentations	Other
ECON 526		X	X		X				
ECON 626		X	X		X	X			
HIST 640	X	X		X	X	X			
INTEG 640	X	X	X	X	X	X			
GEOG 606		X	X		X				
PSYCH 640		X	X		X	X			
ECON 625		X	X		X				
INTEG 641	X	X	X	X	X			X	
PS 699	X	X	X	X	X	X		X	
SOC xxx	X		X	X	X			X	
ANTH xxx	X		X	X	X			X	
PS xxx	X	X	X	X	X	X		X	

## Appendix B - Job Descriptions relevant to the GDip CDASH

### 1. Senior Analyst, Data Analytics

TVO

Toronto, Canada Area

Apply on company website Apply to TVO on their website

Job description

The Senior Analyst will implement cross-platform data analytics for the organization's Business Information. This includes Google Analytics for Web Properties, Audience data for broadcast digital and social media; Proprietary data of our educational products including revenues, usage, and educational metrics; Proprietary donor and CRM data, and various third party data sources (including custom research) that provide competitive market analysis.

This individual will provide quantitative and qualitative findings on TVO's and competitors to assist various departments and inform the overall strategic planning efforts of the company. The Senior Analyst will be assigned projects and may develop objectives with clients. He or she will design and carry out background research, data analytics proposals, sample design, data instruments; collects, analyzes and interprets data. Produces written reports for internal and external distribution and oral reports; proposes recommendations and may present results to clients. Provides information on media, education, communications, societal and related issues that meet corporate and client needs. Consults with clients as required. May direct activities of other data personnel on selected projects. Performs other related duties.

The position will be responsible for standard reporting, ad hoc requests, and special projects reporting to the Manager, Data Analytics. The Senior Analyst is a versatile contributor to the Analytics team, collaborating with internal stakeholders. The successful candidate will be confident in media and educational data and will be supported in the evolution of their digital analytic skills.

Specific Accountabilities:

- Ability to data mine the Proprietary Database to extract viewer/user and product information and provide insights based on it.
- In partnership with internal clients, develop objectives, documentation and oversee implementation of Google Analytics and other digital data instruments (e.g. Twitter, Facebook, YouTube, Brightcove, etc.)
- Implement, maintain & update tracking Tags via Google Tag Manager and in liaison with developers.
- Consult with internal clients on carrying out data projects and develop objectives where needed
- Provide television audience analysis for TVO
- Produce written reports proposing recommendations and present to clients:
- Market-focused weekly summaries, genre-specific program tracks, and digests of periodic studies
- Ad hoc requests from internal clients by running, analyzing, and interpreting the appropriate data, and communicating the relevant results

- Create Weekly & Monthly dynamic Dashboards to inform decisions
- Track and monitor information from syndicated and proprietary research sources
- Analyze behavioural and attitudinal trends in media usage and consumption
- Attend meetings with other departments (Programming, Production, Marketing) to present informative and actionable research findings
- Work on a variety of custom projects with guidance and supervision from the Manager of Analytics and/or internal clients.

#### Knowledge and Skills:

- Bachelor's Degree in business, marketing, communications, statistics, or related field, coupled with experience with presenting qualitative and quantitative research findings
- Advanced current working knowledge of Google Analytics with a focus on creating customized views, dimensions & filters
- Proficient with Google Tag Manager and advanced implementation of tracking tags
- Working experience with JavaScript & API usage
- Working experience with A/B and multivariate testing tools such as Google Website

#### Optimizer

- Advanced SQL Query skill & knowledge of Relational Databases
- Experience in creating Dynamic Dashboards using excel and BI Tools (Tableau etc.)
- Experience with Numeris (BBM Infosys) is desirable
- Experience with PMB or other syndicated datasets and experience reconciling multiple datasets to leverage insights responsible for decision-making
- Staying current on new developments in data analytics, measurement tools, and self-serve options. Experience in developing a business case recommending options
- Keen attention to detail, sharp analytical skills and ability to interpret, communicate and present data
- Must bring a sense of urgency, able to work independently, remain flexible, manage and prioritize workload with shifting priorities and ad hoc requests
- Strong communication skills, both written and verbal, coupled with well-developed presentation, interpersonal and relationship building skills
- Able to engage at all levels of internal and external business partners
- Must have strong teamwork and collaboration skills, can anticipate and recognize areas of conflict, able to elicit relevant input and feedback from others in a diplomatic and timely fashion, and able to influence opinions in a positive manner
- Proficiency with Windows-based PC applications such as Excel, Word, and

#### PowerPoint

- Familiarity with comScore, Twitter, Facebook, Hootsuite and digital analytics tools
- Curiosity and willingness to learn.

## 2. Data Research Analyst

### Job description

ScribbleLive is the provider of the world's leading complete content marketing and live publishing software platform. Our all-in-one SaaS solution combines predictive analytics with content workflow technologies and is used by over 500 enterprises including Red Bull, Bayer, Ferrari, CNN, Oracle, and Yahoo!. Our team of world-class engineers and data scientists are

looking for new members who want to disrupt the industry. Whether it's working on deep natural language processing for integrating our newly acquired Insights product, buy-sell economics for the ScribbleMarket, or real-time publishing technologies for CoverItLive, you will be working on challenging problems unique to our space.

Our team is focused on delivering advanced analytics and data-science capability to the ScribbleLive product.

Reporting to VP, Client Services, the incumbent will help provide services to our growing list of clients helping with coordination, data collection, data management, analysis, and report writing for regular and ad-hoc research projects. The position is responsible for coordinating assigned research and evaluation projects; collecting qualitative and quantitative data, assembling data and/or manipulating raw data from primary and secondary data sources, analyzing data (including use of inferential statistics), interpreting data, and developing reports and summaries (including graphical summaries) of research findings. Responsibilities will include but not limited to: providing consulting support to brands and media based clients in the design and conduct of research projects and/or evaluation initiatives; collecting, compiling, analyzing and interpreting data for research related projects; and report generation.

Responsibilities:

- Coordinates and conducts research and evaluation projects, including assisting with the development of research designs and strategies for data collection, analysis and interpretation.
- Conduct research on consumer opinions and marketing strategies, collaborating with marketing professionals, statisticians, pollsters, and other professionals.
- Prepare reports of findings, illustrating data graphically and translating complex findings into written text.
- Retrieves data from the ScribbleLive's own data driven software, existing market research and other publicly available market data sources.
- Plans and coordinates KPIs with our clients and internal stakeholders.
- Seek and provide information to help companies determine their position in the marketplace.
- Analyzes and interprets KPI results and trends to support reporting duties.
- Monitor industry statistics and follow trends in trade literature.
- Responds in a timely manner to ad-hoc requests for KPI data, analysis and report writing, and/or distribution of KPI data and research reports.

Qualifications:

- Experience with boolean logic a must.
- Minimum Bachelor's Degree or equivalent in disciplines such as Statistics, Mathematics, Economics, Marketing, Social Sciences or Business Administration.
- Minimum 2 years work experience managing diverse research and analysis activities.
- Experience in marketing or business is required.
- Proven expertise in research methods, questionnaire development and inferential statistical analysis.
- Superior oral, written and verbal presentation skills.
- Superior attention to detail and accuracy to identify errors or inconsistencies in data and ensure accuracy in all research reports, summaries and analytical tasks.

- Superior planning and coordination skills to handle multiple projects and work under pressure to meet competing deadlines and changing priorities.
- Proficiency in the use of word processing software, such as Microsoft Word.,
- Ability to work with minimal supervision and deliver quality work in a high volume or pressure office.
- Proven problem-solving, analytical and interpretive skills to analyze business needs and user requirements to plan projects and/or design solutions.
- Adept in using MS Office applications such as Word and Excel.

### **3. Analytics & Insights Analyst**

#### **Why LoyaltyOne**

Are you passionate to leverage your analytics talent to help more than 100 of the world's leading brands to improve marketing outcomes and deliver differentiated performance? Are you looking for building an extraordinary career and analytics expertise in one of the most respected analytics companies in Canada? Join LoyaltyOne's growing analytics practice to become a part of the 100 smart and business-oriented analytics thought-leaders and practitioners to translate data to analytics to insights to strategy to results. For 6 consecutive years, LoyaltyOne has been recognized by Hewitt Associates as one of the 50 Best Employers in Canada, demonstrating LoyaltyOne's continued commitment to providing a great work experience for its associates and a great service experience for its clients. Don't miss this opportunity to take your career to a whole new level with LoyaltyOne.

#### **About LoyaltyOne**

LoyaltyOne owns and operates the AIR MILES Reward Program, North America's premier coalition loyalty program. LoyaltyOne is a global leader in the design and implementation of coalition loyalty programs, customer analytics and loyalty services for Fortune 1000 clients around the world. LoyaltyOne's unparalleled track record delivering sustained business performance improvement for clients stems from its unique combination of hands-on practitioner experience and continuous thought leadership. LoyaltyOne has over 20 years history leveraging data-driven insights to develop and operate some of the world's most effective loyalty programs and customer-centric solutions.

#### **About the Opportunity**

The AIR MILES Reward Program Analytics & Insights practice is growing significantly and we are looking for a well-rounded Analytics & Insights Analyst to join our team in Toronto/Calgary/Montreal. We are looking for a best-in-class analytics practitioner with a blend of proficient technical skills and strong business acumen. The Analyst plays an expert role in the application & execution of consumer data and analytics to support the development of customer-centric business strategies and Loyalty Marketing for our clients.

#### **Responsibilities**

- Subject Matter Expert in Loyalty & Marketing Analytics for the assigned client portfolio
- Contribute to all phases of campaign management (ideation, planning, targeting, list generation, measurement, recommendation) with a focus in pre-analysis and post-analysis

- Work collaboratively with internal business partners to fully understand external client's business needs
- Work collaboratively with internal business partners to clearly define analysis / campaign scope, objectives, targeting & measurement strategy for client's loyalty marketing initiatives
- Assist in the translation of business requirements into technical specifications
- Extract, cleanse and modify raw data from data warehouse, conduct customer analysis or campaign measurement to identify opportunities for clients to maximize the use of AIR MILES Reward Program to drive incremental sales
- Present analysis results and recommendations in business language in different forums/meetings
- Identify further marketing opportunities for our clients by triangulating industry / competitive analyses with external 3rd party information (research, government reports / trends)
- Create case studies to demonstrate how analytics drive revenue, profit or efficiencies for our clients and for LoyaltyOne
- Automate process using SAS/SQL and/or make suggestions to tool / process improvement to drive operational efficiency
- Ensure timely completion of analysis while maintaining high quality
- Balance the demands of multiple concurrent projects while maintaining a high level of diplomacy
- Respond to ad hoc requests (internal & external) for analysis, data and information on a regular basis
- Contribute in other corporate strategic initiatives as required

#### Qualifications

##### Functional Expertise:

- Bachelor's degree in a quantitative field: Statistics, Economics, Computer Science, Engineering
- Hands-on proficient experience with SAS, SQL, relational databases, data warehouse, BI, UNICA
- VB, R, C+ skills an asset
- Expert in Microsoft Office (advanced Excel and PowerPoint)
- Expert knowledge in direct marketing, campaign management, experimental design, customer analytics, CRM, segmentation, modeling
- Prefer 3-5 years of customer analysis / insight delivery experience in a complex data-driven organization

##### Business Acumen / Soft Skills:

- Retail / merchandising / financial services industry knowledge a definite advantage
- Problem solving skills coupled with the "can do" attitude
- A strategic / analytical thinker who can link assigned tasks to the bigger picture
- Excellent listening, presentation and communication skills (verbal and written)
- Excellent organizational, time management and project management skills

##### Leadership:

- Ability to effectively manage multiple assignments at once
- Provide fact-based opinion in campaign design and strategy recommendations

#### **4. Senior Data Analyst, Customer Analytics**

Apply on company website Apply to Canadian Tire on their website

##### **Job description**

The Customer Insights and Analytics Group at Canadian Tire deliver customer-focused analytical solutions and insights that enable lasting and meaningful customer relationships. We are a diverse and dynamic team of consultants, data scientists, developers, and consumer researchers united by a common goal – placing the customer at the center of every business decision. We utilize the latest data technologies and advanced analytical techniques to demystify shopper behaviour and embed those insights deep within the fabric of the business.

Genuinely passionate about the transformative power of customer data and our role as the “voice” of our customers, we relentlessly push the boundaries of customer science to ensure we understand our customers better than anyone else and deliver the experiences that will earn their continued loyalty. Our work is redefining the Canadian Tire shopping experience and is a key pillar in our mission to become the most innovative retailer in the world.

##### **Responsibilities**

- Building innovative self-serve analytics tools that give users the ability to interactively explore the vast amount of our customer data, directs the users to the key drivers and provide answers for the business questions
- Developing clear and sound measurement methodology that applies to all area of the business
- Identifying new business/analytical opportunities and develop solutions to drive customer centric business decisions
- Acting as SME, Analytics and Technical expert of the customer data; provide innovative and interactive analytical tools to the business
- Utilizing programming and visualization skills to stitch together multiple systems and data sources to provide holistic view of our customers and present it in a way that is easily digestible
- Managing multiple projects in a fast paced, ever-changing business environment

##### **Qualifications**

- Post-secondary education in business, analytics, economics, engineering and/or a related field
  - Demonstrated superior analytical, and data mining skills with the ability to collect, organise, analyse, and disseminate significant amounts of information with attention to detail and accuracy
  - Ability to build and present data concisely through visually appealing interactive dashboards, BI tools, etc.
  - Identify, analyze, and interpret trends or patterns in complex data sets
  - Programming and Data Visualization experience with - SAS, SPSS, SQL, R, Tableau, SSAS Tabular
  - Working knowledge of Netezza, Hadoop, SAS, SQL, Tableau, SSAS Tabular
  - Customer Retail/Loyalty analytics experience is a strong asset
5. Analyst, Customer Analytics & Database Marketing
- Apply

## 5. Holt Renfrew

Toronto

Sign in to ApplySign into LinkedIn to apply

Job description

At Holt Renfrew, our mission is to present exceptional experiences together with the finest luxury products for life's every day and extraordinary moments. The Analyst, Customer Relationship Marketing (CRM) defines the luxury lifestyle shopping experience through building lasting relationships with our people, customers and partners by applying data mining and statistical techniques to large, multichannel (DM, web, email) data sets in order to develop predictive models and customer segmentation.

This analysis supports the achievement of customer relationship marketing (CRM) goals for the Holt Renfrew Marketing team including: acquisition, up-sell, cross-sell and retention and will be integrated with overall CRM and data-driven marketing initiatives and solutions.

Specific responsibilities include (but are not limited to) the following:

- Build effective partnerships with major internal contacts, i.e. executives and management across the organization
- Produces datasets, analyses, tabulations, graphics and listings
- Develops, documents and tests analysis data and programming codes to meet regulatory and company standards
- Designs, developments, codes, tests, debugs and documents applications to satisfy the requirements of one or more user areas
- Contributes to on-going quality improvement efforts within each project
- Evaluates existing reports and identifies potential problems through regular audit activities, troubleshooting as appropriate
- Participates in hands-on new development as well as support, maintenance or enhancement of existing applications
- Ownership of the creation of predictive/forecasting models for departments based on historical data and potential changes to key drivers
- Support business stakeholders by understanding current state business models and contributing to opportunity assessments, feasibility studies and business case development for improved and/or new solutions
- Works closely with client management to identify and specify complex business requirements and processes
- Prepare detailed commentary to explain the financial results and assist the various lines of business in developing action plans as required
- Perform financial analysis to assist in the evaluation of potential business opportunities and proposed strategic initiatives
- Serves as the Subject matter Expert for data mapping and SAS scripts
- Complies with all Health & Safety policies and requirements

Desired Skills and Experience

The ideal candidate:

- Bachelor's degree in statistics, mathematics, computer science or related quantitative field
- 3 years of data mining and modeling - SAS Enterprise Guide 4.1, SAS Macro language and SAS SQL
- SAS Certified Base Programmer; or Advanced Programmer

- Base SAS, SAS/STAT, SAS/GRAPH, and Campaign Management SAS required
- Needs to have experience working with SAS and solid SAS SQL querying skills
- Experience in marketing, loyalty, retail or financial industry
- A strong, demonstrated background in applied statistical analysis, specifically in modeling and target marketing applications
- Knowledge of concepts such as customer segmentation and profiling, clustering, associate and basket analysis, RFM
- Strong quantitative skills, attention to detail, a high aptitude for problem solving and a natural interest in understanding customer behavior

## **6. Director, Data Analytics Branch**

Organization: Ministry of Government and Consumer Services

Division: Enterprise Digital Service Integration

City: Toronto

Job Term: 1 Permanent

Job Code: XEXE2 - Executive 2

Salary: \$130,930.00 - \$164,930.00 Per Year

Understanding the job ad – definitions Posting Status: Open Targeted

Job ID: 123955

Do you have a passion for data and analytics? Would you be interested in an opportunity to help make Digital Government a reality for Ontario? Then, bring your drive and passion for analytics and innovation and join the exceptional leadership team at the Enterprise Digital Service Integration Division, Ministry of Government and Consumer Affairs. In a sector where people and quality government services matter, working as Director of Data Analytics puts you in the center of decision making using data to drive change in how we develop policy and deliver services across the Ontario Provincial service.

In this role, you will lead the definition, development and delivery of a plan for how the Ministry can make use of the data sources we are responsible for, as well as the data sources we need, to reimagine the services that we deliver to our staff, other ministries, as well as the public and businesses of Ontario. You will provide analytical leadership and support strategic analysis enterprise-wide, while building capacity and leading a high performing team of managers and analysts.

What can I expect to do in this role?

Reporting to the Assistant Deputy Minister, and working horizontally across the ministry's lines of business, you will:

- Lead and promote the capabilities of business analytics and intelligence in supporting strategic direction, priority setting, policy development, service development and operational planning, with the lens of advancing an enterprise-wide data driven culture
- Measure and monitor progress against objectives and performance of the ministry Data Analytics Strategic Plan and make recommendations for continuous improvement of business analytics technologies, policies, processes, and procedures
- Provide oversight into the coordination and improvement of data quality and the integration of information system development
- Oversee statistical analysis/modelling/frameworks to ensure reliability, credibility and viability of recommendations presented to senior management and stakeholders

- Lead a highly skilled team of management and professionals, ensuring development of analytical capacity, validation of analysis and results, and a collaborative, team-based approach to achieve organizational goals

How do I qualify?

#### Leadership

- You have proven leadership skills to promote excellence, deliver results and manage risks in an evolving change management environment
- You have a record of getting results through others and have a reputation of being open, transparent and effective in influencing others
- You model leadership by creating and promoting a cross-functional team environment which encourages employees to work collaboratively in both formal and informal teams and networks to achieve common objectives
- You lead by example and foster a workplace culture of high performance, diversity, inclusion and equity

#### Data and Analytics Expertise

- You are considered a leader with expert level knowledge of the major domains within the field of Data Analytics, and Business Intelligence
- You demonstrate an expert level of knowledge and ability to keep current with multiple tool-sets used in the delivery of data related functions from ETL tools through to big data and artificial intelligence
- You have a strong working level of knowledge of the major delivery models associated with the infrastructure, technologies and tools of data related functions, such as on-premise based technologies, virtualization, appliances, managed services and cloud and hybrid-cloud architectures and associated service delivery models
- You have a solid working level of knowledge of general IT architectures, trends, technologies, networks, infrastructures, principles and practices
- You have strong knowledge of and experience in applying change management theories, principles and practices and their application to guide the transformation of relevant data and analytic services
- You have an understanding of government directions, priorities, policies, strategies and planning processes to develop strategies and services
- You are a strategic and analytical thinker who is comfortable working with ambiguity in a fast paced environment
- You are experienced in providing solutions through imaginative approaches where constructive thinking and innovation are required

#### Relationship Management

- You can work across divisions and ministries or organizations to provide services and build strong partnerships
- You foster active networks and partnerships with other ministries, governments, private sector organizations and other jurisdictions, particularly in the field of analytics
- You are skilled at bringing people with varying viewpoints together in support of common goals
- You foster a collaborative work environment that promotes and facilitates transparency and accountability

#### Judgment and Political Sensitivity

- You have political acuity to anticipate and respond to sensitive situations

- You have demonstrated political acumen to engage and manage stakeholders and external networks in a complex environment, forging collaborative relationships
- You have flexibility and are open to new ideas that adapt to a changing environment

Additional Information:

Address:

1 Permanent, 777 Bay St, Toronto, Toronto Region

Compensation Group:Executive

Understanding the job ad – definitions Schedule:

Category: Executive

Posted on: Thursday, May 17, 2018

Note:

Interview Dates: The week of June 25

## 1. Data and information Scientist

Ontario Ministry of the Environment and Climate Change

Division: Information Management and Access Branch

City: Toronto

Job Term: 1 Permanent, 1 Temporary upto 12 months

Job Code: 6A008 - ProgPlanEval06

Salary: \$70,538.00 - \$103,944.00 Per Year

Understanding the job ad – definitions Posting Status: Open

Job ID: 121367 [View Job Description](#)

Are you looking for a great opportunity to showcase your data science expertise and analytics knowledge and skills? Do you want to be a part of the changes that affect MOECC? If so, we want to hear from you!

We are looking for a motivated professional to join our team to provide leadership and expertise in the field of data science analysis in order to enhance our data services catalogue with an innovative workbench of analytical tools that can serve a diverse client base in accordance with OPS principles and objectives.

What can I expect to do in this role?

As a Data and Information Scientist, you will:

- act as the leading technical expert in the field of data mining, data modelling, design, development and enhancement as it applies to complex environmental systems.
- provide strategic expertise and coordination for planning, development, implementation and delivery of, advice, support and education related to environmental data mining, data science, products and tools to support systems planning and decision making
- lead continuing improvement in analytic capacities for environmental systems management and planning
- develop and prepare various reports and papers on the application of methodologies, statistical methods and data analysis techniques
- lead the development of internal capacities for data mining and development of data analysis tools
- provide interpretation, advice, and expertise to client groups and other stakeholders
- provide strategic and operational leadership for planning, development and delivery of data mining and data services programs

- lead large, complex, high impact research and analytical studies, projects and activities

How do I qualify?

Technical Knowledge:

- You have knowledge of theories, concepts, methods and measures of environmental standards, Compliance, Permissions, and Science.
- You have knowledge of the range of analytical methods, techniques, and tools such as, but not limited to: statistical analysis and modelling, data mining, machine learning, deep learning, and algorithms, natural language processing, artificial intelligence and other related disciplines at the specified experience level.
- You have knowledge of relevant software packages, programming, statistics, and modelling to provide technical leadership to colleagues and internal/external clients.
- You have programming skills in the areas of big data, statistical modelling, and visual analytics.

Communication, Consultative and Relationship Management Skills:

- You can achieve consensus on policy issues and influence discussions with stakeholders.
- You have consensus-building and networking skills to maintain strong relationships with partner branches, other ministries, and internal and external stakeholders.
- You can develop support for key initiatives and ensure that the initiatives reflect the coordinated input from all key players.
- You have interpersonal and presentation skills to develop and maintain effective relationships with clients, stakeholders and colleagues and to participate in an advisory capacity on committees or working groups.

Leadership, Research and Analytical Skills:

- You can lead the design, development, implementation, evaluation and continuous improvement of data science program standards for programs and services.
- You have research and analytical skills to lead program/policy reviews and developments as it pertains to data analytics and Business Intelligence tools
- You can anticipate, identify and deal effectively with emerging relevant issues.
- You can analyze large, complex, multi-dimensional datasets with a variety of tools.
- You can assess both qualitative and quantitative information to evaluate the implications and impact of proposed policy changes.

Project Management Skills:

- You can plan and lead concurrent projects and have demonstrated ability to lead concurrent project teams

Additional Information:

Address:

1 Permanent, 40 St Clair Ave W, Toronto, Toronto Region

1 Temporary, duration up to 12 months, 40 St Clair Ave W, Toronto, Toronto Region

Compensation Group: Association of Management, Administrative and Professional Crown Employees of Ontario

Understanding the job ad – definitions Schedule: 6

Category: Consulting and Planning

Posted on: Tuesday, March 20, 2018

Note:

T-ET-121367/18(2)

**UNIVERSITY OF  
WATERLOO**



**GRADUATE EXPEDITED PROPOSAL  
OF  
GRADUATE DIPLOMA  
IN  
COMPUTATIONAL DATA ANALYTICS FOR THE SOCIAL  
SCIENCES & HUMANITIES**

**Submitted to the  
Ontario Universities Council on Quality Assurance**

**VOLUME II – FACULTY CURRICULA VITAE  
APRIL 2020**

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