UNIVERSITY OF WATERLOO
SENATE GRADUATE & RESEARCH COUNCIL
NOTICE OF MEETING

DATE: Monday 13 June 2022   Chair – C. Dean
TIME: 10:30 a.m. – 12:00 noon
PLACE: Microsoft Teams

AGENDA

Item	**Action**
Declarations of Conflict of Interest	
a. Excerpt from Bylaw 1, section 8*	Information
CONSENT AGENDA	
Motion: To approve or receive for information by consent, items 1-4 below.	
1. Minutes of 9 May 2022*	Decision
2. Research Ethics* (Joza)	
a. Human Research Ethics Board – membership updates	Decision (SGRC)
b. Canadian Council on Animal Care Assessment	Information
3. Graduate Awards* (Simm)	
a. Waterloo Apple PhD Fellowship in Data Science and Machine Learning- trust	Decision (SGRC)
b. President's Graduate Scholarship (PGS) - operating	Decision (SGRC)
c. Mac Lewis Memorial Award in Classics - trust	Decision (SGRC)
4. Renewal Extension: Centre for Bioengineering and Biotechnology*(Momani)	Decision (SGRC)
REGULAR AGENDA	
5. Business Arising from the Minutes	Information
6. Co-chairs' Remarks	Information
7. Research Centres and Institutes (Momani)	
a. Dissolution: Centre for Advanced Trenchless Technologies* (Mark Knight)	SEN-Regular
b. Dissolution: Institute for Computer Research* (Christiane Lemieux)	SEN-Regular
c. Renewal: Heritage Resource Centre* (Michael Drescher)	Decision (SGRC)
d. Renewal: Waterloo Artificial Intelligence Institute*(Vijay Ganesh, Jimmy Lin, Harold Godwin)	Decision (SGRC)
8. Discussion regarding SGRC – continued from 8 May 2022* (45 minutes)	Input/Discussion
9. Curricular Submissions	
a. Engineering* (Sivoththaman)	Decision (SGRC)
b. Arts* (Esselment)	Item a; SEN-Regular
10. Institutional Research Data Management Strategy Update* (Alison Hitchens, Sara Anderson)	Information
11. Other Business	Information
12. Next Meeting: 12 September 2022 from 10:30 a.m. - 12 noon; Microsoft Teams	Information

*material attached
** to be distributed separately
"SGRC" to be approved on behalf of Senate
"SEN" to be recommended to Senate for approval

30 May 2022   Kathy Winter, PhD, CPsych
                                                          Assistant University Secretary

Excerpt from Senate Bylaw 1

8. Declarations of conflict of interest

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 9 May 2022 Meeting
[in agenda order]
Microsoft Teams Meeting Videoconference

Present: Jeff Casello, Amelia Clarke, David Clausi, Peter Deadman, Charmaine Dean, Anna Esselment, Ana Ferrer, Bertrand Guenin, Alison Hitchens, Aiden Huffman, Julie Joza, Brian Laird, Glaucia Melo, Ian Milligan, Bessma Momani, Liz Nilsen, Jennifer Reid, Martin Ross, Marianne Simm, Kankar Bhattacharya (on behalf of Siva Sivoththaman), Mike Szarka, John Thompson, Kathy Winter (secretary).

Resources: Trevor Clews, Carrie MacKinnon-Molson, Amanda McKenzie.

Guests: Sarah Burch, Suzan Ilcan, Carol Penner, Nadia Singh, Andrew Thompson

Regrets: Maureen Drysdale*, Richard Staines *, Shawn Wettig*

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 11 APRIL 2022 AND BUSINESS ARISING
By consensus, the minutes were approved as distributed.

3. CO-CHAIRS' REMARKS
Casello informed council that a number of interdisciplinary postdoctoral initiatives (postdoctoral appointments proposal, postdoctoral funding for equity-deserving groups) are currently underway.

4. DISCUSSION REGARDING SGRC
As part of the University's Senate Governance Review (January 2022-present), Senate Graduate and Research Council (SGRC) discussed the structure and functioning of SGRC. Memos submitted by the Associate Deans Research (ADR) and Associate Deans Graduate (ADG) formed the basis of, as well as informed this important conversation. Council members raised a variety of subjects relating to SGRC's operations, including whether it should remain as one council or dissolve into separate research and academic councils. Council members identified that:

- SGRC (or any other University committee[1]) does not serve as a mechanism for essential research content and discussions (e.g., IP, research risk, research security, grants, data management, etc.)
- SGRC business is heavily and disproportionately weighted to academic content
- SGRC is unnecessarily administrative with little time spent in fruitful, substantive, synergistic discussion—whether academic or research-related
- regardless of the future of SGRC, student membership is necessary, but resources are finite

From these discussions, a number of key foci emerged in order to improve SGRC efficacy:

- To identify key strategic research and academic matters for discussion and ensure equitable time for each
- To consider the role of new (sub)committees (e.g., curriculum committee) and/or working groups to delegate appropriate matters elsewhere and allow more time at SGRC for increased engagement on critical research and academic topics and strategic matters
- To refine and improve SGRC agendas (e.g., implement consent agenda)

Council agreed to continue discussion at 13 June 2022 SGRC:

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[1] The existing Research Operations Council (ROC) is not a formal or deliberative body of the university.

5. POLICY 30 – EMPLOYMENT OF GRADUATE STUDENT TEACHING ASSISTANTS

Council received for input and discussion the Policy 30 draft which is in its formal review stage before finalization through the Vice-President Academic and Provost and Senate. Singh, Secretariat member of the Drafting committee, was in attendance. In discussion: support for this "well-constructed policy"; recognition of the significant value of teaching experience gained through Teaching Assistantships; that the policy has a dispute resolution process between the instructor and TA that is separate and in addition to other applicable university policies (such as Policy 33). Council raised no new or substantive issues during the meeting as part of this Policy 30 consultation process, though a minor typo was noted in Appendix B ("GPA" in last bullet point should read "GTA"). Casello invited any feedback to be received to GSPA by 16 May 2022.

6. ACADEMIC PROGRAM REVIEWS

On behalf of Senate, council heard a motion to approve the following, as presented:
   a. Two-Year Progress Report – Global Governance. Esselment and Nilsen. Carried.
   b. Two-Year Progress Report – Theological Studies. Esselment and Ferrer. Carried.

7. RESEARCH CENTERS AND INSTITUTES

On behalf of Senate, council heard a motion to approve the name change of Interdisciplinary Centre on Climate change (IC3) to the Waterloo Climate Institute, as presented. Momani and Hitchens. Carried.

8. CURRICULAR SUBMISSIONS

Council heard a motion to recommend to Senate to approve the following Faculties joining the Collaborative Aeronautics Program (CAP), effective 1 September 2022, as presented[2].

- Environment: Master of Arts in Geography – Aeronautics; Master of Science in Geography – Aeronautics; Master of Environmental Studies in Geography – Aeronautics; Doctor of Philosophy in Geography – Aeronautics. Deadman and Clarke. Carried.
- Health: Master of Science in Kinesiology – Aeronautics; Doctor of Philosophy in Kinesiology – Aeronautics. Laird and Guenin. Carried.
- Mathematics: Master of Mathematics in Applied Mathematics – Aeronautics; Doctor of Philosophy in Applied Mathematics – Aeronautics. Guenin and Laird. Carried

Faculty of Engineering
Council heard a motion to recommend to Senate to approve updating the MEng in Electrical and Computer Engineering degree requirements to include one new Graduate Specialization in Business Leadership, effective 1 September 2022, as presented. Bhattacharya and Ferrer. Carried. Council heard a motion to recommend to Senate to approve a direct entry Co-operative program/option to the MEng in Electrical and Computer Engineering program., effective 1 September 2022, as presented. Bhattacharya and Ferrer. Carried. On behalf of Senate, council heard a motion to approve items 1b, 2, and 3, as presented. Bhattacharya and Ferrer. Carried.

Faculty of Environment
Council heard a motion to recommend to Senate to approve adding a new Master's Research Paper with Internship study option to the Master of Environmental Studies in Social and Ecological Sustainability, effective 1 September 2022, as presented. Deadman and Clarke. Carried. On behalf of Senate, council heard a motion to approve item 2, as presented. Deadman and Clarke. Carried.

[2] See 11 April 2022 Senate Graduate and Research Council (agenda item 5).

Faculty of Health

Council heard a motion to recommend to Senate to approve changing the PhD and MSc program names to align with the following recent department and school name changes, effective 1 September 2022, as presented. Laird and Guenin. Carried.

- "Department of Kinesiology" to the "Department of Kinesiology and Health Sciences"
- "School of Public Health and Health Systems" to the "School of Public Health Sciences"

On behalf of Senate, council heard a motion to approve items 1, 2, 3.1.1, 4.1.1, and 5, as presented. Laird and Guenin. Carried.

Faculty of Mathematics

Council heard a motion to recommend to Senate to approve the discontinuation of the coursework study option from Master of Mathematics in Computer Science and the Co-operative Program, effective 1 September 2022, as presented. Guenin and Laird. Carried. On behalf of Senate, council heard a motion to approve item, as presented. Guenin and Laird. Carried.

9. GRADUATE AWARDS

On behalf of Senate, council heard a motion to approve items a-b, as presented. Simm and Clarke. Carried. Council received items c-g for information.

10. OTHER BUSINESS

There was no other business.

11. NEXT MEETING

The next meeting will be held Monday 13 June 2022 from 10:30 a.m. to 12 noon; Microsoft Teams.

26 May 2022   Kathy Winter, PhD, CPsych,
                                                Assistant University Secretary

Memorandum

To: **Members**
                Senate Graduate and Research Council (SGRC)

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

Date: **May 30, 2022**

Subject: **Membership on the Human Research Ethics Board**

This memo outlines membership updates that will be taking place on the Human Research Ethics Board (HREB). This update is for consideration and approval by the Senate Graduate and Research Council.

New Member

Kelly Skinner, PhD, CIHR Applied Public Health Chair and Associate Professor in the School of Public Health Sciences (SPHS) will replace Hannah Tait Neufeld from September 1, 2022, to March 31, 2023, while Hannah is on six-month sabbatical. Kelly has extensive experience in qualitative methods and participatory action research. Kelly's research involves direct engagement with northern and remote communities in Canada and Kelly has extensive experience working with Indigenous populations.

Renewing Member

Dianna Fong Lee, BSc (OT), MA, will begin a third term as a community member from September 1, 2022, to August 31, 2025. Dianna has been a community member on HREB since 2016. Dianna has more than 30 years of teaching experience in post-secondary education and is a registered occupational therapist and specializes in assistive and adaptive technology.

For Information: Member Change

Gail Wagner, RN, BA, and Nurse Supervisor with Campus Wellness will join HREB for one year from July 1, 2022, to June 30, 2023. Gail will fill the ex-officio role left by Dr. Clark Baldwin until a replacement is found.

Reminder: SGRC members who wish to learn more about the qualifications or academic background and interests of the individual being nominated to the REB are encouraged to contact Julie Joza, Director, Research Ethics at jajoza@uwaterloo.ca. Julie will be pleased to discuss with SGRC members in advance of the meeting the information they may need to help support their decision to recommend the nomination of the individual in becoming a member of the REB. On behalf of the SGRC, the research ethics office retains a copy of each member's CV and expression of interest in being a REB member.

Memorandum

To: **Members**
                Senate Graduate and Research Council (SGRC)

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

Date: **May 30, 2022**

Subject: **Canadian Council on Animal Care Assessment**

This memo is for information regarding the upcoming assessment visit by the Canadian Council on Animal Care (CCAC).

Institutions are subject to a peer review of their animal care program every three-years by the Canadian Council on Animal Care (CCAC). Regular visits are conducted every six-years by an assessment panel made up of up to 10 members identified by the CCAC. Interim visits are conducted at the three-year mark after a regular visit. The University of Waterloo is scheduled for a regular visit by the assessment panel in November 2022.

Maintaining a Certificate of Good Animal Practice (GAP) is an ongoing process for institutions who participate in the CCAC program. The assessment involves a review of the animal facilities, practices, and procedures.

SGRC members who wish to learn more about the CCAC assessment visits and certification process are encouraged to visit the [CCAC website](#) or contact Julie Joza.

UNIVERSITY OF WATERLOO | Graduate Studies and Postdoctoral Affairs

May 30, 2022

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 – June 2022

<u>Items for Approval</u>

a) **Waterloo Apple PhD Fellowship in Data Science and Machine Learning – trust**
   Fellowships valued at $37,500 per year for a maximum of two years, will be awarded annually to graduate students registered full time in their second or third year of their doctoral program in the School of Computer Science. Selection will be based on academic achievements, leadership contributions and potential, and on the strength of their research proposal. Candidates must be conducting research in the area of Data Science or Machine Learning. Interested students should submit an application package by March 31 to the Director of Graduate Studies in the School of Computer Science. The application package must consist of the student's CV, UW transcript, and a research proposal. Two references must submit support letters for the student directly to the Director of Graduate Studies in the School of Computer Science. One of the references must be the student's primary thesis supervisor.
   It is anticipated that the last fellowships will be paid in the 2025 fiscal year.

b) **President's Graduate Scholarship (PGS) – operating**
   Originally established in May 2003 to provide top-up funding to recruit and retain recipients of major external scholarships, the program has gone through several amendments over the years.

   Current PGS values for recipients of a tri-agency doctoral scholarship, Vanier, or Trudeau Doctoral Scholarship are as follows:

If student is entering the first term of their doctoral program and was awarded one of the above scholarships:		
PGS paid by	*Year 1 of doctoral program*	*Year 2 of doctoral program (and beyond)*
GSPA	up to $10,000 paid across 3 terms	up to $5,000 paid across 3 terms
Department/Faculty	up to $5,000	up to $5,000
TOTAL	**up to $15,000**	**up to $10,000**

If student is already in a doctoral program when awarded one of the above scholarships:	
PGS paid by	*Annual amount while holding the eligible doctoral scholarship*
GSPA	up to $5,000 paid across 3 terms
Department/Faculty	up to $5,000
TOTAL	**up to $10,000**

   Recognizing that *current* Waterloo recipients of the above scholarships receive a lower-valued PGS than new students just starting their program, and further recognizing that the intention of the program was to recruit and *retain*, the PGS value is being harmonized such that any recipient of a tri-agency doctoral or Vanier scholarship will receive a central PGS through GSPA valued at $5,000 per year regardless of whether the recipient is a current or new student. The

department and/or Faculty are still responsible for matching up to $5,000 per year for a total PGS of $10,000 per year while holding one of the eligible scholarships.

Additionally, since the Trudeau Doctoral Scholarship competition no longer requires an institutional-level adjudication, this scholarship is being removed as one of the eligible awards.

These amendments, which have been discussed and approved by the Graduate Operations Committee, will take effect for the 2023-2024 scholarship competitions onwards. Current recipients of the higher valued PGS will continue to be honoured.

c)   **Mac Lewis Memorial Award in Classics – trust**
Awards valued at up to $2,500 will be provided annually to full-time undergraduate or graduate students in the Department of Classical Studies. Selection is based on academic achievement (minimum cumulative average of 75% or equivalent) and candidates must be pursuing an immersive experiential activity to support their interest and academic journey related to archeology and/or material culture. Eligible activities may include an archeological dig, a Classical Studies travel abroad course, or an internship at CIG (Canadian Institute in Greece). Interested students must complete an application that can be found on the Department of Classical Studies website. Recipients will be selected by a committee within the Department of Classical Studies.

The value of each award will vary depending on the budget requirements for the experience and the availability of funds. Students will normally be awarded an amount to help with their costs rather than the full cost of the activity.

Total gift = $25,000

MEMORANDUM

To: **Senate Graduate & Research Council**

CC: **Bessma Momani, Interim Associate Vice-President, Interdisciplinary Research and Sponsored Research**
Bob Lemieux, Dean of Science
Mary Wells, Dean of Engineering
Doug Peers, Dean of Arts
Lili Liu, Dean of Health Sciences
Jean Andrey, Dean of Environment
Kathy Winter, Assistant University Secretary and Privacy Officer

From: **Charmaine B. Dean, Vice-President, Research and International**

Date: **June 6, 2022**

Subject: **Extensions for Centre Renewal Timeline**

               - For decision -

To provide sufficient time for the Centre for Bioengineering and Biotechnology to consider a case for renewal, and to host discussions related to health initiatives on campus, they have requested additional time to consider the development of a renewal document. I endorse this recommendation. The recommended extension period and revised renewal dates are shown in the table below.

Centre	Extension Period	Revised Renewal Date
Centre for Bioengineering and Biotechnology	20 months	31 December, 2023

UNIVERSITY OF WATERLOO

MEMORANDUM

TO: Senate Graduate and Research Council

CC: Kathy Winter, Secretariat

                Mark Knight, Associate Professor, Civil and Environmental Engineering
                Mary Wells, Dean of Engineering
                Bessma Momani, Interim Associate Vice-President, Interdisciplinary and Sponsored
                Research

FROM: Charmaine B. Dean, Vice-President, Research and International

DATE: Monday May 9, 2022

SUBJECT: Centre for Advancement of Trenchless Technologies (CATT)

                - For action -

The attached documentation was received on April 11 2022 from Mark Knight, Director of the Centre for Advancement of Trenchless Technologies recommending that the Centre be dissolved in 2022. This memo is to recommend that Senate Graduate and Research Council review the proposal, and discuss and vote on the dissolution of the Centre for Advancement of Trenchless Technologies (CATT).

Date: April 26 2022

To: Dr. Bessma Momani
Interim Associate Vice-President, Interdisciplinary and Sponsored Research

re: Dissolution of the Centre of Advancement of Trenchless Technologies (CATT)

The Centre for the Advancement of Trenchless Technologies (CATT) was established as one of Engineering's first centres in 1996. Over the past 26 years, CATT has grown to be recognized as an international leader in the field of trenchless technologies. This has been possible though the leadership of the Executive Directors (Drs. Bruce Hutchinson, Robert McKim, Ralph Haas, and Mark Knight), the Board of Directors, dedicated staff, and numerous industry professionals who have dedicated time as volunteers.

In February 2022, CATT's Board of Directors unanimously approved a motion to dissolve CATT on April 30, 2022. To transition, CATT members can join the newly formed Canadian Underground Infrastructure Innovative Centre (CUIIC) at the University of Alberta. It is my understanding that CUIIC will be led by Dr. Alireza Bayat who obtained his Doctorate in the Department of Civil and Environmental Engineering at the University of Waterloo and was active in CATT as a PhD candidate. On March 5, 2022, the CATT membership approved the Board's motion to dissolve CATT on April 30, 2022.

The Faculty of Engineering and the Department of Civil and Environmental Engineering support the CATT's Board and Membership decision to dissolve on April 30th, 2022. We also fully support the formation of CUIIC at the University of Alberta and will encourage UW faculty to support and be active in CUIIC so that it can continue to build on CATT's successes.

Yours truly,

David A. Clausi, Acting Dean
Faculty of Engineering

April 11, 2022

To: Charmaine Dean, UW Vice President Research and International

RE: The Centre for Advancement with Close on April 30, 2022

In 1994, the City of Waterloo came to the University of Waterloo to help them with their failing Black Pipe lateral problem. This led to the formation of the Centre of Advancement of Trenchless Technologies (CATT) in 1996.

Over the past twenty-eight years, CATT has grown to be an international leader in trenchless research and professional education. CATT's success have been built on the efforts of many; the past Executive Directors, the Board of Directors, CATT staff that grew from one half day person three days a week, to two full time dedicated staff, co-op students, graduate students, CATT volunteers, and most importantly our loyal, paying and supporting annual members.

Over the past 28 years the Canadian underground infrastructure has changed. To adapt to this change and to better represent the Canadian industry, the **Canadian Underground Infrastructure Innovation Centre (CUIIC)**, at the University of Alberta has been established. This new center will be led by Dr. Alireza Bayat, a Professor at the University of Alberta. Dr Bayat is a Department of Civil and Environmental Engineering and University of Waterloo Alumni, the holder of the NSERC Associate Industrial Research Chair in Underground Trenchless Construction, and a Ralph Haas/Stantec Fellow in Civil Engineering.

CUIIC is committed to continue and to expand CATT's mandate. Although the location and name maybe changing, it is important to note that CATT's original vision and mandate will carry on and evolve, just as it has since 1994 when CATT was formed. So, there is only one voice in CANADA and to fully support CUIIC, CATT is winding down at the University of Waterloo on April 30, 2022. For more information on CUIIC go to WWW.CATT.CA or contact Dr. Mark Knight (mark.knight@uwaterloo.ca).

CATT maybe winding down however, ongoing underground research at UWaterloo is not winding down. The transfer of CATT's mandate to the new and exciting Canadian Underground Infrastructure Innovation Centre (CUIIC), will allow Dr. Knight and his team to focus on existing ongoing research projects and to expand them. These projects include the testing and design of liners used to rehabilitate pressure pipelines; Subsurface Utility Engineering Return on Investment; Water Infrastructure Asset Management; Environmental Assessment of Pipe Lining Materials; and Pipeline Rehabilitation Material Testing.

CATT would like to thank the University of Waterloo for there continued support over the past 28 years.

Regards,

Executive Director, Dr. Mark Knight Email: maknight@uwaterloo.ca

MEMO

2020-04-19

To: Dr. Bessma Momani

              Interim Associate Vice-President, Interdisciplinary and Sponsored Research

From: Dr. Mark Knight, CATT Executive Director

RE: CATT's Stakeholders Notification

This memo provides information regarding the notification of stakeholders about CATT's Dissolution on April 30, 2022.

CATT's Board and Membership

1) On February 15, 2022, CATT's Board of Directors unanimously voted to dissolve CATT on April 30, 2022.
2) On February 23, 2022, CATT's Board of Directors sent a letter, to CATT members, to notify all members, that the Board voted o dissolve CATT on April 30, 2022, and that a virtual CATT membership meeting would be held on March 5, 2022. The letter also provided a Motion to CATT members to dissolve CATT on April 30, 2022.
3) On March 5, 2022, CATT's membership passed the membership motion with 91% approving and 9% abstaining.

CATT Staff Notification

Secretary note: brief summary to be shared at 13 June 2022 SGRC

MEMO

2020-04-19

To: Dr. Bessma Momani

Interim Associate Vice-President, Interdisciplinary and Sponsored Research

From: Dr. Mark Knight, CATT Executive Director

RE: CATT's plan for remaining funds and resources

This memo provides information regarding CATT's plan for remaining funds and resources after dissolution on April 30, 2022.

CATT's last planned event will be the April 24th to 26th Trenchless Technology Roadshow that will be held in Kelowna, British Columbia. This event will bring together over 200 industry professionals.

Since February of 2022, CATT's Executive Director has been working with the Department of Civil and Environmental Engineering Chair, The Department Administrative Officer, and Tracy Williams, CPA, CA Faculty Financial Officer to develop a close out plan. This plan has been developed and is being implemented.

Final transactions will take place in fiscal 2022-2023 after which, the organizational unit 8071 will be closed.

MEMORANDUM

TO: Senate Graduate and Research Council

CC: Kathy Winter, Secretariat

                Christiane Lemieux, Associate Dean Operations & Academic, Faculty of Mathematics
                Mark Giesbrecht, Dean of Mathematics
                Mary Wells, Dean of Engineering
                Bessma Momani, Interim Associate Vice-President, Interdisciplinary and Sponsored
                Research

FROM: Charmaine B. Dean, Vice-President, Research and International

DATE: Tuesday May 24, 2022

SUBJECT: Institute for Computer Research (ICR)

                - For action -

The attached documentation was received on May 3, 2022, from Christiane Lemieux, Associate Dean
Operations & Academic, Faculty of Mathematics recommending that the Centre be dissolved in 2022.
This memo is to recommend that Senate Graduate and Research Council review the proposal and
discuss and vote on the dissolution of the Institute for Computer Research (ICR).

UNIVERSITY OF WATERLOO

FACULTY OF MATHEMATICS | Office of the Dean
519-888-4567, ext. 33474 | fax 519-888-4302
deanmath@uwaterloo.ca | uwaterloo.ca/math

MEMORANDUM

To: Research Leaders Council

From: Christiane Lemieux, Associate Dean Operations & Academic, Faculty of Mathematics

Date: May 3, 2022

Re: Dissolution of ICR

The Faculty of Mathematics is seeking the dissolution of the Institute for Computer Research (ICR).

When ICR was formed in 1982, computing was revolutionizing many fields. ICR was created as a federation of research groups and individuals involved in computer-related research at the University of Waterloo, providing shared expertise and resources that enabled collaboration and innovation.

Now computing is ubiquitous and part of all research we do, and as a result the initial motivation for this Institute no longer exists. The Board of Directors was wound down as activities of the Institute transitioned from a federation of computer research groups to a staff acquiring funds for research as more of a targeted and embedded academic support unit. The remaining constituents were researchers, depending on ICR for initiating new grants and contracts, which transitioned to other institutes (e.g. WatCAR) and the Math and Engineering Research Offices, and for help with management of larger grants involving groups of researchers, which were transitioned to department and Faculty finance officers. ICR is no longer active with the retirement of its Executive Director (Vic DiCiccio) in 2018 and its Manager (Jean Webster) in 2019; there is no staff or space associated to it, and there are no funds remaining.

Thus, the Faculty of Mathematics is now seeking formal approval for its dissolution. There are no current outstanding issues.

May 6, 2022

Research Leaders Council
University of Waterloo

To whom it may concern:

This is to confirm that the Faculty of Mathematics endorses the formal request for approval in regard to the dissolution of the ICR. This is in accordance with previous conversations with ICR leadership and the Dean of Engineering, who are both supportive of the process.

Your truly,

Mark Giesbrecht
Dean, Faculty of Mathematics
Professor, Cheriton School of Computing Science
deanmath@uwaterloo.ca

May 10, 2022

Research Leaders Council
University of Waterloo

To Whom It May Concern:

This is to confirm that the Faculty of Engineering endorses the formal request for approval in regard to the dissolution of the Institute for Computer Research (ICR). This is in accordance with previous conversations with the Dean of Mathematics and the leadership of ICR, where the dissolution was agreed upon.

Sincerely yours,

Mary Wells

Mary Wells
Dean, Faculty of Engineering

UNIVERSITY OF WATERLOO

MEMORANDUM

To: Senate Graduate & Research Council

CC: Bessma Momani, Interim Associate Vice-President, Interdisciplinary Research

Jean Andrey, Dean of Environment

Kathy Winter, Assistant University Secretary and Privacy Officer

From: Charmaine B. Dean, Vice-President, Research & International

Date: May 6, 2022

Subject: Support for Heritage Resources Centre (HRC) Renewal

- For decision -

Dr. Michael Drescher presented a well laid out proposal for the renewal of the faculty-level Heritage Resources Centre (HRC).

I am recommending that Senate Graduate and Research Council review this proposal, discuss and vote on the renewal of the Heritage Resources Centre (HRC).

Heritage Resources Centre
Centre des ressources du patrimonie

Hay Bales on Field in West Flamborough, City of Hamilton
Part of the Ontario Greenbelt

Six-Year Report 2016-2022
Heritage Resource Centre
School of Planning
University of Waterloo

Table of Contents

Executive Summary

In accordance with the University of Waterloo guidelines for the review of centres and institutes, this report reflects on the activities of the Heritage Resources Centre since its last renewal review. While reviews normally occur every five years, this report covers 2016-2022, a six-year period. This extended period of operation was granted by Professor Duncker, Associate Vice-President, Interdisciplinary Research, with support by Professor Jean Andrey, Dean of the Faculty of Environment, in recognition of the various impacts of the COVID-19 pandemic on university operations. This is the sixth time that the Heritage Resources Centre is undergoing a review by the Senate Graduate and Research Council.

Over the past six years, the Heritage Resources Centre engaged in 11 research projects of which several are ongoing. These projects have a total reach of more than 2,200 people in various forms of participation, ranging from interviews to mail and online surveys, and online mapping applications. Over the same period, the Heritage Resources Centre worked on eight community engagement activities of various formats, including workshops, webinars, an online blog and through social media. These activities reached a documented minimum of 194 people through workshops. However, the total reach of all community engagement activities is much larger including 1,441 people through the heritage policy blog, Twitter followers and the Heritage Resources Centre email list, plus hundreds more including students through coursework and the online Case Law and Research Inventory. During the review period, Heritage Resources Centre members published their work in 26 journal publications, eight book chapters, two books and 13 dissertations and theses. The Heritage Resources Centre received funding for 13 projects amounting to $295,265. The Heritage Resources Centre is the only organization of its kind in Canada and is well respected for its outstanding heritage-related research, conservation work and education. Recognition of the work of the Heritage Resources Centre is expressed through awards for its Ontario heritage policy blog such as in 2017 the Heritage Education and Scholarship Award of Excellence from the Canadian Association of Heritage Professionals and in 2020 the Stephen A. Otto Award for Research and Documentation from the Architectural Conservancy Ontario, as well as through the support it receives from municipal governments, the private sector and the not-for profit sector. The Heritage Resources Centre also enjoys continuing support from the School of Planning and the Faculty of Environment.

The Heritage Resources Centre continues to pursue priorities identified during the previous review period such as in the fields of natural heritage, cultural heritage landscapes, aboriginal communities, critical heritage and more, while maintaining is strong connection with issues affecting built heritage. While the Heritage Resources Centre is pursuing these priorities, emerging challenges in heritage planning provide future opportunities for engagement, including in the educational sector. The alignment of the Heritage Resources Centre with the University of Waterloo and Faculty of Environment Strategic Plans 2020 positions the Centre well within the evolving mission of the University of Waterloo.

1. Director's Message

The Heritage Resources Centre was last reviewed in 2016. Normally, the current report would have been submitted in 2021, toward the end of the normal five-year renewal cycle. However, due to the manyfold impacts of the COVID-19 pandemic on university operations of all kinds, Professor Duncker, Associate Vice-President, Interdisciplinary Research, agreed to extend the five-year approval period by one year to 2022. This approval period extension was supported by Professor Jean Andrey, Dean of the Faculty of Environment. Consequently, the current report covers an exceptional six-year period from 2016 to 2022.

The COVID-19 pandemic has affected all of us in many ways. Canada alone has experienced over 3.5 million confirmed cases and close to 40,000 deaths due to COVID-19. The specters of additional pandemic waves and the long-term health impacts of COVID-19 infections are still hanging over us. Hardly anyone of us has not been touched by this disease or does not at least know somebody who has. Next to the direct health impacts on individuals, the pandemic has worked as a great accelerator of change. Some of these changes might have been positive, such as our increased familiarity and skill in communicating remotely. This can make many of our communications easier by saving time and reducing travel-related greenhouse gas emissions. As time progresses, other changes still have to be judged for being positive or negative. However, several changes clearly have been negative. Emergency infection control measures such as stay-at-home orders and social distancing regulations have saved many lives. But these measures also have caused economic hardship for many Canadians, vastly increased social isolation, and have contributed to huge growth in conspiracy theories and extreme views held by community members. With the words of Alberta Independent Senator Paula Simons, "I really do think COVID has broken a lot of people." Arguably, while we all yearn for more social connectedness, Canadian society never has been more divided than now. While many Canadians engage in acts large and small to connect and support each other, there seems to be a growing tendency amongst some people to engage and identify with small, "special interest" groups, instead of with the larger community. These processes weaken our society and can easily pit people against each other. The backdrop of the COVID-19 pandemic and its various social, economic and political consequences puts into sharp relief the importance of community for our individual and collective wellbeing.

The fellowship we feel with other people – the foundation of community – can be grounded in the sharing of a great variety of characteristics. These characteristics can be very narrow such as a specific interest or a geographic place of residence; or they can be very broad such as our shared humanity. The perception of a common heritage is a very powerful driver of community identity. However, heritage is not created in the past and it is not static. Rodney Harrison, Lecturer in Museum and Heritage Studies, University College London, posits that heritage is created in the present as we form relationships with objects from the past. These relationships are malleable and are constantly reshaped. Some of this reshaping happens organically, as we and the world around us are changing and with them our perceptions of the world. However, at other times this reshaping is pursued purposefully by deep political interests of certain groups or actors. The currently purported narrative of the lack of a historic basis for a Ukrainian national identity, espoused by the Russian government, is a very poignant example of this, and has led to the most horrific results in the form of the Russian-Ukrainian war. If anybody ever thought that history

and heritage are irrelevant in our modern times and have no consequences in the real world of our lived experiences, these latest atrocities would have proven them wrong.

The Spanish philosopher and poet George Santayana stated, "Those who cannot remember the past are condemned to repeat it." Unfortunately, remembering the past is only a necessary but not a sufficient condition for not repeating history. Understanding heritage – our presently formed relationships with objects of the past – clearly does not protect us against making the same errors over and over again. However, ignoring heritage – what it does, and how it is evolving and contested – is one of the very best ways of sentencing us to lose ourselves and repeat the errors of the past. This is why we cannot ignore heritage and why the work of organizations such as the Heritage Resources Centre is of critical importance to society.

Dr. Michael Drescher
Associate Professor, School of Planning
Director, Heritage Resources Centre

Affiliated Faculty, Ostrom Workshop in Political Theory & Policy Analysis
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2. Background

2.1. Historic Developments

At present, the Heritage Resources Centre is one of the oldest research institutes at the University of Waterloo, established in 1984. Its creation grew from an arrangement with Parks Canada that began in 1981. The Federal Government initially funded this cooperative venture, which led to the securing of other grants and contracts by members of the University of Waterloo. In 1983, Parks Canada was compelled to terminate the agreement because of the cost-cutting measures that were underway at that time in the federal government. At that point the Heritage Resources Centre was created to allow the University of Waterloo to continue developing a broad range of work with various federal and provincial agencies, private sector organizations, other universities, and groups in the heritage field.

The Heritage Resources Centre has operated continuously since its inception in 1984. During that time it has undergone five Senate reviews and received strong endorsement in every case. To date, there have been three Directors: Professor Gordon Nelson from 1984 to his retirement in 2003, Professor Robert Shipley from 2003 to his retirement in 2016, and Professor Michael Drescher from 2016. Prior to his appointment as Director, Michael Drescher has served as Associate Director of the Heritage Resources Centre from 2014 to 2016. All three directors are or have been faculty members in the School of Planning.

All three Directors of the Heritage Resources Centre brought with them a particular focus of research, though of course there is much overlap among them as well. The topical focus of the Heritage Resources Centre under the leadership of Professor Nelson was wide-ranging and addressed many topics in the heritage field in the broad sense of its statement of purpose. Overall however it centred on natural heritage. Within this general direction, Professor Nelson's work covered the heritage of the Grand River basin; planning for parks and protected areas at the local, provincial, national, and international levels; coastal zone planning; and heritage landscape guides at the community and regional levels; and others. With the change in leadership from Professor Nelson to Professor Shipley, there has naturally been some shifting of emphasis reflecting the interests and expertise of the new Director. Professor Shipley's work was primarily focused on the area of the built environment. Within this general direction, his work covered economic benefits of heritage conservation districts; policy tools for heritage preservation; program evaluations for historic town regeneration; historic building material reuse; cultural heritage landscape assessments; investigations of heritage tourism economics; and others. The recent change in leadership from Professor Shipley to Professor Drescher brought with it another change in focus. Professor Drescher has endeavoured to balance the previous efforts in natural heritage and built heritage with an emphasis on cultural heritage landscapes that explicitly acknowledges the bi-directional interactions between natural and built heritage. In parallel to an emphasis on cultural heritage landscapes, increasing attention is given to intangible heritage, defined as the practices, expressions, knowledge and skills of individuals and communities, including arts and oral history, as well as aboriginal heritage and critical heritage studies.

The record of the Heritage Resources Centre has remained strong throughout its existence and it is anticipated that many opportunities exist for it to continue to make important contributions into the future.

2.2. Objectives and Mission Statement

The original objectives of the Heritage Resources Centre have been formulated close to 40 years ago. However, thanks to the outstanding vision and leadership of Professor Nelson, the founding Director of the Heritage Resources Centre, these objectives are still of great relevance today. The Heritage Resources Centre takes a broad view of heritage as outlined in its original mission statement:

"The Heritage Resources Centre (HRC) encourages research, education, and information exchange activities among a wide range of groups and individuals. Participants come from university, government, and private groups in Ontario, elsewhere in Canada, and the international community. The word "heritage" is used in a broad sense involving both natural and cultural heritage. The HRC's activities encompass geological, biological, archaeological, cultural, historical, marine and geographical aspects of heritage, as well as policies and institutions for heritage planning and management. The term goes beyond these more tangible things as well: to include the ideas, beliefs, and ways of life that people value and use when faced with change. To the extent that its resources permit, the HRC aims to serve those who wish to understand, conserve and use their heritage."

It is also important to note that while the Heritage Resources Centre carries out its research in the traditional way through the efforts of individual researchers and research teams, including students, it also continues to conduct its research and learning activities through workshops, seminars and study tours. These activities offer interactive opportunities to bring professional researchers together with concerned or affected citizens and organizations at the provincial, regional and local levels, and provide for the inclusion of their learning, experience and perspectives in the research.

Only a few Canadian universities train students in heritage planning and the Heritage Resources Centre is the sole research centre in Canada focusing on heritage planning and research. The Heritage Resources Centre is of major influence on the heritage community in Ontario, having been involved in the training of most of the current heritage planners in the province and providing intellectual leadership through scholarship and teaching.

3. Governance and Organization

The governance model of the Heritage Resources Centre has been codified in a report ("New Governance Structure of the Heritage Resources Centre, University of Waterloo"), submitted in January 2016 to then Professor George Dixon (Vice President, University Research, and Co-Chair of the Senate Graduate & Research Council), Professor Bruce Muirhead (Associate Vice President External Research), and Professor Jean Andrey (Dean of the Faculty of Environment). A description of the governance model follows below (Figure 1).
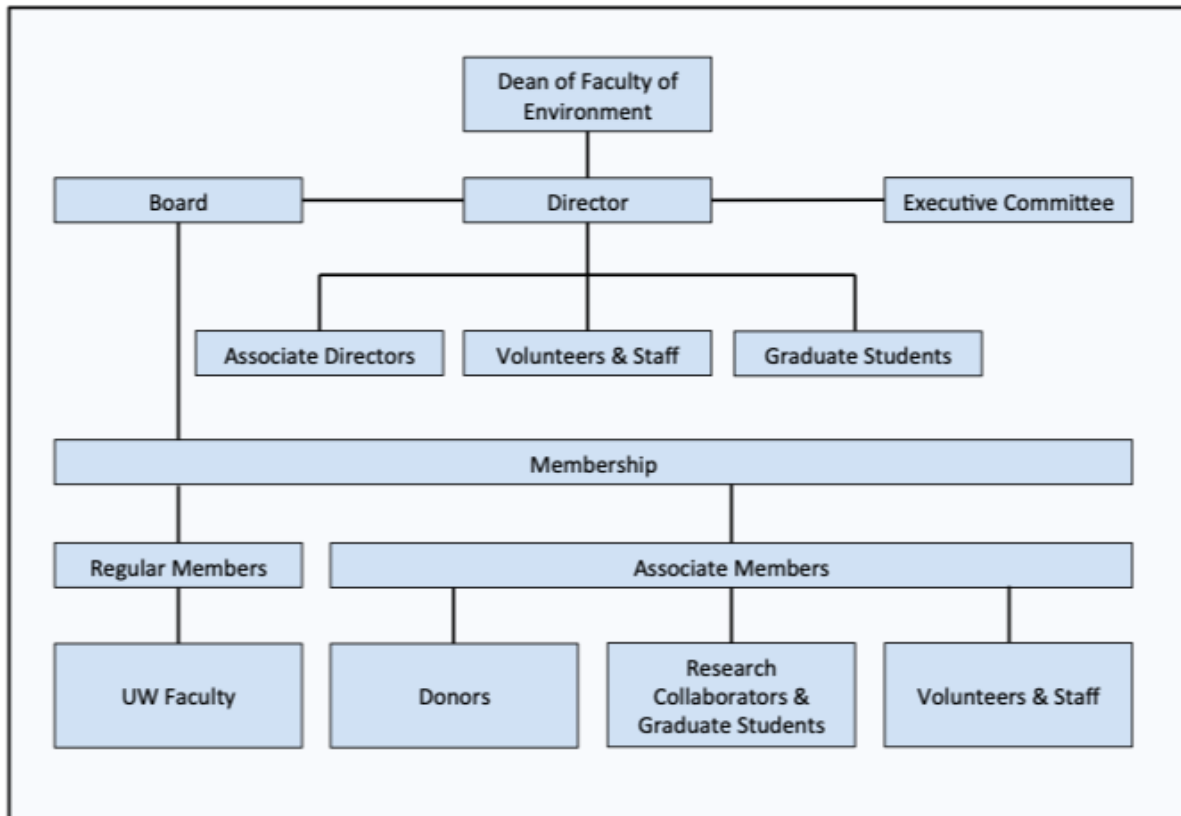

Figure 1. *Schematic of the governance structure of the Heritage Resources Centre*

3.1. Governance Objectives

Following the codified governance structure, the Heritage Resources Centre:
- Complies with Senate Graduate and Research Council's guidelines for the organization and management of University of Waterloo research centres and institutes;
- Distributes control over the centre across the Director, the Board and the Executive Council;
- Ensures accountability and transparency of the operations of the Heritage Resources Centre;
- Opens the Heritage Resources Centre to wider participation both within the University of Waterloo and beyond.

3.2. Membership

Membership in the Heritage Resources Centre is open to University of Waterloo faculty members and other individuals who are actively involved in the mission of the Heritage Resources Centre. Categories of membership are outlined below. Active involvement may be shown in a number of ways and may include attending workshops organized by the Heritage Resources Centre, participating in Heritage Resources Centre research projects, or taking an active role in organizing events and projects for the Heritage Resources Centre. Consequently, membership can be extended to interested students, volunteers and employees of the Heritage Resources Centre. Members will be informed of Heritage Resources Centre activities through social media, emailed newsletters, and the Centre's website. Members will be invited to an Annual General Meeting and will renew their membership on an annual basis. The members of the Heritage Resources Centre elect the Board of the Heritage Resources Centre.

There are two categories of membership:
- Regular Members: These are University of Waterloo faculty members of any rank including lecturers, adjunct and emeritus faculty) who are involved in work related to the Heritage Resources Centre
- Associate Members: These are individuals who are not members of the University of Waterloo faculty, including faculty from other universities, who are actively involved in the mission of the Heritage Resources Centre such as:
    - o Collaborators in research projects
    - o Donors
    - o Graduate students whose research falls within the Heritage Resources Centre areas of interest
    - o Employees of the Heritage Resources Centre
    - o Volunteers of the Heritage Resources Centre

The Director grants membership in the Heritage Resources Centre for a period of one year. After one year, membership will be renewed automatically unless the Member or the Director indicates otherwise in writing, at least one month before automatic renewal. Membership can be severed in writing at any time within the annual renewal cycle by the Member or the Director, but requires one-month notice. Normally, minimum requirement for renewal of the membership is attendance at the Annual General Meeting (or attendance by proxy). Only Members of the Heritage Resources Centre may refer to themselves as such.

3.4. Composition and Responsibilities of the Board

- The Dean of the Faculty of Environment is the Chair of the Board of the Heritage Resources Centre. The Dean may elect to delegate his/her role as Chair to the Director.
- The Board will consist of no fewer than five and not more than ten Board Members, of whom a majority have to be Regular Members. The Director is not a Board Member but participates in Board meetings ex officio.
- Members of the Board will be elected at the Annual General Meeting as positions at the Board are opening up.
- Normally, Members of the Board shall serve for a three-year term that is renewable.

- The Board will meet annually or as deemed necessary to discuss Heritage Resources Centre policy and strategic direction.
- The Board will be responsible for endorsing an Annual Report and work plan for the Heritage Resources Centre as presented by the Director.
- The Board recommends to the Director the appointment and removal of Members of the Heritage Resources Centre.

3.5. Composition and Responsibilities of the Executive Council

- The Executive Committee has three members, two of whom must be Regular Members and one an Associate Member.
- Normally, Members of the Executive Committee shall serve for a three-year term that is renewable.
- If positions in the Executive Committee are opening up, then following the Annual General Meeting, the Board will appoint Board Members to the Executive Committee from among the Board Members.
- The Executive Committee should be representative of the membership of the Heritage Resources Centre.
- The Executive Committee will meet at least three times per year to give guidance to the Director.
- The Executive Committee also acts as Nominating Committee and will present a slate of potential Board Members to the Annual General Meeting.
- The Executive Committee recommends to the Dean the appointment of a Director, as well as the appointment or removal of any staff of the Heritage Resources Centre.
- The Executive Committee may also, from time to time, appoint sub-committees from among the Board or Heritage Resources Centre Membership to undertake specific tasks.
- The Executive Committee also functions as the Trust Committee of the Heritage Resources Centre.

3.6. The Trust Account

- The Heritage Resources Centre is allowed to receive tax-deductible donations and those funds are placed in a Trust Account.
- The Director may make allocations from the Trust Account with the permission of the Executive Committee.

3.7. Board Member Remuneration

- Board Members will not receive any remuneration for their Board service but may, when the budgets allows, receive travel expenses to attend meetings.
- Board Members who provide specific, budgeted operational services to the Heritage Resources Centre may be awarded an honorarium for such services.

3.8. Voting Procedures

- An Annual General Meeting to which all Members are invited will be held in January or at another time set by the Board during their term of office. At that time the Members will vote directly or by proxy to elect Members to the Board.

4. Administration and Management

4.1. Director

The Director is leading the day-to-day operations of the Centre. Following are the operational guidelines for the Director of the Heritage Resources Centre:

- The Director will be a University of Waterloo faculty or staff member.
- The Director will be appointed for a fixed term of up to five years that is renewable.
- The Director will be appointed by the Dean of the Faculty of Environment, on recommendation by the Executive Committee of the Heritage Resources Centre.
- The Director is ultimately accountable to the Dean of the Faculty of Environment on all matters academic and financial.
- The Director is responsible for the overall management of the Heritage Resources Centre, the preparation of its Annual Report, supervision of Heritage Resources Centre employees, graduate students and volunteers working in the Heritage Resources Centre.
- The Director will be advised regarding the Heritage Resources Centre's operations by the Executive Committee.
- The Director is responsible for guiding the research agenda of the Heritage Resources Centre, with input from its membership, Board and Executive Committee.
- The Director may delegate some of his/her duties to one or more Associate Directors or one or more staff members. The Director may also relieve an Associate Director and/or staff member from these duties.

4.2. Staff and Volunteers

- Currently there are two full-time, funding contingent staff positions rated at USG 8 that are unfilled.
- Since October 2016, two persons have been working (consecutively) for the Heritage Resources Centre on a part-time basis providing social media support, website maintenance and community outreach. Currently, this person is being paid from the Trust Account.
- Until 2018, one person has been working for the Heritage Resources Centre on a part-time basis providing administrative support. This function is now filled on an ad-hoc function and paid from the Trust Account.
- During the review period, two volunteers have been fulfilling critical functions for the Heritage Resources Centre. One person has been absolutely central to the organization of the heritage planning symposium in 2019. The other person is the driving force behind the highly successful OHA+M blog – a bi-monthly online publication covering Ontario heritage policy.

5. Members and Personnel

The members of the Heritage Resources Centre are the most important assets of this organization. Without the cooperation and support by its members, the Heritage Resources Centre cannot succeed.

5.1. Director

In the summer of 2016, the Executive Committee of the Heritage Resources Centre has recommended to the Dean of the Faculty of Environment to appoint Professor Michael Drescher as Director of the Heritage Resources Centre.

Professor Drescher has been a faculty member with the School of Planning since 2010. He has been trained academically in natural resource conservation and management. His current research interests centre on environmental social sciences, conservation and management of natural heritage features on private land, the planning of ecosystem service provisioning by green (vegetation) and blue (water) natural spaces in urban settings, and climate change adaptation of natural heritage organizations.

5.2. Associate Directors and Staff

Professor Drescher, Director of the Heritage Resources Centre, has been Associate Director of the centre from 2014 until 2016. Currently, the Heritage Resources Centre has no Associate Director. The Heritage Resources Centre is planning to attract an Associate Director during the upcoming renewal cycle.

Until 2016, Ms. Marg Rowell has worked in a part-time position as administrative support for the Heritage Resources Centre. This position is currently unfilled but we hope to be filling this position again in the future. Ms. Rowell is currently working on an ad-hoc basis for the Centre.

From 2016 until 2019, Mr. Tim Lee has been working for the Heritage Resources Centre on a part-time basis. His work involved social media support, website maintenance and community outreach. Mr. Lee has left the Heritage Resources Centre in 2019. The position has been filled by Natasha Jade Ing, who has covered social media support, website maintenance and community outreach until present.

5.3. Executive Committee

The Executive Committee consists of three Board members (two Regular Members and one Associate Member) of the Heritage Resources Centre. The members of the Executive Committee are also Board members and have been appointed by the Board. One Regular Member Executive Committee position is currently vacant. A search is planned to fill this position in 2022. The current Executive Committee Members are:

1. Professor Kieran Bonner: Regular Member, Sociology and Legal Studies, Faculty of Arts
2. Mr. Fred McGarry: Associate Member, Centre for Community Mapping
3. Vacant

5.4. Board

The Board of the Heritage Resources Centre involves six faculty members (Regular Members) from three University of Waterloo faculties (Faculty of Arts, Faculty of Environment and Faculty of Applied Health Sciences), expressing and strengthening its inter-disciplinary academic work. It also involves four heritage practitioners (Associate Members) that are vital for the centre's community engagement. All of the current Board members have been elected by the membership of the Heritage Resources Centre during the General Annual Meeting in January 2016 and have continued serving on the Board until present. The Board Members are:

1. Professor Kieran Bonner: Regular Member, Sociology and Legal Studies, Faculty of Arts
2. Professor Joan Coutu: Regular Member, Fine Arts, Faculty of Arts
3. Professor Robert Feick: Regular Member, Planning, Faculty of Environment
4. Ms. Kayla Jonas Galvin: Associate Member, Archaeological Research Associates Ltd.
5. Professor Troy Glover: Regular Member, Recreation and Leisure Studies, Faculty of Applied Health Sciences
6. Professor Geoffrey Hayes: Regular Member, History, Faculty of Arts
7. Dr. Marcus Letourneau: Associate Member, Letourneau Heritage Consulting Inc.
8. Professor Robert MacDonald: Regular Member, Anthropology, Faculty of Arts
9. Mr. Fred McGarry: Associate Member, Centre for Community Mapping
10. Mr. Radoslav Petkovic: Associate Member, Community Heritage Ontario

5.5. Membership

Over the review period, the active membership of the Heritage Resources Centre consisted of 15 Regular Members and 31 Associate Members (Figure 2). The Associate Members included 13 heritage practitioners and members of the general heritage community, 13 University of Waterloo graduate students, two volunteers, and three staff members.

There is a much larger group of people that are involved with the Heritage Resources Centre on an ad-hoc basis or more passively involved through email newsletters and similar outreach activities. This list of people currently contains 1,441 entries. Part of the work of the new staff member for social media support and outreach was to increase the engagement of these individuals. The Heritage Resources Centre has a large social media reach, with currently 986 Twitter followers.

Figure 2. *Composition of the membership of the Heritage Resources Centre according to membership category.*

6. Achievements

6.1. Projects

The Heritage Resources Centre conducts research and supports the 'heritage community' through educational activities such as educational workshops, seminars, and so forth. The Heritage Resources Centre defines heritage very widely to include built and natural resources in any environment and their interactions, as well as intangible resources such as ideas, beliefs, and ways of life. Furthermore, increasingly the Heritage Resources Centre addresses 'critical heritage studies', i.e., the social and political dimensions of heritage using a 'critical' stance. This critical stance involves examination of how heritage issues can be used for good and for bad – as a basis to shape places, identity, and community, but also to exclude and marginalize others.

Over the last six years, the Heritage Resources Centre has been engaged in various projects of which most are of an applied nature. To give an idea of the work of the Heritage Resources Centre, it is best to outline some of the major activities undertaken during these six years:

- The Heritage Resources Centre designed and held a daylong symposium on heritage planning for academics, practitioners and interested laypeople. During the symposium, a variety of heritage experts reported on their recent research and practical work. These presentations were starting points for the exploration of recent changes and current challenges to the practice of heritage planning, heritage conservation and heritage education. Symposium participants engaged in focus groups and discussed future directions for heritage research and education that should be explored to maintain the vigor and currency of the field.

- The Heritage Resources Centre developed and held a daylong workshop for the Lake Huron Centre for Coastal Conservation: The Lake Huron Centre for Coastal Conservation is interested in an initiative for sustainable economic development of the Lake Huron coast acknowledging the need for wise use of biotic, abiotic and cultural heritage resources.

- The Heritage Resources Centre undertook several cultural heritage landscape studies of the townships in the Region of Waterloo:
  o The Heritage Resources Centre completed examinations of the cultural heritage landscape resources in the Townships of Wellesley and Woolwich, including contested heritage narratives. The study of the Township of Woolwich has led the Township council to identify the community of Maryhill for designation as a cultural heritage landscape with impacts on infrastructure planning in the surrounding landscapes.
  o The Heritage Resources Centre has been approached by the Township of Woolwich to conduct a boundary study for the Maryhill cultural heritage landscape. It is hoped that this boundary study will be conducted in 2023. The Maryhill cultural heritage landscape is a very significant project as it clearly demonstrates the implementation of our research in planning policy.
  o The Heritage Resources Centre was retained by the Region of Waterloo to also examine the cultural heritage landscape resources in the Townships of Wilmot and North Dumfries.

- The Heritage Resources Centre has been engaged by the Township North Dumfries to conduct a study of the community support for a heritage conservation district in the community of Ayr. This study supported the Township's interest in pursuing a heritage conservation district in the centre of Ayr.

- The City of Stratford asked the Heritage Resources Centre to conduct inventories of built heritage. The City of Stratford has abundant built heritage resources but not all of them are identified as designated heritage properties. The task of the Heritage Resources Centre was to identify properties that should be added to the list of non-designated heritage properties for the City.

- The Heritage Resources Centre is working with Archeological Research Associated Ltd. on a study of the treatment of heritage buildings by the insurance industry. Recent policy changes among some insurers are threatening the insurability of heritage buildings and therefore are a risk to the preservation of heritage features of our communities. The extent, impact and possible solutions to this problematic situation are being investigated.

- The Heritage Resources Centre maintains the Case Law and Research Inventory, a publicly accessible inventory of over 1,500 Ontario land tribunal cases and research publications. A large proportion of these publications are not available online and the Heritage Resources Centre is one of the few places anywhere in the world where these publications can be accessed.

- The Heritage Resources Centre is housing the OHA+M blog – a bi-monthly online communication that discusses heritage policy matters with relevance to the Province of Ontario.

The full list of research projects – excluding workshops and other community engagement activities – that the Heritage Resource Centre was engaged in entails 11 projects that reached a total of over 200 people in various forms of participation. A currently ongoing study is planned to engage with an additional 2,000 people through surveys and interviews, resulting in a total reach of over 2,200 people (Table 1).

Table 1. *Heritage Resources Centre research projects completed, continued or started during the evaluation period of 2016-2022.*

Projects & Activities	Project or Activity Type	Location	HRC Members Involved	Reach (# Participants)	Comments
Start date: 2016, 2 projects, reach = NA					
University of Waterloo Urban Forest Revitalization & Research	Research	Waterloo, ON	Samuel Gloire Gatabazi, Madison Lee-Nichole Postma, Michael Drescher, Anne Grant, Bev Raimbault,	NA	Inventory of University of Waterloo Urban Forest
Municipal Register of Cultural Heritage Properties - Phase 1	Research	Stratford, ON	Marg Rowell, Margaret Ellis-Young	NA	Inventory of non-designated heritage properties

Table 1. Continued …

Projects & Activities	Project or Activity Type	Location	HRC Members Involved	Reach (# Participants)	Comments
Start date: 2017, 3 projects, reach = 148					
Identifying Barriers and Opportunities to Municipal Natural Assets Projects	Research	Ontario	Michael Drescher	15	Investigation of institutional barriers for municipal planning and management of urban natural areas
Wellesley & Woolwich Cultural Heritage Landscapes	Research	Townships of Wellesley & Woolwich, ON	Robert Shipley, Michael Drescher, Rebecca Koroll, Chris DeGeer, Marg Rowell, Rob Feick	119	Community-based research in candidate sites for cultural heritage landscape status
Ayr Heritage Conservation District	Research	Township of North Dumfries	Marg Rowell, Beth Davies, Katy Belshaw, Michael Drescher	14	Outreach and investigation of community support for heritage conservation district
Start date: 2020, 2 projects, reach = 20					
Advancing municipal natural asset management through monitoring and engagement - Phase 1	Research	Canada (BC & ON)	Lucas Mollame, Michael Drescher	NA	Evaluation of progress in municipal planning and management of urban natural areas
Wilmot & North Dumfries Cultural Heritage Landscapes	Research	Townships of Wilmot & North Dumfries, ON	Chris DeGeer, Michael Drescher	20	Community- and expert-based research in candidate sites for cultural heritage landscape status
Start date: 2021, 2 projects, reach = 44					
Natural heritage planning and implementation in Ontario	Research	Ontario	Margaret Bakelaar, Michael Drescher	44	Investigation of institutional barriers for cross-jurisdictional planning and management of natural areas
Municipal Register of Cultural Heritage Properties - Phase 2	Research	Stratford, ON	Marg Rowell, Elisia Scagnetti	NA	Inventory of non-designated heritage properties
Start date: 2022, 2 projects, reach = 2,000					
Advancing municipal natural asset management through monitoring and engagement - Phase 2	Research	Canada (BC, ON & NB)	Sawroop Sandhu, Michael Drescher	NA	Evaluation of progress in municipal planning and management of urban natural areas and exploration digitization approaches
Residential Property Insurance and Heritage Designation	Research	Ontario	Victoria Mance, Michael Drescher	2,000	Investigation of building heritage status on property insurance
Total 2016-2022, 11 projects, reach = 2,212					

The Heritage Resources Centre is constantly exploring new opportunities for research and ways to support and educate (and learn from) our communities about heritage issues. Currently, the Heritage Resources Centre is planning three new research projects with anticipated start dates in 2022 and 2023 (Table 2).

Table 2. Heritage Resources Centre projects currently planned for 2022 and beyond.

Projects & Activities	Project or Activity Type	Location	HRC Members Involved	Reach (# Participants)	Comments
Currently planned, 3 projects, reach = TBD					
Waterloo Victoria Park Cultural Heritage Landscape	Research	Kitchener, ON	Victoria Mance, Michael Drescher	TBD	Investigation of success factors in cultural heritage landscape planning and management
Boundaries for Maryhill Cultural Heritage Landscape	Research	Woolwich, ON	Chris DeGeer, Michael Drescher	TBD	Determination of spatial boundaries for new Maryhill cultural heritage landscape
Community-Based Conservation of Terrestrial Protected Areas	Research	Waterloo, ON	Chris DeGeer, Michael Drescher	TBD	Assessment of ability of community-based conservation for effective landscape conservation

6.2. Workshops, Education and Community Mobilization

Engagement with the heritage community through education and information exchange is one of the main pillars of the mission of the Heritage Resources Centre. Over the period of 2016-2022, the Heritage Resources Centre engaged in eight activities that reached a documented minimum of 194 people. However, the total reach of these activities is much wider and includes many hundreds of people including students through coursework. The documented reach through social media and other electronic channels (e.g., subscribers to the heritage policy blog and followers of the Twitter account of the Heritage Resource Centre) is at least 1,441 (Table 3).

Table 3. Heritage Resources Centre education and engagement projects for the period 2016-2022.

Activities	Activity Type	Location	HRC Members Involved	Reach (# Participants)	Comments
University of Waterloo Urban Forest Initiative	Community mobilization	Waterloo, ON	Michael Drescher, David Gascoigne, Anne Grant, Bev Raimbault, Joshua Pickering, various undergraduate and graduate students	Hundreds of students through course work, honors theses & volunteer work	Educational uses of urban forest carried out in cooperation with Faculty of Environment Ecology Lab
OHA+M blog	Education	Ontario	Dan Schneider, Natasha Ing	80 subscribers	Award-winning educational blog dealing with Ontario heritage policy

Table 3. Continued …

Activities	Activity Type	Location	HRC Members Involved	Reach (# Participants)	Comments
Heritage Twitter feed	Education	NA	Natasha Ing, Michael Drescher	986 followers	Regular messages covering Ontario, Canada and global heritage topics
Heritage email list	Education	NA	Natasha Ing, Michael Drescher	375 addressees	Regular messages about issues of relevance to the Heritage Resources Centre
Case Law and Research Inventory	Education	NA	Natasha Ing, Michael Drescher, Marcus Letourneau	Unknow, public access on demand	Online database covering heritage-relevant Ontario land tribunal cases and additional publications
The Many Faces of Heritage	Workshop	Waterloo, ON	Michael Drescher, Amanda-Rose McCulley, Marg Rowell, HRC Board Members	76	Exploration of current challenges, trends and future directions in heritage planning
Create you Coast	Workshop	Stratford, ON	Robert Shipley, Michael Drescher, Marg Rowell	23	Visioning workshop for sustainable development initiative of Lake Huron Coast
Resiliency in the face of climate change: a workshop for conservation practitioners	Education & workshop	Ontario	Michael Drescher, John Bice	95	Education about climate change threats to protected natural areas and possible adaptation responses
Total 8 activities, total reach = documented minimum of 1,555, but many hundreds more through additional means					

6.3. Publications

Following are lists of publications authored and co-authored by the members of the Heritage Resources Centre in the period 2016-2022. The reporting for 2016 may slightly overlap with the prior five-year report 2011-2016. Members of the Heritage Resources Centre have published much more material than displayed here, but the focus of this list is on the work of the Heritage Resources Centre Board Members, Regular Members, Student Members and of the Director, and on publications that are linked to the mission of the Heritage Resources Centre.

There was a reduction of journal manuscripts published around 2020, because of the retirement of some Regular Members of the Heritage Resources Centre and because of the life cycle of several relevant projects that came to an end. Since then, there has been another increase in published journal manuscripts. The publication list shows the breadth and strength of scholarship of active members of the Heritage Resources Centre. Over the review period, this conservative estimate of Heritage Resources Centre publications results in 26 journal publications, eight book chapters, two books, and 13 dissertations and theses.

6.3.1. Journal Publications

6.3.1.1. Journal Publications 2022

Oviedo, M., **Drescher, M.** and Dean, J. 2022. Urban green space values, uses and access: A case study of user perceptions in Toronto ravine parks. Urban Forestry & Urban Greening .

Birch, W.S., **Drescher, M.**, Pittman, J. and Rooney, R. 2022. Trends and Predictors of Wetland Conversion in Urbanizing Environments. Journal of Environmental Management 310: 114723.

Drescher, M. and Warriner, G.K. 2022. Environmental Concerns and Stewardship Behaviors Among Rural Landowners: What Supports Farmers and Non-farmers in Being Good Stewards? Frontiers in Sustainable Food Systems 6: 758426.

6.3.1.2. Journal Publications 2021

Akbari, A., Pittman, J. and **Feick, R.** 2021. Mapping the Relative Habitat Quality Values for the Burrowing Owls (*Athene cunicularia*) of the Canadian Prairies Using an Innovative Parameterization Approach in the InVEST HQ Module. Environmental Management 68(3): 310-328.

Glover, T.D. 2021. Healthy Garden Plots? Harvesting Stories of Social Connectedness from Community Gardens. International Journal of Environmental Research and Public Health 18 (11): 5747.

Glover, T.D. 2021. Neighboring in the Time of Coronavirus? Paying Civil Attention While Walking the Neighborhood. Leisure Sciences 43(1-2): 280-286.

Glover, T.D., Munro, S., Men, I., Loates, W. and Altman, I. 2021. Skateboarding, gentle activism, and the animation of public space: CITE–A Celebration of Skateboard Arts and Culture at The Bentway. Leisure Studies 40(1): 42-56.

Gray, A., Robertson, C. and **Feick, R.** 2021. CWDAT-an open-source tool for the visualization and analysis of community-generated water quality data. ISPRS International Journal of Geo-Information 10(4): 207.

Lashua, B., Baker, S. and **Glover, T.D.** 2021. Leisure Myths and Mythmaking: Introduction to the Special Issue. Leisure Sciences 43(6): 539-548.

6.3.1.3. Journal Publications 2020

Dean, J., Biglieri, S., **Drescher, M.**, Garnett, A., **Glover, T.D.** and Casello, J. 2020. Thinking relationally about built environments and walkability: A study of adult walking behavior in Waterloo, Ontario. Health and Place 64: 102352.

6.3.1.4. Journal Publications 2019

Shankardass, K., Robertson, C., Shaughnessy, K., Sykora, M. and **Feick, R.** 2019. A unified ecological framework for studying effects of digital places on well-being. Social Science & Medicine 227, 119-127.

Glover, T.D. 2019. The transformative (and potentially discriminatory) possibilities of animating public space. World Leisure Journal 61(2): 144-156.

6.3.1.5. Journal Publications 2018

Drescher, M. and Brenner, J.C. 2018. The practice and promise of private land conservation. Ecology and Society 23(2): 3.

Glover, T.D. 2018. All the Lonely People: Social Isolation and the Promise and Pitfalls of Leisure. Leisure Sciences 40(1-2): 25-35.

Shaughnessy, K., Reyes, R., Shankardass, K., Sykora, M., **Feick, R.**, Lawrence, H. and Robertson, C. 2018. Using geolocated social media for ecological momentary assessments of emotion: Innovative opportunities in psychology science and practice. Canadian Psychology 59(1): 47-53.

6.3.1.6. Journal Publications 2017

Colistra, C.M., Schmalz, D. and **Glover, T.D.** 2017. The meaning of relationship building in the context of the community center and its implications. Journal of Park and Recreation Administration 35(2).

Cowan, D., Alencar, P., Young, K., Smale, B., Erb, R. and **McGarry, F.** 2017. A model for the socially smart city practical uses of city-level socio-economic indicators. Proceedings - 2017 IEEE International Conference on Big Data, Big Data 2017: 4058-4067.

Drescher, M., Warriner, G.K., Farmer, J.R. and Larson, B.M.H. 2017. Private landowners and environmental conservation: A case study of socio-psychological determinants of conservation program participation in Ontario. Ecology and Society 22(1):44.

6.3.1.7. Journal Publications 2016

Bonner, K. 2016. Arendt, Role Theory and the Ethical Evaluation of Action. Irish Journal of Sociology 24(2): 200-225.

Campbell, G., **Glover, T.D.** and Laryea, E. 2016. Recreation, Settlement, and the Welcoming Community: Mapping Community with African-Canadian Youth Newcomers. Leisure Sciences 38 (3), 215-231.

Coutu, J. Re-inscribing a Monument: Vimy in the Canadian Consciousness. Journal of Canadian Studies. in-press.

Farmer, J.R., Ma, Z., **Drescher, M.**, Knackmuhs, E.G. and Dickinson, S. Private Landowners, Voluntary Conservation Programs, and Implementation of Conservation Friendly Land Management Practices. Conservation Letters. accepted.

Farmer, J.R., Brenner, J., **Drescher, M.**, Dickinson, S. and Knackmuhs, E.G. 2016. Perpetual private land conservation: the case for outdoor recreation and functional leisure. Ecology and Society 21(2): 46.

Karrow, T. and **Suffling, R.** 2016. Pre-settlement vegetation maps generated using Ontario early survey: An online database providing enhanced map access for researchers. Canadian Geographer 60(1): 135-148.

Robertson, C. and **Feick, R.** 2016. Bumps and bruises in the digital skins of cities: unevenly distributed user-generated content across US urban areas. Cartography and Geographic Information Science 43(4): 283-300.

Zhang, S. and **Feick, R.** 2016 Understanding Public Opinions from Geosocial Media. International Journal of Geo-Information 5(6): 74.

6.3.2. Book Chapters

Sharpe, E.K. and **Glover, T.D.** 2020. Placemaking in the playful city: Playing in and playing with the urban environment. In: E.K. Sharpe and T.D. Glover (Eds.) Leisure Communities: Rethinking Mutuality, Collective Identity and Belonging in the New Century. Routledge Taylor & Francis Group, London. Pp. 91-99.

Drescher, M., Feick, R., DeGeer, C. and Shipley, R. 2019. Participatory Methods for Identifying Cultural Heritage Landscapes. In: M. Scott, N. Gallent, & M. Gkartzios (Eds.), Routledge Companion to Rural Planning. Routledge Taylor & Francis Group, London. Pp. 446-456.

MacDonald, R. 2019. Public Issues Anthropology as a Framework for Teaching Archaeology at the University of Waterloo. In: P. Mauch Messenger and S.J. Bender (Eds.), History and Approaches to Heritage Studies. University Press of Florida, Gainsville, FL. Pp. 154-167.

Bonner, K. 2017. Arendt's Multi-perspectivism and the Tension Between Place and Space. In: B. Janz (Ed.), Place, Space and Hermeneutics. Contributions to Hermeneutics, Vol 5. Springer, Cham. Pp. 211-225.

Ferster, C.J., Nelson, T., Robertson, C. and **Feick, R.** 2017. Current Themes in Volunteered Geographic Information. In: T.J. Cova, M.-H. Tsou, G. Bareth, C. Song, Y. Song, K. Cao, E. A. Silva (Eds.), Comprehensive Geographic Information Systems Vol. 3, Elsevier, Amsterdam. Pp. 26-41.

Glover, T.D. 2017. Leisure, social space, and belonging. In: K. Spracklen, B. Lashua, E. Sharpe and S. Swain (Eds.), The Palgrave Handbook of Leisure Theory. Palgrave Macmillan, London. Pp. 873-890.

Coutu, J. 2017. Sculpture and the Forming of National Tastes in the Middle of the Eighteenth Century. In: S. Burnage and J. Edwards (Eds.), The "British" School of Sculpture, c.1762-1835. Farnham: Ashgate Press. Pp. 34-53.

Coutu, J. 2016. On Being There: The Significance of Place and the Grand Tour for Britons in the Eighteenth Century. In: C. Smylitopoulos (Ed.), Agents of Space: Eighteenth-Century Art, Architecture and Visual Culture. Newcastle: Cambridge Scholars. Pp. 20-42.

6.3.3. Books

Kalman, H. and **Létourneau, M.R.** 2020. Heritage planning: Principles and process. Routledge Taylor & Francis Group, London.

Sharpe, E.K. and **Glover, T.D.** 2020. Leisure Communities: Rethinking Mutuality, Collective Identity and Belonging in the New Century. Routledge Taylor & Francis Group, London.

6.3.4. Dissertations and theses (supervised by members of the HRC)

Chahal, M.S. 2021. Investigating the use of a web-map survey tool for heritage planning. MSc in Geography, University of Waterloo.

Mollame, L. 2021. Advancing Municipal Natural Asset Management through Standardized Evaluation. MA in Planning Thesis, University of Waterloo.

Huang, C. 2020. Recreating a Taste of Home in Canada: A Radical Interpretive Inquiry into Toronto's Intergenerational Chinese Food Sharing Networks. PhD in Sociology, University of Waterloo.

Waverley, B. 2019. An Examination of Wetland Conversion and Resulting Effects on Landscape Connectivity in Southern Ontario Municipalities. MES in Planning Thesis, University of Waterloo.

Milligan, Z.E.E. 2019. Enabling the Integration of Ecosystem Service-based Approaches into Planning Organizations: Municipal Natural Asset Management. MES in Planning Thesis, University of Waterloo.

Alexander, D.R. 2018. Dum Vivimus Vivamus: The Lost Identity of the Owen Sound Collegiate and Vocational Institute Second World War Dead. MA in History Thesis, University of Waterloo.

DeGeer, C. 2018. Planning at the Interface of Nature and Culture: Theory, Methods, and Identification of Cultural Landscapes in the Townships of Woolwich and Wellesley. MES in Planning Thesis, University of Waterloo.

Henhawk, D. 2018. A war between stories: Leisure, colonialism and my struggles to reconcile my Indigeneity. PhD in Recreation and Leisure Studies, University of Waterloo.

Oviedo, M. 2018. Toronto's Ravines: Conditions and Visitor Perspectives. MES in Planning Thesis, University of Waterloo.

Bogdon, Z. 2016. Towards Understanding the Development of Connectedness-to-Nature, and its Role in Land Conservation Behaviour . MES in Planning Thesis, University of Waterloo.

Davies, B. 2016. "Second Tier Cool": Residents' Experiences of a Mid-Size City's Gentrifying Downtown. MA in Planning Thesis, University of Waterloo.

Jonas Galvin, K. 2016. Goderich: A Case Study of Conserving Cultural Heritage Resources in a Disaster. MA in Planning Thesis, University of Waterloo.

McCormick-Johnson, A.D. 2016. Canada, Great Britain, and the Ukrainian Famine: Failing to Respond to a Humanitarian Crisis, 1932-33. MA in History Thesis, University of Waterloo.

6.4. Funding Received

The Heritage Resources Centre was successful in securing funding for its various activities in research, education, and outreach. The documented funding totals $295,265 over 13 projects and initiatives. This count only includes funding for Heritage Resources Centre projects led by the Director of the Centre or led by main staff members (Table 4). Of course, Regular Members and Associate Members of the Heritage Resources Centre have been successful in acquiring additional funding for activities separate from the Centre, but this is not reported here.

Table 4. Funding for Heritage Resources Centre projects (research & other) led by the Director of the Centre or led by main staff members or Regular Members for the period 2016-2022.

Project	Staff	Funding ($)
Start date: 2016, 2 projects with total funding: $21,000		
University of Waterloo Urban Forest Revitalization & Research	Samuel Gloire Gatabazi, Madison Lee-Nichole Postma, Michael Drescher, Anne Grant, Bev Raimbault	16,000
Municipal Register of Cultural Heritage Properties - Phase 1	Marg Rowell, Margaret Ellis-Young	5,000

Table 4. *Continued ...*

Project	Staff	Funding ($)
Start date: 2017, 4 projects with total funding: $91,482		
Identifying Barriers and Opportunities to Municipal Natural Assets Projects	Michael Drescher	24,882
Wellesley & Woolwich Cultural Heritage Landscapes	Robert Shipley, Michael Drescher, Rebecca Koroll, Chris DeGeer, Marg Rowell, Rob Feick	60,000
Create your Coast	Robert Shipley, Michael Drescher, Marg Rowell	2,600
Ayr Heritage Conservation District	Marg Rowell, Beth Davies, Katy Belshaw, Michael Drescher	4,000
Start date: 2019, 1 project, total funding: $1,865		
The Many Faces of Heritage	Michael Drescher, Amanda-Rose McCulley, Marg Rowell, HRC Board Members	1,865
Start date: 2020, 2 projects with total funding: $93,159		
Advancing municipal natural asset management through monitoring and engagement - Phase 1	Lucas Mollame, Michael Drescher	45,000
Wilmot & North Dumfries Cultural Heritage Landscapes	Chris DeGeer, Michael Drescher	48,159
Start date: 2021, 2 projects with total funding $27,796		
Municipal Register of Cultural Heritage Properties - Phase 2	Marg Rowell, Elisia Scagnetti	2,802
Resiliency in the face of climate change: a workshop for conservation practitioners	Michael Drescher, John Bice	24,994
Start date: 2022, 2 projects with total funding: $59,963		
Advancing municipal natural asset management through monitoring and engagement - Phase 2	Sawroop Sandhu, Michael Drescher	45,000
Residential Property Insurance and Heritage Designation	Victoria Mance, Michael Drescher	14,963
Total number of funded projects: 12, total funding over 2016-2022: $291,265		

The research projects currently planned to start in 2022 and 2023 suggest that the Heritage Resources Centre will continue to be successful in acquiring funding for its research and educational activities.

6.6. Awards and Recognitions

Over the last six years, the outstanding work of the Heritage Resources Centre in its pursuit of research, education and conservation of heritage has been recognized officially by various organizations. Most notable are the following recognitions:

- The OHA+M blog is published by Dan Schneider in cooperation with the Heritage Resources Centre. For this work, Dan Schneider has received several awards:

- o In October 2017, Dan Schneider received a Heritage Education and Scholarship Award of Excellence for the blog from the Canadian Association of Heritage Professionals (CAHP) (Appendix 1).
  - o In October 2020, on the fifth anniversary of the blog, Dan Schneider was granted the Stephen A. Otto Award for Research and Documentation, awarded by the Architectural Conservancy Ontario (Appendix 1).

- The Faculty of Environment and the School of Planning recognize the Heritage Resources Centre for its important and unique contributions to heritage research and management in Canada, and are continuing their strong support for the centre (Appendix 2).

- The Heritage Resources Centre is recognized by governmental and non-governmental groups (for profit and not-for-profit) as an invaluable contributor to research, education and conservation of the natural, built and cultural heritage in the Region of Waterloo, Ontario, and Canada and beyond (Appendix 2).

6.7. Assistance to Ontario Municipalities and Communities

The Heritage Resources Centre is well-connected with municipalities and groups of residents throughout Ontario and renown for the high quality of its research and educational work. The work of the Heritage Resources Centre is supporting these organizations in their efforts for the conservation and wise use of heritage resources throughout the province. During the past six years, work of the Heritage Resources Centre supported nine municipalities and communities in the Region of Waterloo and beyond (Table 5).

Table 5. List of municipalities and communities supported by work of the Heritage Resources Centre for the period 2016-2022.

Municipality/community	Project
Ayr	Study of community support for heritage conservation district
Kitchener	Policy study for harmonizing heritage conservation district and adjacent urban development
Township of Wilmot	Cultural heritage landscape survey
Township of Wellesley	Cultural heritage landscape survey
Township of Woolwich	Cultural heritage landscape survey
Township of North Dumfries	Cultural heritage landscape survey
City of Stratford	Inventories of heritage properties for inclusion into non-designated heritage buildings list
Beeton	Initial review of potential for a heritage conservation district study
Maryhill	Initiation of a cultural heritage landscape boundary study

7. Recent Developments

Since its founding in 1984, the Heritage Resources Centre has enjoyed very productive and successful periods of operation under the Directorships of Professors Nelson, Shipley and Drescher. It is expected that the Heritage Resources Centre will continue to enjoy productive operations throughout the next renewal cycle.

7.1. Progress on Actions Suggested by Membership

During the 2016 Annual General Meeting of the Heritage Resources Centre, the membership of the Heritage Resources Centre provided feedback about activities and themes that would be of special value to pursue. Over the past six years, progress has been made on several of these items:

- *Educational workshops for community members:* The Heritage Resources Centre designed and organized three workshops and one webinar series focused on trends in heritage education and heritage research, sustainable development of natural heritage resources, and climate change adaptation options for conservation of natural heritage resources. In addition, the Heritage Resources Centre is operating a very successful Twitter account covering heritage matters from Ontario, Canada and across the globe.

- *Heritage conservation legislation:* The Heritage Resources Centre has entered a partnership with dan Schneider, the author of the OHA+M blog. This highly successful and popular blog covers heritage policy matters with a focus on Ontario. Dan Schneider has received several awards (Education and Scholarship Award of Excellence from the Canadian Association of Heritage Professionals, Stephen A. Otto Award for Research and Documentation from the Architectural Conservancy Ontario) for his outstanding work for this heritage policy blog.

- *Increased cooperation between heritage organizations on grant proposals and work:* The Heritage Resources Centre has been successful in co-applying with Archeological Research Associated Ltd. for a grant from Community Heritage Ontario. The work will focus on an analysis of the extent and severity of recent changes to insurance policies that make it difficult for some owners of heritage properties to obtain property insurance. Director Drescher and partners from the land conservation field (Ontario Land Trust Alliance, Thames Talbot Land Trust, rare Charitable Research Reserve) have been successful in obtaining funding from the Social Sciences and Humanities Research Council of Canada. This work focuses on helping the private land conservation sector to prepare for climate change impacts on its operations.

- *Outreach to northern Ontario and aboriginal communities:* The Heritage Resources Centre has worked with the community of Beeton (Simcoe County) on an initial investigation for the potential of a study of a heritage conservation district. The Heritage Resources Centre also has participated in various engagement activities bringing together Canadian settlers and First Nation community members. Despite these efforts, no concrete projects with aboriginal communities have emerged as of yet. Efforts in this direction will continue, but naturally these projects must be driven by the interests of First Nations communities.

- *Integration of archaeology in the heritage field:* The University of Waterloo is home to an outstanding Department of Anthropology with its Archeological Anthropology subfield. Department of Anthropology's Dr. Robert Park was a participant in the 2019 heritage planning symposium organized by the Heritage Resources Centre. In addition, the Board of the Heritage Resources Centre includes individuals from Archeological Research Associated Ltd. and Archaeological Services Inc. Recently, the Heritage Resources Centre has worked with Archeological Research Associated Ltd. in successfully pursuing a grant from Community Heritage Ontario. Further efforts will be explored to strengthen the links between the Heritage Resources Centre and the field of archeology.

- *Increased cooperation with architecture and landscape architecture:* The University of Waterloo School of Architecture is known as a leader in innovative design. School of Architecture's Dr. Anne Bordeleau was a participant in the 2019 heritage planning symposium organized by the Heritage Resources Centre. In addition, one of the Student Members of the Heritage Resources Centre is a trained landscape architect and preparing a research study on the planning and management of the natural heritage surrounding Ontario's Golden Horseshoe. The Heritage Resources Centre will continue its efforts to deepen its links with the fields of architecture and landscape architecture.

- *Engagement of young people in the heritage sector:* The Heritage Resources Centre has organized a daylong symposium covering topics including heritage education that should be explored to increase the relevance and attractiveness of this field to new generations of professionals from various fields. The Heritage Resources Centre is also a participant in the National Roundtable on Heritage Education. There is an opportunity for the University of Waterloo to maintain and increase its role as a centre for heritage education in Ontario. However, other academic institutions have noticed this opportunity as well and are closing the gap. The Heritage Resources Centre would require the support of the University of Waterloo to maintain its leading position in heritage education in the Province.

- *Natural heritage and cultural heritage landscapes:* Much of the work of Heritage Resources Centre Director Michael Drescher is focused on the management, planning and stewardship of the natural heritage of the Province of Ontario. In addition, the Heritage Resources Centre has completed very successful cultural heritage landscape studies of the Townships of Wellesley and Woolwich. This work has led to the process of designating the community of Maryhill as a new cultural heritage landscape in the Townships of Woolwich. At this time, the Heritage Resources Centre is in the final stages of a cultural heritage landscape studies of the Townships of Wilmot and North Dumfries. The Heritage Resources Centre is looking for opportunities to continue its very successful work in this direction.

- *Connections of heritage with sense-of-place and mental health:* Natural heritage – the forests, grasslands, wetlands, rivers and lakes of an area – are important resources for their human communities. They are assets that provide benefits to people, which often are

called ecosystem services. Cultural ecosystem services include recreation, esthetics, and spiritual experiences; they foster a sense-of-place and social cohesion, which are critical to human health and wellbeing, including mental health. Much of the work of Heritage Resources Centre Director Michael Drescher is addressing issues of the planning and management of natural heritage for ecosystem services in urban environments. It is expected that work in this direction will continue for many years.

- ***Strong relationship with heritage issues in the Region of Waterloo:*** The Heritage Resources Centre is a well-respected organization and known champion of heritage matters in the Region of Waterloo. The recent and ongoing cultural heritage landscape studies in the Townships of Wellesley, Woolwich, Wilmot and North Dumfries are clear expressions of this. The Heritage Resources Centre is looking forward to continuing this strong relationship into the future.

- ***Intellectual exchange with the international heritage community:*** Members of the Heritage Resources Centre have worked on a journal manuscript (under review) on climate change impacts on cultural heritage landscapes with scholars from Cornell University, New York, and the University of Camerino, Italy. The Heritage Resources Centre will continue to pursue more international opportunities during the upcoming renewal cycle.

In the last report by the Heritage Resources Centre, five themes were suggested as thematic focus areas for future efforts. These themes were: (i) Aboriginal heritage, (ii) natural heritage, (iii) cultural heritage landscapes, (iv) critical heritage, and (v) intangible heritage. Themes (i) – (iii) overlap to a great extent with the suggestions for actions by the membership of the Heritage Resources Centre and have been addressed above. Themes (iv) – (v) are addressed in the following section:

- ***Critical heritage:*** 'Critical heritage studies' address the social and political dimensions of heritage using a 'critical' stance. This involves how heritage is and can be used for good and for bad - as a basis to shape places, identity and community, but also to exclude and marginalize others. Through its Director, Michael Drescher, the Heritage Resources Centre is member of the Association of Critical Heritage Studies. This association provides a global forum for communication among academics and practitioners interested in heritage matters in the widest sense.

  To date, the Heritage Recourses Centre has not been involved in projects that focus fully on critical heritage assessments. However, the cultural heritage landscape studies of the Townships of Wellesley and Woolwich have uncovered themes such as heritages that are contested between First Nations and settler Canadians, and have raised important questions such as under which conditions heritage should remain "hidden" to protect it from the risk of exploitation. The Heritage Resources Centre will continue to examine opportunities for critical heritage research.

- ***Intangible heritage:*** 'Intangible heritage' includes the intellectual wealth of people such as their ideas, beliefs, and knowledges, as well as oral traditions, performing arts, social

practices, rituals, festive events, and so forth. Intellectual heritage facilitates group cohesion, enables the formation of a sense of identity, and is the basis of belonging in social environments. To date, the Heritage Resources Centre has not engaged in studies of intangible heritage but is continuing to look for prospects in this direction.

8. Future Opportunities

In 2019, the Heritage Resources Centre designed and organized a symposium for academics, practitioners and interested laypeople on research and education in heritage planning. This very successful symposium reviewed the current situation of heritage planning in Ontario and beyond as well as anticipated future trends. Symposium participants presented on recent research and professional work, followed by discussions in several focus groups and a plenary with discussion among all participants.

8.1. *Opportunities Identified by the Heritage Planning Symposium*

The symposium presentations, plenary, and discussions were analyzed with approaches borrowed from content analysis leading to the discovery of six key themes in heritage panning:

First theme: Heritage matters are increasingly over-regulated. Heritage legislation is of growing complexity making heritage matters inaccessible to many ordinary citizens, while at the same time political backing is decreasing. In response, many people are turned off of heritage matters while other groups weaponize heritage issues in pursuit of other interests. It may often be better to pursue heritage interests with other means than heavy-handed regulations. Making heritage issues matter to young people and diverse communities requires genuine engagement instead of top-down approaches.

Second theme: There is growing appreciation of the complexity and diversity of heritage objects including built, natural and intangible heritages. This diversification of heritage matters seems to reflect a more inclusive approach to heritage and allows the addressing of heritage issues in a wide variety of contexts and from a variety of disciplines. However, this heritage diversification also leads to an increasing complexity for the definition of heritage and a possible vagueness of the field as a whole. A reinserting of a public dialogue about Canadian heritage matters is required to come to a new understanding of the meaning and role of heritage in modern-day Canadian society.

Third theme: Heritage matters increasingly are intertwined with urban and land development. This intertwining is reflected in growing interest in the conservation of cultural heritage landscapes, the interactions between heritage and environmental sustainability issues such as climate change and biodiversity, and Indigenous reconciliation and land claims. Driving these interactions is the consumptive resource extraction of European settler societies that fundamentally transforms landscapes, cultural identities, and the very nature of human interactions with the environment. It is necessary to observe heritage matters as embedded in the larger framework of global environmental and social changes to understand better how heritage is affected and affects these dynamics.

Fourth theme: The great interdisciplinarity of the heritage field requires heritage education that equips professionals with a wide practical skill set and a broad knowledge range, covering legislation, community relations, sustainability issues, economic development, and so forth. Especially soft skills are increasingly important for the engagement of diverse communities and negotiations with an array of stakeholders and their various interests. While many heritage professionals come to the heritage field from other professions, a dedicated heritage education covering theory and practice would be much sought after.

Sixth theme: The currently working heritage practitioners (professionals and interested laypeople) come from a wide range of backgrounds. They desire and require ongoing specific heritage education to refine their knowledge and skill sets. Additional continuing education opportunities next to formal certificate or degree programs would lower access limitations for these populations and provide for a better connection between the academic and practicing heritage sectors.

While these key themes may present challenges to the field, they can also provide opportunities for future work. According to its mission, the Heritage Resources Centre is prepared to play a facilitative role in supporting the wider heritage community in taking on these challenges.

9. Resources and Tools in Pursuit of the Centre's Mission

9.1. Administrative Capacity

Supported by the Board and the Executive Committee, the Director of the Heritage Resources Centre is the main force driving operational matters of the Centre and coordinating the varied activities and research interests pursued by members of the Centre. However, the Director of the Heritage Resources Centre is also a regular faculty member with the ordinary contractual requirements for research, teaching and service. The administrative needs of the Heritage Resources Centre compete with the research, teaching and service requirements for the time of the Director.

Currently, there is no regular administrative support available to the Heritage Resources Centre. A reduction in the Director's teaching load with a cap of two teaching assignments per year would be required if the Heritage Resources Centre is expected to reach its full potential and position itself as Canada-wide leader of heritage research and education of international renown.

9.2. Financial Resources

Since its founding, the Heritage Resources Centre has operated without direct continuing funding from the University of Waterloo or from the faculties. Despite this, the Heritage Resources Centre has been able to continue producing outstanding research and education. However, natural fluctuations in the activities of the members of the Centre and in the success of funding applications have led to annual changes in the product output levels. This has also led to changes in the ability of the Heritage Resources Centre to employ administrative support. Consequently, in times of financial strain the Director has to take on much more of the administrative load than at other times, which makes it more difficult for the Director to pursue the larger goals of the Heritage Resources Centre.

Past experience in the Heritage Resources Centre has shown that continuing administrative support pays off in the number of grants obtained and consequently increases product output levels. The Heritage Resources Centre five-year report 2006-2011 gave account of funds obtained to the value of approximately $610,000. This amount is more than twice the funds obtained in the periods 2011-2016 and 2016-2022, as reported in the past two reports, and was made possible with the help of continuing administrative support (not financed by the University of Waterloo). Already a modest but continuing financial support of the Heritage Resources Centre would enable the part-time employment of continuing administrative support for the Centre. It is expected that such modest financial support would enable the Heritage Resources Centre to recover the funding application success levels of the period 2011-2015 and regain its very strong performance in research, workshops, and education. The Heritage Resources Centre continues to explore options to secure such funding.

9.3. Space

The provision of office space is fundamental for the good functioning of the Heritage Resources Centre, just as for any other research centre. This space is required for work by an administrative support person and other staff members. It serves as the storefront of the Heritage Resources Centre, as meeting and workplace for graduate students, and as collaboration location for faculty

members. Unfortunately, because of pressing space needs in the Faculty of Environment from 2013 to 2016, the Heritage Resources Centre has been asked to relinquish more and more office space and move to progressively smaller locations. Of course, the Heritage Resources Centre is pleased to do its part in contributing to resolving pressing space needs in the Faculty of Environment. However, the shrinking office space made it difficult for the Centre to maintain its physical assets, including its library of heritage research publications, its office furniture and its computer equipment. Modest financial support as addressed above under 'Financial Resources' would enable the conversion of most paper copy research publications to digital format and thus support the Centre in its effective functioning in a smaller office space.

The Heritage Resources Centre is fortunate and grateful to be supported in its space needs by the School of Planning. Currently, the School of Planning is housing the Heritage Resources Centre, expressing its commitment to support the excellent research and educational activities created at the Centre.

10. Alignment with Strategic Plans of the University of Waterloo and the Faculty of Environment

The University of Waterloo Strategic Plan 2020 sets out a path for the University of Waterloo to emerge as one of the top innovation universities globally. To achieve this aspiration, the University of Waterloo pursues transformational research in eight theme areas: (i) Discovery and Design of Materials and Systems, (ii) Environment and Energy, (iii) Health and Well-Being (iv) Information and Communication Technology, (v) Manufacturing and Devices, (vi) Mathematical Sciences and Computer Science, (vii) Society, Culture, and Governance, and (viii) Quantum Information and Nanotechnology.

Through its work in heritage research and education, the Heritage Resources Centre is addressing the theme area *Society, Culture, and Governance* in outstanding ways: Heritage addresses peoples' continuing stories from the past to the present and into the future. Heritage studies help us understanding where we are coming from, how we came to be where we are now, and where we might be heading. However, heritage is not objective or static, but instead it is ever contested and constantly remodelled as we tell ourselves stories about who we are and in doing so reinvent our individual and collective identities. Finally, heritage does not just exist in the grandiose and magnificent but in the everyday of ordinary people. Inviting these communities in the exploration of heritage, its creation and management, is empowering people to write and tell their own stories, and to gain a better understanding of their place in this world.

The Faculty of Environment Strategic Plan 2020 formulates the ambition of the Faculty to develop into Canadas' leader in teaching and research for the environment and sustainability. To achieve this goal, the Faculty of Environment is pursuing educational excellence and outstanding research through eight educational and six research focal points. The Heritage Resources Centre intimately connects with several of these focal points. Through its work the Heritage Resources Centre closely links with:

(i) *Cross-campus and inter-faculty partnerships* – The Board of the Heritage Resources Centre draws on Members from the Faculty of Environment, The Faculty of Arts, and the Faculty of Applied Health Sciences.

(ii) *Non-traditional education* – Since long, the Heritage Resources Centre has provided educational services to heritage practitioners and interested laypeople through workshops and digital channels such as social media outreach.

(iii) *Graduates' skills for societal and economic contributions* – The majority of heritage planners in municipalities throughout the Province of Ontario have been trained in various forms by the Heritage Resources Centre.

(iv) *Interdisciplinary approaches to environmental and sustainability problems* – Heritage studies are interdisciplinary by their very nature covering disciplines such as material studies, arts and architecture (built heritage), ecology and environmental studies (natural heritage), archeology and Indigenous studies (Indigenous heritage), anthropology and languages (intangible heritage), and political science (critical heritage).

(v)   ***Achievement of the United Nations Sustainable Development Goals*** – Sustainable Development Goal 4 'Quality Education' calls specifically for "appreciation of cultural diversity and of culture's contribution to sustainable development" in its target 4.7. The exploration of the heritages of all Canadians with their varied cultural and ethnic backgrounds links directly to this target.

Innovation and entrepreneurial spirit are hallmarks of the University of Waterloo. A main characteristic of the Heritage Resources Centre is to get things done, to do more with less, and to create opportunities where there were none. This entrepreneurial spirit has uniquely qualified our alumni for success in the workplace. The Heritage Resources Centre is the only research centre of its kind in Canada and has an outstanding reputation for producing scientifically sound and practically relevant research in support of our communities.

8. Appendices

8.1. Appendix 1: Awards and Recognitions

<div align="center">

Dan Schneider

</div>

<div align="center">

Nominated for the Stephen A. Otto Award for Research and Documentation for his blog Ontario Heritage Act and More (OHA + M)

</div>

Dan Schneider was hired when Stephen A. Otto was Executive Director of the Heritage Conservation Division from the mid 1970s to the early 1980s. As such, Dan has had a ring side seat on the evolution of Ontario heritage policy, rising to senior policy advisor on cultural heritage with the Ontario culture ministry, becoming the lead policy expert on the 2005 changes before his retirement. Dan's careful work throughout his career reflects the exacting standards of his first taskmaster.

In 2015, sensing the need for a new vehicle for discussion of Ontario heritage policy, Dan Schneider conceived and created the OHA+M (Ontario Heritage Act and More) blog as a public resource and forum for understanding and exploring heritage policy issues in Ontario. Launched during Ontario Heritage Week in February 2015, the 40th anniversary of the passage of the Ontario Heritage Act in 1975 and the 10th anniversary of comprehensive amendments to the Act in 2005, OHA+M is a platform for telling "policy stories" about the beginnings and evolution of Ontario's heritage legislation, policies and programs. It focuses on legislation, public policy, and tribunal decisions. The blog is a highly valuable resource, receiving a 2017 Award of Excellence from his colleagues at the Canadian Association of Heritage Professionals. With new postings monthly, Dan covers an extensive range of topics, often dwelling on the historical evolution of aspects of Ontario's legal and policy framework for the conservation of cultural and natural heritage. He has also welcomed five guest contributors.

CAHP AWARDS 2017 – PRIX DE L'ACECP 2017

AWARD OF EXCELLENCE
PRIX D'EXCELLENCE

Category: Heritage Education, Awareness and Scholarship
Catégorie : Éducation, sensibilisation et bourse, et domaine du patrimoine

Awarded to
Attribué à

Dan Schneider, Dan Schneider Heritage Consulting

OHA+M (Ontario Heritage Act and more)
Heritage Policy Blog
LPO+P (Loi sur le patrimoine de l'Ontario et plus)
Blog sur la politique patrimoniale

Rosanne Moss
CAHP President
Présidente de l'ACECP

Don Loucks
Co-Chair of Awards Committee
Le coprésident de comité de prix

Ellen Kowalchuk
Co-Chair of Awards Committee
La coprésidente de comité de prix

Canadian Association of Heritage Professionals - L'association canadienne d'experts-conseils en patrimoine

8.2. Appendix 2: Letters of Support

UNIVERSITY OF WATERLOO

FACULTY OF ENVIRONMENT | Office of the Dean
519-888-4567 | fax 519-746-2031
uwaterloo.ca/environment

March 30, 2022

Dr. Charmaine Dean
VP, Research & International

Dear Dr. Dean,

Support for the Renewal of the Heritage Resource Centre

I am writing to express my strong support for the renewal of the Heritage Resource Centre (HRC) as a Senate-Approved Research Centre/Institute. The HRC provides a hub for research and community engagement on matters pertaining to heritage, including workshops and seminars, which foster meaningful relationships with local agencies and groups in working toward heritage appreciation and protection.

Heritage is broadly defined including built and natural resources in any environment, as well as intangible resources such as ideas, beliefs and ways of life. In addition, increasingly the HRC addresses 'critical heritage studies', i.e., the social and political dimensions of heritage using a 'critical' stance. This involves how heritage is and can be used to shape places, identity, community and sense of belonging.

The HRC was established in 1984 and has previously undergone six Senate reviews with positive endorsement. Over the last five years, the HRC has engaged in a wide range of projects. In addition to workshops and seminars, these include:
- o Several cultural heritage landscape studies of the townships in the Region of Waterloo, which led to the township of Woolwich identifying the community of Maryhill for designation as a 'cultural heritage landscape' and opportunities for the Centre to help translate this research into planning policy.
- o Several studies of built heritage resources, e.g., in the communities of Ayr and City of Stratford.

The Faculty of Environment is committed to providing space for the HRC to enable full-time or part-time staff, as may be appropriate. Further, the current Director, Dr. Michael Drescher, from the School of Planning, remains committed to ensuring that the HRC is impactful in its research and outreach activities.

As the only research centre of its kind in Canada, the HRC has an outstanding reputation for producing scientifically sound and practically relevant research. On this basis, I am pleased to offer my support for the Centre's renewal.

Sincerely,

Jean Andrey
Dean

March 29, 2022

Dr. Charmaine Dean
Vice-President, Research & International
University of Waterloo
Waterloo, Ontario

Re: **Renewal Application Heritage Resources Centre (HRC)**

Dear Professor Charmaine:

I am writing to express my strong support for the Heritage Resources Centre (HRC) for the periodic review at the University of Waterloo. The School of Planning has been a strong supporter of the HRC over many years, for instance through administrative support, engagement of School faculty members and provision of School space to house the HRC. The HRC has a strong record of applied research and community engagement that are a strong fit with the School's vision for grounded scholarship with direct connections to practice.

Dr. Michael Drescher, faculty in the School, has been a strong lead for the HRC. Dr. Drescher led the HRC expansion in terms of mission to include an increasing array of dimensions related to heritage. While traditionally having focused on built form, the HRC now defines heritage quite broadly to include landscapes, natural resources, ways of living and belief systems among other dimensions. Importantly, the HRC is increasingly positioning itself to deliver on "critical heritage" studies that deal with social and political dimensions of heritage bound up in processes of exclusion, colonialism and racism, among other factors. This is a welcome addition, and I would argue fits well with priorities of the School of Planning, the planning profession and the University of Waterloo.

In line with its mission, recent activities of the HRC have included a wide range of research and community support/outreach activities such as workshops and seminars for heritage practitioners, academics and the broader community, cultural heritage landscape studies for municipal governments, and studies investigating community support for heritage conservation. I understand that the HRC is now also engaged in a study with the Archeological Research Associated Ltd. (ARA) that examines the treatment of heritage properties by the insurance industry.

The School of Planning is fortunate to have a connection with the HRC not least because the HRC activities help bridge academic research and the broader practice community. The HRC has a strong record of studying important and valuable dimensions of heritage in an applied way with real implications for planning and heritage protection practice. This type of scholarship is highly valued in academic planning departments in general and within our School specifically. I look forward to continuing a strong working relationship with the HRC moving forward.

Sincerely,

Markus Moos, PhD MCIP RPP
Director, School of Planning

Cc/ Michael Drescher, HRC & School of Planning

March 28, 2022

Dr. Charmaine Dean
Vice President University Research & International
Chair of the Senate Graduate & Research Council
University of Waterloo
Waterloo, ON

Re: Letter of Support for the Five Year Review of the Heritage Resources Centre

Dear Professor Charmaine Dean,

The Region of Waterloo is pleased to write a letter in support of the continuing operation of the Heritage Resources Centre (HRC). Since its establishment over 35 years ago, the HRC has played an integral role in the conservation of cultural heritage, not just in the Region of Waterloo, but in Ontario, Canada and beyond.

The research undertaken by the Centre has proven invaluable to the Region's efforts to conserve cultural heritage landscapes and built heritage resources. Notably, the HRC has established expertise in the identification of cultural heritage landscapes (CHL) and assisted the Region in exploring potential approaches to CHL conservation. The Region and HRC worked in partnership to inventory potential CHLs across Wellesley and Woolwich Townships. This work was given a solid foundation through the early examination of landscape-scale conservation by the HRC to help the Township of Woolwich identify and designate the West Montrose Area as a CHL – one of the first historically significant landscapes in Ontario to be recognized under the Planning Act. Currently, the HRC is undertaking another CHL inventory in partnership with the Region of Waterloo, for Wilmot and North Dumfries Townships. Again, utilizing the strong methodology developed and tested by the Centre. It is hoped that this work will be as valuable to future CHL designations as the initial Wellesley and Woolwich study has proven to be.

Other research documents and inventories, such as the Grand River watershed-wide heritage bridge inventory, *Arch, Truss and Beam*, *The Lazarus Effect*, *Building Stories*, and both phases of the *Heritage Districts Work!* study have aided Regional staff in the identification, conservation and celebration of our cultural heritage resources.
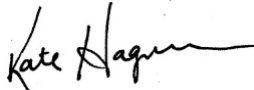
Document Number: 2194920

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The Region of Waterloo was pleased to have supported *The Many Faces of Heritage: An Interdisciplinary Colloquium* hosted by the Centre, and values the shared learning and networking opportunities that are provided through the work of the Centre.

In addition to arming the heritage industry with sound research in support of conservation, the HRC continues to foster the next generation of heritage professionals. For decades, students employed or volunteering at the HRC have been given the opportunity to work on projects for professional clients, gaining hands-on, real-world experience. The chance to work with private sector organizations, municipal governments, and community groups exposes these students to a broad network of professionals that opens doors to future career opportunities. It is worthwhile to note that two of the Region's past Cultural Heritage Planners began their careers working or volunteering at the HRC.

Thank you for providing this chance to showcase the important research, education and advocacy role that the HRC has played, and continues to play, in the field of conservation. The Region looks forward to continuing to partner with the Centre to conserve Ontario's rich cultural heritage resources.

Sincerely,

Kate Hagerman, MCIP RPP
Manager, Environmental Planning and Sustainability
Region of Waterloo

Bridget Coady, MCIP RPP
Cultural Heritage Principal Planner
Region of Waterloo

cc: Michael Drescher, Director, HRC
        Robert Shipley, Past Director, HRC

TOWNSHIP OF WELLESLEY

March 24, 2022

Dr. Charmaine Dean

Vice President University Research & International Chair of the Senate Graduate & Research Council University of Waterloo Waterloo, ON

Dear Professor Dean,

Re: Letter of Support for the Review of the Heritage Resource Centre

Thank-you for the opportunity to provide input into the review of the Heritage Resource Centre. As a graduate of the U of W School of Planning I first became aware of the HRC when I worked with Professor Gordon Nelson, in the late 1980's on research related to the southern sections of the Grand River. Professor Nelson's early vision and guidance has created an invaluable resource for municipalities, students and heritage organizations in Canada since 1987.

The HRC has continually provided students in the Faculty of Environment the opportunity to become familiar with heritage and how built form and cultural heritage impacts and informs our communities. It allows these students to be exposed to a broad range of geographies and professionals in all levels of government, non-profits and other organizations.

The Township of Wellesley worked directly with Dr. Drescher and the HRC on a Cultural Heritage Lanscape study in 2017/2018. As a small municipality Wellesley would not have been able to undertake this work without the expertise and generous support of the HRC. Dr. Drescher and the students who worked on the Cultural Heritage Landscape study were a pleasure to work with and provided a very well researched study that will be of great value for Wellesley in managing future planning for the Township.

Thank you for providing this chance to support the important research, education and advocacy role that the HRC has played, and continues to play, in the field of conservation. The Township of Wellesley looks forward to continuing to partner with the Centre to conserve Ontario's rich cultural heritage resources.

Sincerely,

Geoff VanderBaaren, RPP
Director of Planning

cc. Dr. Michael Drescher

4639 Lobsinger Line, St. Clements, Ontario N0B 2M0
P| 519-699-4611   F| 519-699-4540

THE TOWNSHIP OF
WOOLWICH

BOX 158, 24 CHURCH ST. W.
ELMIRA, ONTARIO N3B 2Z6
TEL. 519-669-1647 / 1-877-969-0094
COUNCIL/CAO/CLERKS FAX 519-6691820
PLANNING/ENGINEERING/BUILDING FAX 519-669-4669
FINANCE/RECREATION/FACILITIES FAX 519-669-9348

March 24, 2022

Dr. Charmaine Dean
Vice President University Research & International
Chair of the Senate Graduate & Research Council
University of Waterloo
Waterloo, ON

Dear Dr. Dean;

RE: Letter of Support for the Renewal of the Heritage Resource Centre

I am writing to express the Township's support of the University of Waterloo Heritage Resources Centre (HRC). The HRC provides important connections with the wider community and the City's and Townships in the Region.

The Township of Woolwich has several historical resources and no dedicated Heritage staff. The access to the HRC with the knowledge of the University of Waterloo students and staff will be an important part of future research, development, and implementation of heritage designations, plans and studies. The HRC has benefitted the Township in the past and will continue in the future to help with advice regarding cultural heritage conservation issues. The HRC helped the Township create a new heritage committee in 2016 which is still operating today and recently worked with the Township and the Region to identify some potential/candidate CHL locations.

We strongly support the renewal of the HRC as a continued resource in our Region.

Thank you,

Deanne Friess
Director of Development Services
Township of Woolwich

Infrastructure and Development
Services Department
82 Erie Street, 3rd Floor
Stratford, ON N5A 2M4
(519) 271-0250
Fax (519) 271-5966
www.stratford.ca

April 1, 2022

Charmain Dean, VP University Research and
Professor Jeff Casello
Co-Chairs of the Senate Graduate & Research Council
University of Waterloo,
Waterloo, ON

Dear Ms. Dean and Professor Casello,

The City of Stratford is pleased to write a letter in support of the continuing operation of the Heritage Resources Centre (HRC). The research undertaken by the Centre has been incredibly valuable to the City of Stratford in the City's efforts to conserve cultural heritage resources. Specifically, the services of the HRC have allowed the City of Stratford through the City's Heritage Advisory Committee, Heritage Stratford to advance considerable work on the City's Non-Designated Heritage Registry. For smaller municipalities, such as the City of Stratford, the HRC provides a resource to advance cultural heritage projects that would otherwise not be possible due to internal staff capacity constraints and limited expertise in the field of cultural heritage.

Thank you for providing this opportunity to showcase the important research role the HRC has played and continues to play in the field of cultural heritage conservation. The City of Stratford looks forward to continuing to partner with the HRC in the future to conserve Ontario's rich cultural heritage resources.

Should you have any questions, I can be reached at (519) 271-0250 ext. 5221 or abridge@stratford.ca.

Yours truly,

Alyssa Bridge, MAES, MCIP, RPP
Manager of Planning

NORTH WATERLOO REGION

Dr. Charmaine Dean, Vice President   March 27, 2022
University Research & International Chair
of the Senate Graduate & Research Council
University of Waterloo, Waterloo, ON

Dear Dr. Dean,

I am writing to support the continued existence of the Heritage Resources Centre (HRC) in my capacity as Communications Coordinator for the Architectural Conservancy of Ontario (ACO) North Waterloo Region Branch. Our mandate is to encourage the preservation, and adaptive reuse of our built heritage as well as the preservation of areas of cultural heritage significance.

The North Waterloo Region Branch has had a long association with the HRC and has been very impressed with the quality of the projects that the staff of HRC has undertaken. The book *Arch, Truss & Beam* co-sponsored by the HRC in 2013 is an inventory of bridges in the Grand River Watershed. With the renewed interest in preserving the early truss bridges, this inventory has provided much valuable information.

In April of 2019 the HRC held a Heritage Planning Colloquium. This colloquium covered many topics of interest to academics, professionals and lay people who have an interest in heritage matters.

In 2017 and 2018, in partnership with the Region of Waterloo and others, the HRC undertook a project to identify places of cultural heritage significance in Woolwich and Wellesley Townships. There was significant public engagement in the form of meetings with local people and workshops to give the participants an opportunity to state what areas they thought might be places of significance. A similar study for Wilmot Township and North Dumfries Township is almost complete. We hope that by identifying these places that they will be given more protection.

In 2016 the City of Stratford asked the HRC to assist them with surveying properties to see if they would qualify for inclusion on a Non-designated Register. In the fall of 2021, the city asked the HRC to complete the survey.

The Township of North Dumfries asked the HRC to conduct a study to see what level of interest there would be for establishing a Heritage Conservation District in Ayr. Property owners were interviewed and the results were quite positive. A public meeting was held to share the results with those who

E: aco.nwrb@gmail.com   www.aconwr.ca   **The past. Our present. Your future.**

attended.

The North Waterloo Region Branch of ACO was contacted by Professor Drescher who is teaching an advanced planning course, Integrated Planning Project (PLAN 405). This senior level course provides an opportunity for students to integrate their planning skills and knowledge in an applied context. ACO North Waterloo Branch proposed a project to have a comprehensive review and analysis of buildings on the Non-designated Registers for the municipalities of Kitchener and Waterloo and the Townships of Woolwich and Wilmot. The students will analyze heritage value for these properties with a view to progressing their status to designated on the heritage registers. The database will also be valuable to increase the visibility of heritage properties in a comprehensive, publicly accessible form. The project will soon be completed by mid April 2022.

The Heritage Resource Centre's blog, OHA+M, is an award-winning resource for information about the Ontario Heritage Act, heritage policy in Ontario and related topics. The blog often deals with current heritage issues which affect the status of heritage resources in Ontario.

In sum, the HRC has a key role in promoting a better understanding of natural and human heritage, for better planning and for better public policy. Communities and organizations through out the region benefit greatly from its research, education, and extension work. We are very fortunate to have the HRC in the region. It has been a pleasure working with them and we hope that it will continue.

Sincerely

(Mr.) Gail Pool, PhD
Communications Coordinator
ACO North Waterloo Region Branch

E: aco.nwrb@gmail.com   www.aconwr.ca   **The past. Our present. Your future.**

March 27, 2022

Dr. Charmaine Dean
Vice President University Research & International
Chair of the Senate Graduate & Research Council
University of Waterloo, Waterloo, ON
Via email to vpri@uwaterloo.ca

Dear Dr. Dean,

I am writing to express support for the continuing operation of the Heritage Resource Centre (HRC), in my capacity as a member of Friends of Olde Berlin Town. Friends of Olde Berlin Town is a Kitchener neighbourhood group that supports compatible, inclusive development that permits existing neighbours to thrive and the Civic Centre Heritage District to endure.

We have already benefitted from the collection of timely, learned writings available via the blog on the HRC's website. A recent scan of the HRC's website reveals a further wealth of resources that we look forward to reviewing. And we have benefitted from advice and guidance from Past-Director Dr. Robert Shipley and Administrator Marg Rowell. We appreciate that Dr. Shipley and Ms. Rowell were able to acquire an acumen of knowledge and connections via their work at the HRC. We appreciate that the same investment is being made in current Director Dr. Drescher.

Friends of Olde Berlin Town is presently benefitting from the research being conducted by University of Waterloo planning students via the Studio Course. The research will enable us to better understand the wider array of planning challenges in our Region and our efforts at heritage preservation against the context of similar work throughout Ontario and other jurisdictions. I do not believe we would have heard about the Studio Course were it not for the HRC and Dr. Drescher's involvement in it.

I hope that the HRC may continue to serve the community.

Sincerely,

Hal Jaeger
Friends of Olde Berlin Town (www.obtfriends.ca)
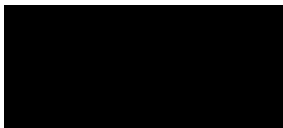
Cc: Michael Drescher, Director, HRC
        Robert Shipley, Past Director, HRC

comap.ca

Dr. Charmaine Dean
Vice President University Research & International
Chair of the Senate Graduate & Research Council
University of Waterloo
Waterloo, ON

March 31st, 2022

Reference: University of Waterloo Heritage Resource Centre (UWHRC)

Dear Professor Dean,

We are responding to a request for a letter of support of the up-coming renewal application of the University of Waterloo Heritage Resource Centre (UWHRC) for research institute centre status at the University of Waterloo. We believe that our partnership with UWHRC has and will have broad impact owing to UWHRC strengs in multi-disciplinary collaboration and community outreach. The UWHRC is unique in English speaking Canada, leading research in the preservation of built heritage and cultural landscapes through community engagement and support.

The Centre for Community Mapping (COMAP) is a not-for-profit software research corporation founded in 2005. COMAP's primary mission is to: "research, develop, supply and sustain information technology and communications services (ITC) to strengthen civil society."

COMAP works quite closely with the University of Waterloo Computer Systems Group (UWCSG) in support of its ongoing academic software engineering research. COMAP investigates the adequacy of current versions of UWCSG software architecture, meta-models and technologies by designing, building, serving and maintaining operational applications for a broad client base. In this pursuit, COMAP creates and deploys innovative strategies for socio-economic, cultural and environmental sustainability, several of which have evolved from work with UWHRC.

Since 2011, COMAP has worked successfully with the UWHRC, leveraging UWHRC capacity for community engagement, to pursue its objective of building applications that use community level information assets for community benefit.

COMAP and UWCSG support the current UWHRC emphasis on the identification and preservation of cultural landscapes of significance to cultural and ethnic communities. Three COMAP projects that have engaged with UWHRC and will evolve with its support are: Building Stories, First Story and the Shared Path Consultation Initiative.

comap.ca

Building Stories (www.buildingstories.co) is a digital platform that is used to record properties that ordinary people identify as being of cultural interest and significance. Building Stories was created for UWHRC in 2012 -2013. Cumulative grants and contributions have resulted in a $500,000 system.

Building Stories is an open, adjudicated crowd-sourced system that allows the recording of site features such as the architectural style of a building. By offering a mobile app, Building Stories makes it possible for users to access information and stories about a building and to be guided from one site to another as they walk the streets of a community. There are currently over 3000 properties and tours in the Building Stories database that are identified by communities across Canada as valued urban and rural heritage. Most of these are located in Southern Ontario. The current focus of Building Stories is on architectural and historical merit for purposes of municipal planning and preservation. Future versions will emphasize the stories associated with valued properties to offer a richer cultural experience that would appeal to a wider audience and help to strengthen a community's interest in preservation. We are working with UWHRC to secure funding so that Building Stories will be updated and configured to include these broader stories and illustrated cultural landscapes.

First Story (https://firststoryblog.wordpress.com/) is an independent community-based collaborative that started as the archives department of the Native Canadian Centre of Toronto in the 1980's. First Story engages Indigenous and non-Indigenous people who research and share Toronto's rich and diverse Indigenous heritage via a variety of popular initiatives. The First Story mobile app was initiated in 2015 by COMAP and UWCSG, with the support and advice of UWHRC, and operated for several years before the First Story material was migrated to the Driftscape app. The First Story content has attracted the most users among the many organizations that also publish place-based content to Driftscape.

"Many Indigenous communities have left their mark on our city's past and present and continue to shape its future. The First Story app is an interactive map accessing original stories, photographs, archival documents, audio and video clips that illuminate the evolving Indigenous history of the Toronto area. First Story endeavors to bridge traditional knowledge with social media, inviting users to explore Toronto's history and Events as told from the perspective of Indigenous communities."

Shared Path Consultation Initiative (Shared Path), formed in 2019, is a Canadian Charity that is addressing the challenges and opportunities that emerge where land use change and Aboriginal and Treaty Rights intersect. Shared Path facilitates and supports a community of practice drawn from Indigenous and local governments, institutions, and organizations in navigating the challenges of an emerging reconciliation landscape through research, education, and relationship-building and the development of educational resources.

Shared Path and COMAP are interested in developing a database of land use information products, with the support of UWHRC, that would inform land holders of the continuing interest held by First Nations in their land, potential risks implied and opportunities for reconciliation.

cømap.ca

COMAP intends to draw on UWHRC knowledgebase and resources as it refines land use information that meets the demand for property related regulations, opportunities for and constraints to development of land with built heritage and within cultural landscapes.

We trust that the UWHRC renewal will be confirmed and look forward to extending our on-going collaboration on the many projects we have underway with you and the UWHRC.

Yours sincerely,

Fred McGarry
Executive Director
The Centre for Community Mapping

50 Westmount Road, North, Suite 206m Waterloo, Ontario N2L 2R5: 519 716 7740

March 30, 2022

Dr. Charmaine Dean
Vice President University Research & International
Chair of the Senate Graduate & Research Council
University of Waterloo
Waterloo, ON
200 University Avenue West
Waterloo, ON, Canada
N2L 3G1

Dear Professor Dean

Re: Five-year Review of Heritage Resource Centre

We are responding to a request for a letter of support of the up-coming renewal application for Heritage Resource Centre at the University of Waterloo. We believe, and this letter illustrates, that the work of the centre had broad impact because of the valuable contribution it makes the heritage field.

Established in 1972, Archaeological Research Associates (ARA) is Ontario's oldest archaeology and heritage consulting firm. ARA is one of the few firms in Ontario that offers coordinated archaeological, marine heritage, and cultural heritage services.

ARA is proud to have been involved with the HRC since 2010 completing several projects together. Within the last five years, ARA has presented at *The Many Faces of Heritage: An Interdisciplinary Colloquium.* This event efficiently brought together those studying teaching and practicing in the private and public sectors of heritage for a discussion on emerging challenges.

ARA and the HRC are currently partners in the completion of at study on *Residential Property Insurance and Heritage Designation* for Community Heritage Ontario (CHO). CHO represents all municipal heritage committees (advisory committees to city councils) in Ontario. The goal of the project is to provide information to property owners, municipal planners as well as the insurance industry. Insurance is particularly relevant in light of natural disasters that have put the spotlight on replacement of cultural heritage, such at the tornado in Goderich. Insuring properties is a critical issue in the conservation of cultural heritage resources in Ontario. The project involves gathering of information, particularly through a survey to property owners across Ontario. Thought the involvement of the HRC this project represents an opportunity to contribute to heritage education
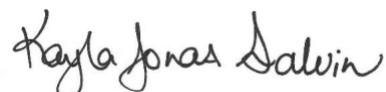
in Ontario directly. A key goal for the HRC is to provide practical experience to students interested in cultural heritage. As such, the HRC contribution is being undertaken by a heritage grad student. Further, Dr. Michael Dresher, Survey Design Advisor, will provide input into the survey that will add methodological rigor to the survey approach to ensure that the information collected is useful in both anecdotal information as well as statistical data. This approach will increase the credibility of the results.

The HRC's past works, including *Heritage Districts Work!* hosted on the centre's website continue to be a key source of information in our work, particularly in providing data to residents in potential heritage conservation districts during consultation activities. We also mention the OHA +M blog as a valuable source of analysis of current heritage issues.

In short, the HRC is invaluable in providing critical data to the heritage sector and creating link between research and private sector.

Yours truly,

Kayla Jonas Galvin
Heritage Operations Manager
Archaeological Research Associates Ltd.

March 31, 2022

Senate Graduate & Research Council
University of Waterloo
200 University Avenue West
Waterloo, ON, N2L 3G1
by email

To Whom It May Concern:

Re: Letter of Support for Renewal of Mandate for the Heritage Resources Centre, School of Planning, University of Waterloo

I am writing in my capacity as an Adjunct Assistant Professor in the Department of Anthropology, University of Waterloo, and as Managing Partner of Archaeological Services Inc., the largest professional services firm in Canada exclusively devoted to heritage resource management. As a former Executive Board member, I am very familiar with the Heritage Resources Centre (HRC) and have followed and supported its work for over two decades. I enthusiastically support renewal of its mandate by the Senate Graduate & Research Council.

Since its founding in 1980, the HRC has been a leader in the pursuit of excellence in the field of natural and cultural heritage research and teaching. Currently, thanks in large part to the resources of the HRC and its affiliated faculty, the School of Planning offers one of only three programs in Canada leading to the Heritage Planner professional accreditation. This is a rapidly expanding field with many graduates being employed in this capacity by municipalities across Canada. Dr. Michelle Lee, Senior Policy Planner at the City of Waterloo, is one such graduate, having earned her doctorate in heritage planning at the University of Waterloo in 2018.

In addition to serving as an incubator for heritage research and expertise that is in high demand from both the private and public sectors, the HRC continues to be a thought leader and pioneer in the realm of heritage conservation and management. In 2019, prior to the advent of the world-wide coronavirus pandemic, the HRC hosted an interdisciplinary provincial colloquium aimed at growing and strengthening the community of teaching and practice in the heritage field. This initiative exemplifies the leadership role that the HRC has pursued, both within the academic sphere and in the wider provincial, national, and international communities.

In conclusion, I extend my heartfelt endorsement of the HRC mandate renewal in order to continue the rich legacy of leadership, scholarship, and mentorship that the Heritage Resources Centre has built for over four decades.

Sincerely,

Robert I. MacDonald, PhD, RPA
Managing Partner

MEMORANDUM

TO: Senate Graduate and Research Council

CC: Kathy Winter, Secretariat

                Jimmy Lin, Professor, Computer Science
                Vijay Ganesh, Associate Professor, Electrical and Computer Engineering
                Harold Godwin, Managing Director, Waterloo.AI
                Mark Giesbrecht, Dean of Mathematics
                Mary Wells, Dean of Engineering
                Bessma Momani, Interim Associate Vice-President, Interdisciplinary and Sponsored
                Research

FROM: Charmaine B. Dean, Vice-President, Research and International

DATE: Monday May 30, 2022

SUBJECT: Waterloo Institute for Artificial Intelligence (Waterloo.AI)

                - For action -

I am pleased to inform you that I am recommending that Senate Graduate and Research Council review the proposal for the faculty-level centre jointly supported by the Dean of Math and the Dean of Engineering and discuss and vote on the renewal of Waterloo.AI for another five-year term.

WATERLOO.AI
WATERLOO ARTIFICIAL INTELLIGENCE INSTITUTE

25 May 2022

Senate, University of Waterloo
Senate Graduate & Research Council, University of Waterloo
Research Council Leaders, University of Waterloo

SUBJECT: Renewal of Waterloo Artificial Intelligence Institute (Waterloo.AI)

The Waterloo Artificial Intelligence Institute is pleased to submit the attached report that highlights its accomplishments, mandate, structure, activities, and finances since its inception in 2017 till today, as well as its future strategic initiatives, direction, and its updated mission and vision statements. These activities were in accordance with the mandate of the Institute as approved by the Senate, the Dean of the Faculty of Engineering, and the Dean of the Faculty of Math in 2017. Also provided in the Appendices are lists of members of the Institute, completed and ongoing research projects, external partners, as well as letters of support from Deans of all six Faculties and several Institutes on campus advocating for the Institute's renewal.

The report shows that the Institute met and exceeded its planned objectives, and is financially sustainable with a net carry forward. Key highlights of the Institute's accomplishments and activities include:

1. Institute membership of over 230+ members of the University and 450+ graduate students, creating a large, vibrant, multidisciplinary and cross-faculty community of AI researchers from all 6 Faculties on campus
2. Over two dozen external partner companies at different levels of sponsorship
3. Over $5.8 million of research funding from external partners and government matching
4. Nearly 50 research projects funded over the last 5 years
5. Over $120K in scholarships given to graduate students at the University
6. Organized over 11 partner focused professional AI education seminars and 16 research seminars in the last 5 years, with over 37,000 views of the recordings on Waterloo.AI YouTube channel in the past 2.5 years
7. Organized 7 AI job fairs in the last 5 years
8. Organized 2 Industry Days containing 24 short AI talks in 2021\]

9. In cooperation with Microsoft, provided $US 300,000 of Azure credits to support GPU needs of researchers on campus
10. Supported initiatives to attract 3 CIFAR Chairs to the University
11. Initiated three international collaboration workshops, two with University of Bordeaux, France; and one with Twente University in the Netherlands
12. Launched and managed the growth of a well-financed and well-run AI institute that has a bright future over the years ahead

Respectfully Submitted,

Dr. Vijay Ganesh, Co-Director, Waterloo.AI and Associate Professor, Department of Electrical Computer Engineering, Faculty of Engineering

Dr. Jimmy Lin, Co-Director, Waterloo.AI and Professor, School of Computer Science, Faculty of Math

Attachments include letters of support from the following members of our University:

- Dr. Mary Wells, Dean, Faculty of Engineering
- Dr. Mark Giesbrecht, Dean, Faculty of Mathematics
- Dr. Bob Lemieux, Dean, Faculty of Science
- Dr. Jean Andrey, Dean, Faculty of Environment
- Dr. Douglas Peers, Dean, Faculty of Arts
- Dr. Lili Liu, Dean, Faculty of Public Health
- Dr. Sushanta Mitra, Executive Director, Waterloo Institute for Nanotechnology
- Dr. N. Asokan, Executive Director, Waterloo Cybersecurity and Privacy Institute
- Dr. Suzanne Kearns, Founding Director, Waterloo Institute for Sustainable Aeronautics
- Dr. Ann Fitz-Gerald, Director, Balsillie School of International Affairs

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Waterloo Artificial Intelligence Institute

2022 Institute Renewal Report

April 2022

Prepared By:

Dr. Vijay Ganesh, Co-Director, Waterloo.AI
Dr. Jimmy Lin, Co-Director, Waterloo.AI
Harold Godwin, Managing Director, Waterloo.AI

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EXECUTIVE SUMMARY

The Waterloo AI Institute was founded in 2017 "to cohere, advance, promote, and exploit cross-disciplinary research at the frontiers of artificial intelligence and its applications at the University of Waterloo".

From the outset, the Institute distinguished itself with a focus on a multidisciplinary approach to artificial intelligence (AI) and a focus on applied research. Although led by the Faculty of Engineering and the Faculty of Mathematics, the Institute spans all six Faculties across campus and encompasses a large, vibrant, multidisciplinary community comprising over 230+ faculty members and 450+ graduate students and postdocs. Over the past five years, the Institute has attracted over $5.8 million dollars in support of nearly 50 projects. Today, the University of Waterloo is the second-ranked institution for AI in Canada and the top institution for *applied* AI, according to CSRankings, a widely respected and cited ranking of computer science institutions around the world.

Yet, despite its many successes, the Institute cannot rest on its laurels, especially since the AI landscape is evolving rapidly. As AI becomes increasingly interwoven into our daily lives and deployed in consequential spheres of human activity such as medicine, law, and national security, there are many challenges that lie ahead. It is clear that for AI to continue to have a positive societal impact, we must consider AI systems in the broader context of the data that feeds it, as well as the processes of how they are acquired, manipulated, and used. To this end, we propose that, in the next phase of its existence, the Waterloo AI Institute positions itself to integrate tightly both data science and artificial intelligence. Furthermore, it is imperative that data science and AI technologies be developed, deployed, and applied in a *responsible* manner. This requires research into new paradigms, methods, compliance and governance mechanisms to ensure that AI systems are reliable, secure, and trustworthy.

To reflect the expansion of its scope of activities encompassing both data science and artificial intelligence, the Waterloo AI Institute will be seeking to rename and rebrand itself to better capture its revised vision and mission. This process is ongoing and we are seeking input from our many stakeholders.

Moving forward, beyond organic growth – engaging with more partners, supporting more projects, and further catalyzing research activity on campus – we propose a number of strategic initiatives. These include collaborating with WatSPEED on upskilling and training programs, developing a campus-wide collaborative AI graduate program, expanding institute capacity via research assistant professors, increasing investments in EDI and AI for social good, and building shared GPU and software infrastructure. Building on its past five years of successes, the Waterloo AI Institute is well-poised to fulfill its mission and vision going forward, in particular of advancing the responsible use of data science and AI to enhance the prosperity and well-being of humankind.

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1. INTRODUCTION

There is little doubt that artificial intelligence (AI) is transforming every sector of the economy and reshaping the very fabric of society in fundamental ways. Examples include self-driving cars, intelligent voice assistants, improved health care delivery, and smart factories. These innovations will be tremendously disruptive, both in positive as well as negative ways, and their impact will not only be felt across Canada, but also around the world.

In the "Future of Jobs Report 2020," the World Economic Forum estimates that 85 million jobs will be displaced while 97 million new jobs will be created across 26 countries by 2025.[1] Paraphrasing the gist of the report: AI will automate many repetitive and dangerous tasks. It will change the nature of other jobs to emphasize higher-value tasks that depend on interpersonal interactions. These newly enhanced jobs will allow businesses and individuals to be more creative, strategic, and entrepreneurial. A pressing issue in the development of AI, therefore, is how to mitigate the anticipated negative impacts and to ensure that the benefits of innovation accrue to all segments of society.

While there is no precise, universally accepted definition of AI, here we adopt one that builds on the definition provided in the 2016 report of the *One Hundred Year Study on Artificial Intelligence*, an international cross-sectoral panel that aims to review periodically and advise on the impact of developments in AI:

> Artificial intelligence refers to the science and a set of computational technologies devoted to making machines intelligent, and where intelligence is defined as the quality that enables an entity to sense, learn, reason, and act appropriately and with foresight in its environment.

Drawing from the *One Hundred Year Study* is apt because the founding proposal of the Waterloo AI Institute drew substantially from the report to provide context and background.

At its establishment in 2017, the Waterloo AI Institute aimed "to cohere, advance, promote, and exploit cross-disciplinary research at the frontiers of artificial intelligence and its applications at the University of Waterloo". The Institute was founded under the leadership of Dr. Peter Van Beek from the Faculty of Math and Dr. Fakhri Karray from the Faculty of Engineering, both of whom served as the Founding Co-Directors from 2017 to 2021.

The creation of the Waterloo AI Institute aligned well with the University of Waterloo's 2013 Strategic Plan under the theme of Transformational Research, with the following goals:

- to identify and seize opportunities to lead in new/emerging areas
- to enable conditions that support excellence and impact
- to increase interdisciplinary/transdisciplinary research, and

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[1] https://www.weforum.org/agenda/2020/10/dont-fear-ai-it-will-lead-to-long-term-job-growth/

- to build greater awareness, nationally and globally, of Waterloo's research productivity and impact.

Additionally, the Government of Canada in 2017 appointed CIFAR (Canadian Institute for Advanced Research) to develop and lead a $125 million Pan-Canadian Artificial Intelligence Strategy, the world's first national AI strategy. The strategy created three centres of excellence: the Alberta Machine Intelligence Institute (AMII) in Edmonton, the Vector Institute in Toronto, and the Montreal Institute for Learning Algorithms (Mila) in Montreal. Within the context of this broader ecosystem, the Waterloo AI Institute was created to provide a central point of reference to coordinate and advocate for support and resources for AI research and training at the University of Waterloo, as well as to communicate the strengths of Waterloo and the broader region in AI.

At the outset, there were two unique features of the Waterloo AI Institute that set it apart from other peer institutions:

A focus on a multidisciplinary approach to artificial intelligence. Although led by the Faculty of Engineering and the Faculty of Mathematics, the Institute drew members from all six faculties across campus as AI is inherently multidisciplinary. The connections to math and engineering are obvious. The high-impact applications of AI in areas such as health, social sciences, the arts, and the basic sciences have attracted members from the Faculties of Health, Environment, Arts, and Science to the Institute. A holistic approach to responsible AI crucially relies on the perspectives of philosophers, social scientists, health experts, artists, legal scholars, and policy makers, and hence participation of members from Faculties other than Engineering and Mathematics is critical to the success of the Institute.

A focus on *applied* research. Rather than being driven by a set of technologies, the Institute's mission has been to help our partners solve real-world problems. We, of course, also engage in *foundational* research, but we believe that our problem-oriented perspective provides the opportunity to achieve broader impact. One helpful analogy is that we "pull" the relevant expertise from across the Institute to tackle real-world problems, as opposed to "push" some particular set of technologies that may not be relevant to the challenge at hand.

Of course, the world does not remain static and the Institute needs to evolve accordingly. In short, to achieve its vision, we propose that the Institute broadens its scope to include data science as well as artificial intelligence, with a greater emphasis on the *responsible* deployment of data science and artificial intelligence technology. This re-envisioning of the institute also brings it into greater alignment with the University's 2020-2025 Strategic Plan, as described in the pages below.

1.1 Future Evolution of the Institute

As AI becomes increasingly interwoven into our daily lives, there are many challenges that lie ahead. In the past few years, we have witnessed some high-profile deficiencies in AI systems,

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for example, object recognition systems mislabelling people, chatbots spewing misogynistic hate, racist risk assessment algorithms, self-driving car crashes, failures of medical diagnostic models, and adversarial attacks against AI systems. These unfortunate mishaps and malicious attacks are caused, at least in part, due to data issues. Given the growing prominence of AI-based decision-making across far-reaching spheres of human activity such as medicine and law, it is clear that for AI to continue to have positive societal impact, we must consider AI systems in the broader context of the data that feeds it, as well as processes of how they are acquired, manipulated, and used.

In short, AI needs data science – which we characterize as a holistic and multidisciplinary approach to problem solving that focuses on how data are collected, curated, integrated, processed, analyzed, and visualized. To this end, we propose that, in the next phase of its existence, the Waterloo AI Institute positions itself to integrate tightly both data science and AI.

Data Science

Like AI, data science is inherently multidisciplinary: it builds on a core set of technologies in data engineering, analytics, security and privacy, as well as ethics, in close interaction with application domains (e.g., finance, health, manufacturing) that leverage these technologies to solve pressing real-world challenges.

In more detail, we identify four main building blocks that comprise data science:

- **Data engineering**, e.g., big data storage and computing solutions; data pipelines; data collection, curation, and quality.
- **Data analytics**, e.g., exploration, manipulation, transformation, and visualization of data to yield data-driven solutions.
- **Data security and privacy**, e.g. ensuring that data is not maliciously manipulated; privacy is enforced; applications of cryptography; differential privacy; blockchains.
- **Data ethics**, e.g., examination of the impact of data policies on individuals, organizations, and society; ethical, normative, and regulatory issues.

It is evident there exists obvious synergies between data science and AI. As there is no corresponding university-wide hub for data science research and related activities on campus, the expansion of the scope of the Waterloo AI Institute fills this gap. We believe that the expansion of the Institute to encompass data science will further grow its membership and strengthen the campus community around these synergies.

Responsible and Trustworthy AI

In order to ensure that the fruits of advances in data science and AI contribute to our common prosperity and well-being, and that the benefits of innovation accrue to all segments of society, it is imperative that data science and AI technologies be developed, deployed, and applied in a *responsible* manner. This is particularly important as deployments of technologies have become

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more consequential, for example, in medicine (e.g., to diagnose cancer), law (e.g., for recidivism prediction), finance (e.g., to make loan decisions), and the national security arena.

The phrase "Responsible and Trustworthy AI" is an umbrella term that denotes a number of key properties that are highly desirable in AI systems. Important examples include:

- AI systems should operate in a fair manner that is free from basis. For example, an AI decision-making algorithm should not discriminate on the basis of race
- AI systems should be transparent, for example, in rendering their outputs explainable and their internals interpretable
- AI systems should be safe and secure, both in the course of normal operation as well as under adversarial attacks
- AI systems should function in accordance with well-defined specifications and in compliance with laws and guidelines
- AI systems should be built in a manner that respects the origin, nature, and sensitivity of their data inputs and in accordance with relevant regulations, for example Europe's GDPR (General Data Protection Regulation), and must be algorithmically transparent in accordance with relevant laws, such as the European Commission's Artificial Intelligence Act (AIA)

The importance of responsible and trustworthy AI is obvious, and as such, we aim to engrain such a perspective in all aspects of the activities of the Institute.

1.2 Vision and Mission

The vision of the Waterloo AI Institute is to:

Advance the responsible use of data science and artificial intelligence to enhance the prosperity and well-being of humankind.

Our mission:

- Partner with relevant stakeholders to solve real-world problems through the responsible deployment of data science and artificial intelligence technology
- Lead globally in applied as well as foundational data science and AI research
- Broaden participation and enhance workforce talent in data science and AI through education, training, and outreach
- Drive the adoption and commercialization of data science and AI innovations

To reflect the expansion of its scope of activities to encompass both data science and AI, the Waterloo AI Institute will be seeking to rename and rebrand itself to better capture its vision and mission (for example, the Waterloo Data Science and Artificial Intelligence Institute). This process is ongoing and we are seeking the input from our many stakeholders.

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Thus, accordingly, references to the Waterloo AI Institute in this document should be interpreted as a "placeholder" for the final, yet to be determined name of the Institute.

The vision and mission of the Institute align well with the University's 2020-2025 Strategic Plan, which has the following intersecting themes for impact:

- Developing talent for a complex future
- Advancing research for global impact
- Strengthening sustainable and diverse communities

Specifically, our focus on applied research while advancing foundational knowledge contributes to the second theme; our mission to broaden participation and enhance workforce talent squarely fits with the first and third themes; and finally, driving adoption and commercialization of innovations is consonant with the second and third themes.

1.3 Where We're Going

Over the next five years:

- We will continue to build on our existing strengths and organically grow, engaging with more partners, supporting more projects, and further catalyzing AI research activity on campus. This can be informally characterized as: continue doing what's already working and what we're already doing well, but increasing the intensity of existing activities and continuing to refine our processes for execution
- We will operationalize the revised scope of the Institute and focus on responsible and trustworthy AI in the execution of our vision and mission – by engaging in a number of strategic initiatives, outlined in Section 4.
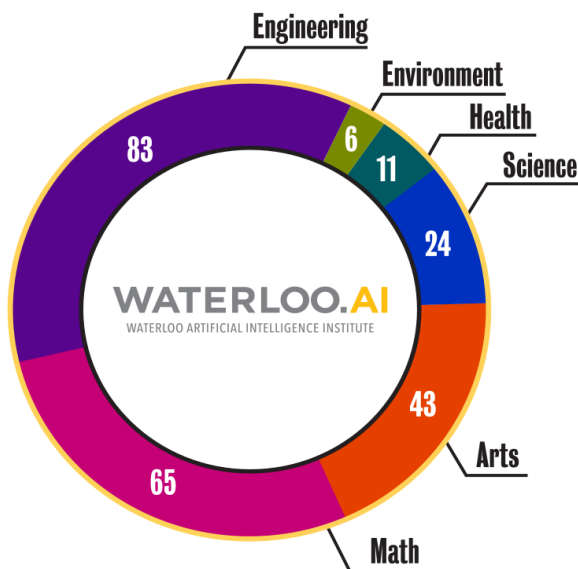
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2. RESEARCH ACCOMPLISHMENTS

At its founding, one of the core missions of the Waterloo AI Institute was to support AI research at Waterloo and enhance the University's reputation as a world-leading centre for both applied and foundational AI research. As detailed below, the Institute has made significant contributions towards enhancing and supporting these efforts since its inception in 2017.

2.1 The Waterloo AI Community

A vibrant and active network of researchers is key to the success of any research institution that aims to be among the best in a field of study. With this in mind, we have leveraged existing strength in the quality and quantity of AI researchers at Waterloo to create a large, vibrant, multidisciplinary and cross-faculty community of over 230+ faculty members and 450+ graduate students and postdocs, who span all six Faculties at Waterloo (the full list of Institute members is shown in Appendix 1). The diagram below shows a breakdown of our members from various Faculties on campus.

We actively reach out to researchers from various Faculties, from Arts to Engineering, and encourage them to join the Institute. The Institute channels research funding to groups of researchers from diverse backgrounds in AI (discussed in greater detail below), organizes cross-disciplinary and cross-faculty workshops (e.g. the Workshop on "AI for Science" held in January 2022), enables creation of new Chairs at the University including three CIFAR Chairs, as well as organizes seminars, job fairs, and industry days. All these activities create further opportunities for collaboration among our researchers and improve connectivity between our professors, students, and our external partners.

The strength of collaborations enabled by the Waterloo AI Institute between researchers from various faculties across campus is illustrated by the co-authorship network below, where each node represents a faculty member and the links denote collaborations on a research paper. This visualization contains only those members of the Institute for whom we were able to semi-automatically identify a Google Scholar profile. Co-authorship information is automatically mined by crawling those profiles, and singleton disconnected nodes are not shown. Nodes are

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colour-coded according to Faculty and scaled proportionally to the *h*-index of the researcher.
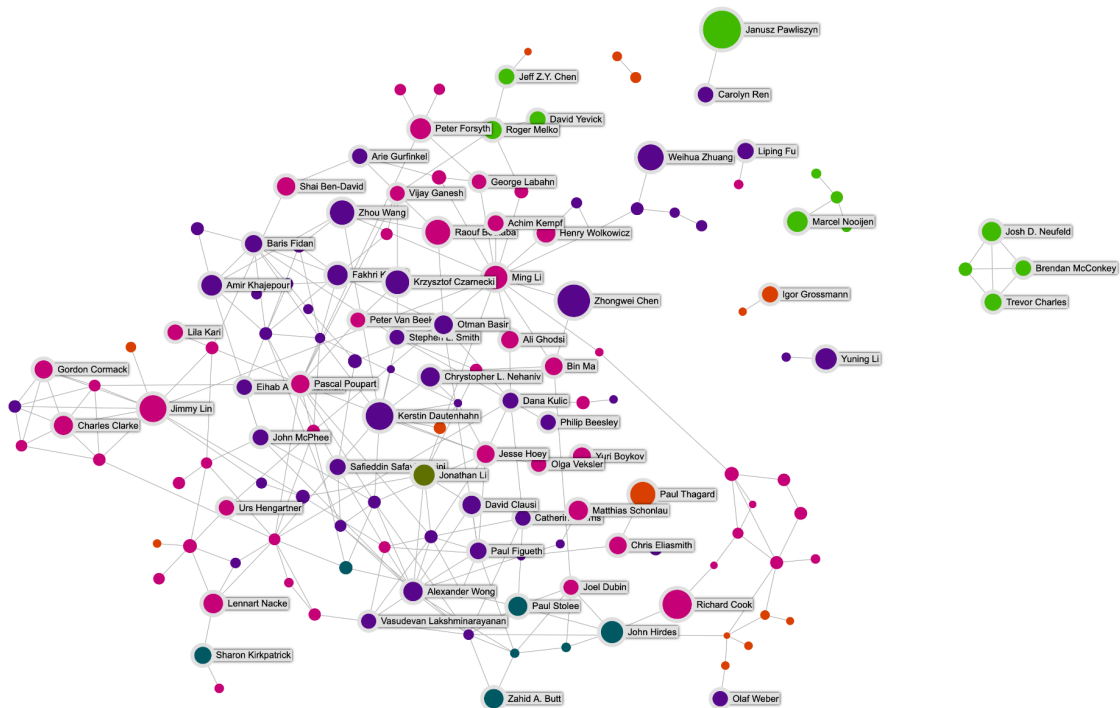
While visualizations constructed from automatically mined data inevitably contain inaccuracies, the collaboration network nevertheless tells the story of rich, intertwined and multidisciplinary collaborations across campus, spanning all six faculties.

All of these efforts by the Institute have contributed significantly to Waterloo's reputation around the world as a leader in AI research. Additionally, the expansion of the Institute to include data science and the associated faculty members as central to its mission will further enhance the reputation and impact of the Waterloo AI Institute.

This enhanced reputation of Waterloo as a world leader in AI research is best illustrated by our high ranking in AI according to CSRankings,[2] a comprehensive and highly respected metrics-based ranking of computer science institutions around the world, quantified in terms of publications at top conferences in various sub-disciplines of computer science. Obviously, it is impossible to adequately capture the richness and depth of research in terms of simple metrics, and any such attempt discards important nuances. Furthermore, CSRankings only captures one
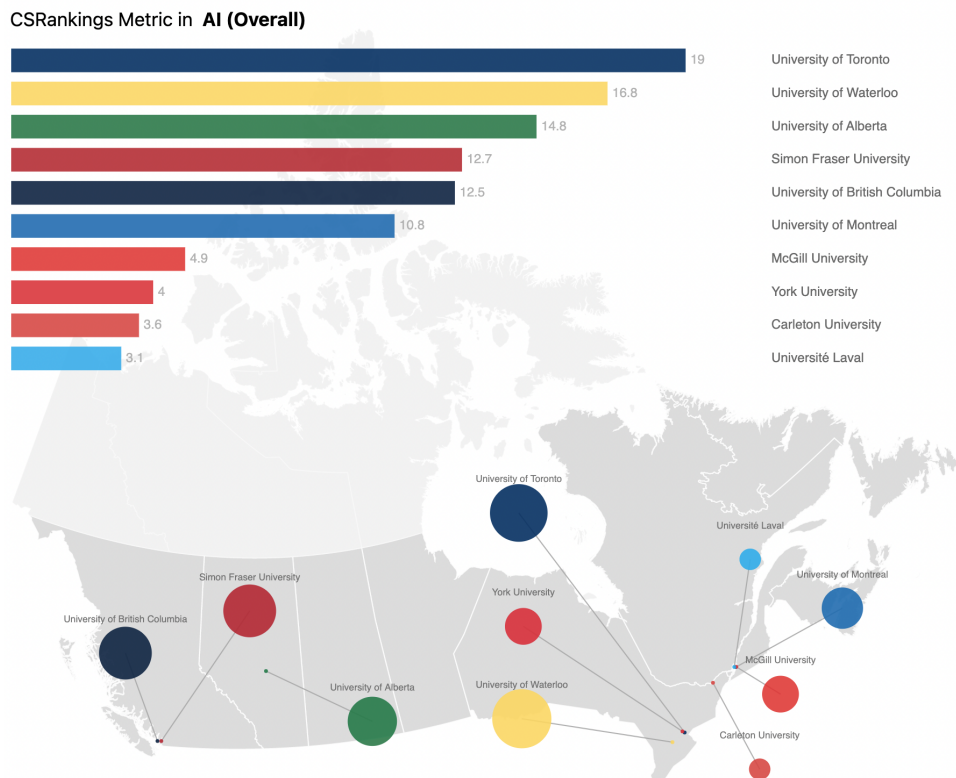
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[2] https://csrankings.org/

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perspective, out of the many that together form the multidisciplinary study of AI. Nevertheless, CSRankings has gained widespread adoption in the community.

In the area of AI overall, the University of Waterloo is currently ranked second in Canada, ahead of University of Montreal and McGill University which are affiliated with Mila, and University of Alberta which is affiliated with Amii (see infographics below).
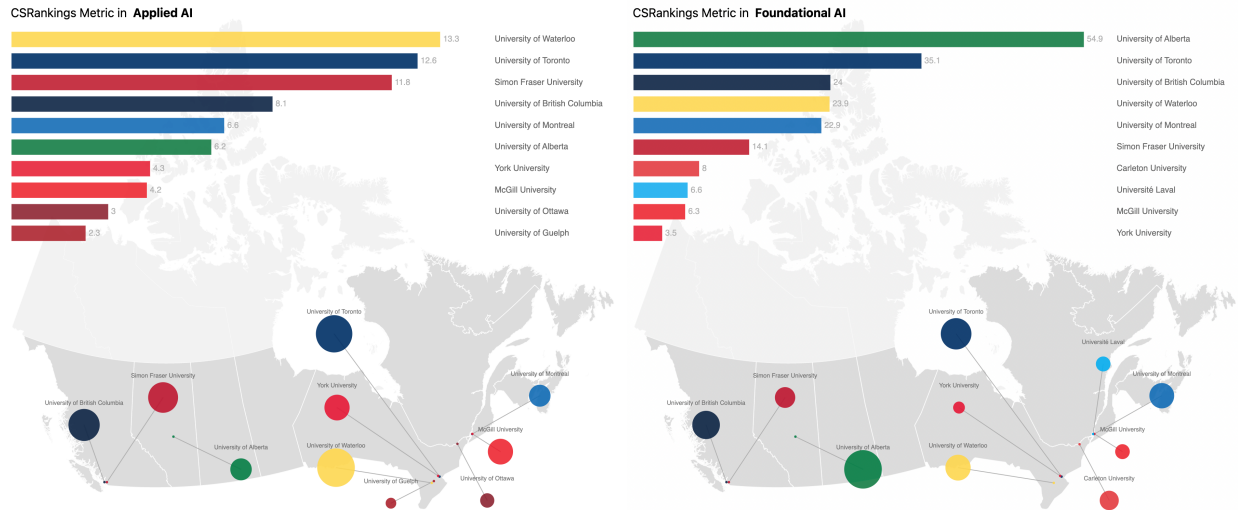
What are the top Canadian universities for AI research?

Data below taken from CSRankings, a metrics-based ranking of top computer science institutions around the world.

CSRankings Metric in **AI (Overall)**

University	Score
University of Toronto	19
University of Waterloo	16.8
University of Alberta	14.8
Simon Fraser University	12.7
University of British Columbia	12.5
University of Montreal	10.8
McGill University	4.9
York University	4
Carleton University	3.6
Université Laval	3.1

CSRankings further breaks down AI into five distinct sub-areas: AI (core), computer vision, machine learning & data mining, natural language processing, and the web & information retrieval. Of those, the first and third can be considered foundational AI, while the remaining three can be considered applied AI.

Breaking CSRankings along this foundational vs. applied split yields the metrics shown in the diagrams below, with applied AI shown on the left and foundational AI shown on the right:

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CSRankings Metric in **Applied AI**

University	Value
University of Waterloo	13.3
University of Toronto	12.6
Simon Fraser University	11.8
University of British Columbia	8.1
University of Montreal	6.6
University of Alberta	6.2
York University	4.3
McGill University	4.2
University of Ottawa	3
University of Guelph	2.3

CSRankings Metric in **Foundational AI**

University	Value
University of Alberta	54.9
University of Toronto	35.1
University of British Columbia	24
University of Waterloo	23.9
University of Montreal	22.9
Simon Fraser University	14.1
Carleton University	8
Université Laval	6.6
McGill University	6.3
York University	3.5

According to this metric, the University of Waterloo is the top ranked university for applied AI in Canada, and we are ranked fourth in foundational AI. The exceptional strength of the University in AI is a testimony to the high quality of our researchers, and the Institute provides the framework for bringing them together into a coherent community.

2.2 Partner Engagement and Sponsored Research

A core focus of the Institute is to enable our members to engage effectively with external partners, whether they be multinationals, SMEs, or non-profits, that are looking to AI to help solve their problems, and thus increase their efficiency, impact, and/or revenue. We do this by providing a scaled membership service to our external partners, wherein our faculty members help solve real-world problems by deploying innovations developed in our labs.

Specifically, our external partners have provided the Waterloo AI Institute with over $5.8 million dollars towards AI research, supporting nearly 50 projects, which in turn have led to dozens of papers published at top-tier AI conferences and journals, contributing to our reputation as discussed above.

We have over two dozen companies as external partners (a complete list can be found in Appendix 2), all the way from small and medium-sized enterprises to world-class multinationals such as Microsoft, Chubb International, Magna etc. that represent a variety of verticals from software, finance and banking, automotive, supply chain, health, agriculture and manufacturing.

Furthermore, Waterloo.AI has facilitated AI research collaboration with other leading universities in the world such as McMaster University (a leader in AI for medicine) and University of Bordeaux, France (a leader in application of AI to materials discovery). We also facilitate cross-faculty research at Waterloo via workshops such as the "AI for Science" workshop held in January 2022 or via direct collaborations between members of different

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faculties, as well as through active collaborations with WISA (Waterloo Institute for Sustainable Aeronautics) and WIN (Waterloo Institute for Nanotechnology).

In addition to all the ongoing research support, we also provide Azure/AWS credits for GPU and CPU clusters, which can be crucial in helping our members complete their research projects in a timely fashion.

2.3 Highlighted Research Projects

Below we highlight a few representative research projects led by members of the Institute. A complete list of project titles can be found in Appendix 3.

Deep Learning for Driver Behaviour Recognition
Researchers in the Centre for Pattern Analysis and Machine Intelligence have developed a new algorithm for predicting and alerting in real time, the behaviour and status of the driver of a vehicle. This solution can operate via a connection to the cloud, or on a stand-alone basis. It will contribute to the design of "level-4" automation in autonomous vehicles. This development has been featured in media including the Washington Post, DigitalTrend, Wired, CBC, Vice Media, Globe and Mail, and Daily Mail.

Evolutionary Deep Intelligence
Researchers in Waterloo's Vision and Image Processing Lab have developed new techniques to obtain highly efficient deep neural network architectures. Their *evolutionary deep intelligence* approach drives the formation, over successive generations, of highly sparse synaptic clusters. The offspring algorithms, trained on image classification, can achieve state-of-the-art performance despite an up to 125-fold decrease in synapses. Such architectures are ideal for low-power embedded CPUs. This research received the best paper award at the efficient deep learning workshop, held at the NIPS Conference in Barcelona, December 2016. A spinoff company, DarwinAI, is aiming to accelerate operational AI from the edge to the cloud for all verticals.

Spaun: World's Largest Model of a Functional Brain
Developed by Chris Eliasmith and his multidisciplinary team at Waterloo's Centre for Theoretical Neuroscience (CTN), Spaun combines 2.5 million simulated neurons with a visual recognition system and a simulated mechanical arm. Just like its human counterpart, it can read, answer questions, play simple games and memorize lists. It can decode numbers written in unfamiliar handwriting and tackle basic logic problems. Like people, it even makes mistakes, faltering at complex questions or getting tripped up when lists get too long. And Spaun learns, adapting its behaviour based on feedback from the world around it.

Combining Machine Learning and Logical Deduction for Efficient SAT and SMT Solvers
Two members of our Institute, Profs. Vijay Ganesh and Pascal Poupart, have been working to

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bring the two key sub-fields of AI, namely, machine learning and logical deduction together to solve problems that either sub-field alone may not be able to solve. Over the last several years they have developed a set of algorithms that combine machine learning techniques with logical deduction methods aimed at efficiently and dynamically guiding the search for proofs for mathematical statements in many fragments of mathematics, from Boolean logic to first-order theories. The result has been a series of SAT and SMT solvers (also known as theorem provers), most prominent among which is the MapleSAT Boolean SAT solver which won gold and silver medals at the highly competitive SAT competition 2016 and 2017, and is currently one of the leading SAT solvers in academia and industry.

Bringing the Power of Natural Language Processing to African Languages with AfriBERTa
A project led by Prof. Jimmy Lin with his master's student Kelechi Ogueji has developed a data-efficient pre-trained transformed-based neural language model to analyze 11 African languages. Their new neural network model, which they have dubbed AfriBERTa, is based on BERT — Bidirectional Encoder Representations from Transformers — a deep learning technique for natural language processing developed in 2018 by Google. The neural language model works specifically with 11 African languages, such as Amharic, Hausa, and Swahili, spoken collectively by more than 400 million people. It achieves output quality comparable to the best existing models despite learning from just one gigabyte of text, while other models require thousands of times more data.

AI-Assisted Design of Adaptive Neurofeedback Games for Autistic Children
This is a project led by Prof. Jian Zhao. It is estimated that 1 in 66 children (5-17 years old) in Canada are suffering from autism spectrum disorder (ASD), a neurological disorder that can severely hinder the quality of life. Children with ASD face many difficulties in daily circumstances due to their impaired social and communicative functions. Emerging studies have shown that neurofeedback training (NFT) games are an effective and playful intervention to enhance social and attentional capabilities in children with ASD. NFT games gather EEG signals of autistic childrens' brain activity, and provide gamified multimodal feedback, to positively reinforce their self-regulation of social and attentional functioning. The high-level goal of this research is to investigate novel techniques for augmenting the design and development of effective NFT games with machine intelligence while leveraging human expertise. This research can potentially generate huge societal impacts, which leads to offering more effective, engaging, and personalized intervention to the large population of autistic children.

2.4 Feedback from Faculty Members

Appendix 1 provides a complete list of faculty members in the Institute. Below we share feedback recently received from some of our members:

> "Waterloo.AI has been a fantastic resource for AI researchers such as myself in a multitude of ways. First, Waterloo.AI has been a wonderful way to connect with industrial partners and has led to the formation of great collaborations that solve

real-world challenges using fundamental research in AI. Secondly, Waterloo.AI has helped AI researchers such as myself spread our AI research with important industrial and general audiences through the wonderful events and workshops being held. Finally, Waterloo.AI has been an important part in gaining access to financial resources to support fundamental AI research, especially in the very important area of AI for social good. It is wonderful to see Waterloo.AI acting as the bridge between academic AI research and industrial AI reality."

"I appreciate the Waterloo.AI YouTube channel, as we all have overly busy schedules and sometimes it is impossible to attend a seminar or workshop. This way we don't miss out."

"Waterloo.AI has been pivotal in supporting industrial collaborations and multidisciplinary research. Waterloo.AI helped me and colleagues in Chemical Engineering land some funding from BMO at the intersection of AI and Climate Change. In addition, I have also been able to diversify my industrial collaborations with new industry partners such as Manulife to address their need for reinforcement learning in digital marketing."

"Through Waterloo AI Institute's seminars, podcasts, and other ideation events, UW AI researchers from different faculties and disciplines have a greater awareness of our colleagues' research interests and strengths. It also played an important role in fostering research and industry partnership in AI fields. For example, the AI institute has connected us with the Microsoft research team to identify common research interests in information and emergent disease surveillance research. In addition, the Azure credits provided by the AI institute have been a timely and helpful resource for us to train large AI models to understand clinical texts and social media data. Thanks for all your support, and we hope to make faster advancements together!"

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3. TRAINING AND OUTREACH ACCOMPLISHMENTS

Another core mission of the Institute is to provide AI training to our external partners as well as our members and students at the University. Beyond the University, we engage in outreach efforts to future promote the Institute and its vision. This section describes training and outreach accomplishments of the Institute over the past 5 years.

3.1 Research and Professional Education Seminars

The Institute invites world-leading AI researchers to give invited talks to our faculty members and students, enabling them to get an understanding of cutting-edge research being conducted by AI researchers worldwide.

Furthermore, we also organize and run professional education seminars (previously referred to as the "reverse co-op" program), wherein a series of talks on important topics in AI are given by leading experts at Waterloo to decision makers at our external partners. These talks are particularly well received since they focus on questions at the intersection of AI and issues that concern these decision makers. These include questions of compliance of AI systems with national and international law (e.g., the GDPR privacy laws), security and privacy of AI systems, and new AI technologies that may impact their business.

3.2 Talent Transfer and Job Fairs

Another key objective of the Institute is to enable our external partners to connect with our highly-talented graduate and undergraduate students. We accomplish this via regular AI Job Fairs, as well as internships. The Job Fairs, typically offered once per school term, enable our partners to pitch employment opportunities to our graduate and fourth year undergrads, while at the same time giving the students the opportunity to gain insights through informal question and answer periods with potential employers.

Another route for talent transfer from the university to industry is via internships that graduate students undertake with our partners as part of the sponsored research projects discussed above. This has proved to be highly successful and popular way for both employers and students to get a thorough glimpse at each other over a 4- or 8-month internship period.

3.3 Graduate Scholarships

The Institute gives out Annual scholarships to three graduate students selected from across all six faculties. The students are selected via a rigorous process that focuses on their past research and academic accomplishments and future potential. To date, $120K worth of graduate scholarships have been awarded by the Institute. One of the goals of these scholarships is to encourage continued engagement of our graduate students in AI, and in particular to reach out to those students who may be conducting interdisciplinary research on topics at the

intersection of AI and a field not traditionally associated with AI such as political science. Below we share some feedback from last year's recipients:

<u>Secretary note:</u> brief summary to be shared at 13 June 2022 SGRC

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3.4 International Workshops and Collaborations

A key goal of the Institute is to encourage strong collaboration between our members and world-leading universities that excel in AI research. To this extent, we have developed two international partnerships focused on AI research with the following:

University of Bordeaux, France. This relationship between Bordeaux and Waterloo.AI began in 2019 with over 25 AI researchers from UW and Bordeaux combined, with 6 projects receiving follow-on funding totalling more than $100K. A second online workshop titled "AI for Science and Engineering" was held on Jan 18 - 20, 2022, which was co-hosted by Waterloo.AI, Waterloo Institute for Nanoscience (WIN) and University of Bordeaux. The event created further connectivity between researchers from the three institutions. Overall, the event had 25 presenters over the three days. Submissions to access $100K in follow-up seed funding are currently under review, which will initiate further collaborative AI research between UW and Bordeaux to enable access to larger funding allocations from the EU.

Twente University, the Netherlands. With an AI for Health focus, this event was held on March 23 & 24, 2022, with a specific focus on developing further collaboration between UW researchers and those from Twente University. The event was co-hosted by UW Centre for Bioengineering and Biotechnology (CBB), Waterloo.AI and Technical Medical Centre (TechMed) Twente. The focused areas for AI were cancer, rehabilitation, dementia and pandemic research. There were 25 presentations and focused collaborative workshops delivered over two days.

3.5 Industry Days

Initiated in 2021, these free events are open to the broad AI ecosystem regionally, nationally and internationally. These Industry Day events serve primarily as a means to introduce and promote Waterloo.AI and the breadth of applied research currently underway at the University. For the two themed Industry Day events held virtually in March 2021 (AI for Advanced Manufacturing, Social Good and Security) and November 2021 (AI for Supply Chain), there were in excess of 850 registered participants combined. We are currently planning an Industry Day event for 2022 which will focus on cutting-edge research at the intersection of AI and Blockchain/crypto currencies and the implications and opportunities for applied research as well as their commercialization.

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4. STRATEGIC INITIATIVES

It is obvious that AI is rapidly advancing and accelerating the pace at which the world is evolving. Despite its many past successes, the Institute cannot simply rest on its laurels. In order to execute its mission and operationalize many of the elements in this report, the Institute is embarking on a number of bold strategic initiatives, detailed below.

All of these plans align well one or more themes from the University's 2020-2025 Strategic Plan:

- Developing talent for a complex future
- Advancing research for global impact
- Strengthening sustainable and diverse communities

The remainder of this section is organized in terms of these themes.

4.1 Developing Talent for a Complex Future

Two of our strategic initiatives focus on talent development, both in Canada and around the world. The rapid pace of technological progress in AI and the pandemic have forced both employers and employees to rethink the nature of work.

4.1.1 Collaborate with WatSPEED on Upskilling Programs

There is a massive talent gap in AI in terms of what employers are looking for and the state of AI skills of the current workforce, both in Canada and around the world. In short, there are insufficient numbers of qualified workers to fill the demand in jobs that require skills in AI. As our President Vivek Goel remarked at the Toronto Board of Trade's Workforce Summit 2.0 in March, 2022: "There are three main areas post-secondary education can help in addressing the gaps: producing new talent – our students; reskilling and upskilling existing talent – those working already; and helping bringing new talent into the country – our international students who become immigrants." The first and third areas reflect the core mission of the University, which the Institute has already made significant contributions to, for example, via sponsored research projects with external partners that involve our students in cutting-edge AI research. The second area forms a strategic initiative of the Institute.

WatSPEED is an academic support unit on campus that provides professional education designed to support the workforce of the future. The Waterloo AI Institute has already embarked on a strategic partnership with WatSPEED to build rigorous, non-degree retraining and upskilling curricula, exactly to alleviate the talent gap referenced above.

A first step is a partnership with the Canadian Institute for Health Information (CIHI) to develop and deliver a bespoke program (already underway) around data science, machine learning, and artificial intelligence for CIHI managers and data analysts. The program was designed to help

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CIHI employees gain familiarity with modern technologies that are poised to transform the healthcare industry.

This CIHI program is at the vanguard of a two-pronged approach to upskilling. The first prong focuses on custom, bespoke courses for partner organizations, while the second will develop open-enrollment courses that aim to reach broader segments of the current workforce. We believe that there are many opportunities to leverage and reuse course content across offerings as part of both prongs.

This partnership between WatSPEED is highly synergistic because it exploits WatSPEED's existing infrastructure for technical support, project and financial management, and the actual delivery of program content. The Institute assists in coordinating and identifying resources across campus who are well-suited to developing and delivering program content. In addition, we provide academic oversight to ensure the overall coherence of curricula and that the offerings meet the standards of rigor and excellence expected from the University of Waterloo.

4.1.2 Develop a Campus-Wide Collaborative AI Program

Given the impact of AI cross-cutting all areas of research and scholarship, it is no surprise that there is intense demand for AI education in the context of training people in AI in a cross-disciplinary setting (aka, "AI + X" programs). Hence, we have initiated discussions with all 6 faculties at the University regarding a Collaborative AI Graduate Program (colloquially, a "minor in AI"). A graduate student enrolling in such a program would gain some knowledge in AI techniques especially as it pertains to their specific area of study or research. For example, someone from the Faculty of Science doing a PhD in physics or chemistry could enroll in the Collaborative AI program and get a minor in AI by completing two AI courses from appropriate departments and conducting a certain amount of research in the use of AI methods in physics (which would be approved by their supervisors).

All the Deans with whom we have held discussions regarding the Collaborative AI Program have been extremely enthusiastic about this program. We hope to complete a detailed plan over the next few months and present it to all Faculties and departments interested in this initiative.

4.2 Advancing Research for Global Impact

At the outset, the *applied* AI focus of the Institute positions our work to achieve impact – to complement our foundational contributions with solutions to real-world problems. Three of our strategic initiatives are squarely focused on this theme of the University's strategic plan.

4.2.1 Broaden the Scope of the Institute to Encompass Data Science

As discussed in the introduction, we propose that the Waterloo AI Institute positions itself to integrate tightly both data science and AI. Beyond articulating this broader vision in all aspects of the Institute's communications with both internal and external stakeholders, we propose two concrete actions.

First, we will endeavour to increase the membership of the Institute to attract those faculty at the University who might think of themselves as working in data science, but not necessarily artificial intelligence. A case in point is the Data Systems Group in the David R. Cheriton School of Computer Science: a large portion of the group's research focuses on data management issues involving databases and other data platforms. While this work might not necessarily be characterized as AI, the contributions to data engineering and data analytics squarely place the research in the domain of data science. As the synergistic relationship between data science and AI has already been articulated in Section 1, we believe that these researchers would both desire and benefit from joining the Institute. Their addition would further strengthen our community and our ability to tackle complex real-world challenges that cannot be neatly siloed as either data science or AI, but need both. We anticipate that the membership of the Institute will grow by dozens of faculty as a result of these efforts.

Second, this broadening in scope will allow the Institute to more meaningfully engage with external partners who may not (yet) think of themselves as AI-driven organizations. It has been our experience, in numerous discussions with potential external partners, that they are relatively early in their "AI journey", in that they are still trying to understand the implications of AI in their industry. However, the recognition of the importance of data-driven decision making is more prevalent, and thus many organizations can be characterized as embarking on the transition from data science to AI. In other words, solutions based on data science achieve more resonance. With this formal repositioning, the Institute can more fully embrace these organizations, engaging on projects that would be considered "out of scope" with respect to the previous narrower vision of the Institute.

Together, these actions are complementary. Broader engagement with external partners will bring to the Institute a greater diversity of real-world problems, and our internal growth in membership will increase the research capacity to tackle them to achieve global impact.

4.2.2 Expand Institute Capacity via Research Assistant Professors

At present, the Institute serves as a conduit connecting external partners with faculty members at Waterloo to develop and then execute research projects that solve real-world challenges. While this model has been highly successful, it requires a delicate balance between external demand and internal capacity. That is, in order for this process to succeed, there must be faculty interest and willingness to engage.

However, we are noticing that for certain in-demand areas, for example, natural language processing and computer vision, external interest and resources from potential partners are outstripping internal capacity. Faculty with the appropriate expertise are reaching the point of saturation where they are unable to take on new projects. As the organic growth in Institute membership by the addition of tenure-track faculty across campus is beyond our control and purview, we propose to bridge this gap to support further research capacity in these high

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demand areas and related commercialization needs via the addition of research assistant professors.

It is our intention, as an initial trial, to hire one research assistant professor (RAP) with salary and benefits supported by the Institute. We anticipate that this faculty member will engage with relevant external partners in developing and executing research projects, and that project resources supplied by the partner can begin to offset the costs of the position. With investment from the Institute as a seed, we ultimately hope that this position can be self-sustaining via external funding, and eventually, additional positions can be created under the same model. This will provide a mechanism to expand the Institute in a sustainable manner.

The RAPs will also help with identifying projects and ideas being developed in the AI labs across the university that may be ripe for commercialization. To this end, we are working with Dr. Karim Karim, the Associate Vice President of the Office of Commercialization and Entrepreneurship, in coming with a program wherein the Institute will solicit proposals for commercialization of AI ideas from its members, which will then go through a rigorous vetting process, before being sent to the Office of Commercialization and Entrepreneurship for further seed funding and training.

4.2.3 Build Shared GPU and Software Resources

A chronic problem that all our AI researchers at the University face is the lack of availability of sufficient hardware and software resources that would enable them to complete their AI experiments in a timely fashion. While our researchers do have access to considerable hardware resources through Compute Canada, these are shared among all AI researchers nationally. The unfortunate result is that these resources are in very high demand and are often oversubscribed right before paper submission deadlines of leading AI conferences. Consequently, this can put our AI researchers at considerable disadvantage compared to those who have access to excellent facilities at, say, the Vector Institute.

Hence, in order to address this problem we plan to develop shared AI hardware and software infrastructure at Waterloo, to which our members will have exclusive access and would be sufficiently robust to handle a high volume of jobs at various times during the year when there are paper deadlines so that our members and their students can complete their projects in a timely fashion.

4.3 Strengthening Sustainable and Diverse Communities

Aligning with the third theme of the University's strategic plan, we propose two initiatives.

4.3.1 Increase Investments in EDI and AI for Social Good

Our emphasis on responsible AI requires increased investments in equity, diversity, and inclusion (EDI). This is necessary if we are to ensure that the benefits of AI accrue to all segments of society, including traditionally disadvantaged populations.

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Of course, EDI is a vastly complex challenge that no single institution can hope to "solve" by itself. Recognizing this limitation, our initial efforts have focused on targeting a specific, but important issue, that of the under-representation of women in computing. We are helping to tackle this challenge by increasing the number of high school girls that are interested in data science and AI, with the hope that they will pursue related topics in their future studies.

To this end, in collaboration with Women in Computer Science (WiCS), the Institute has been developing outreach curricula aimed at introducing girls to data science and AI. Specifically, in Fall 2021, the Institute funded a co-op position to develop exactly such material; we are now in the process of refining content and hope to pilot outreach efforts in the near future.
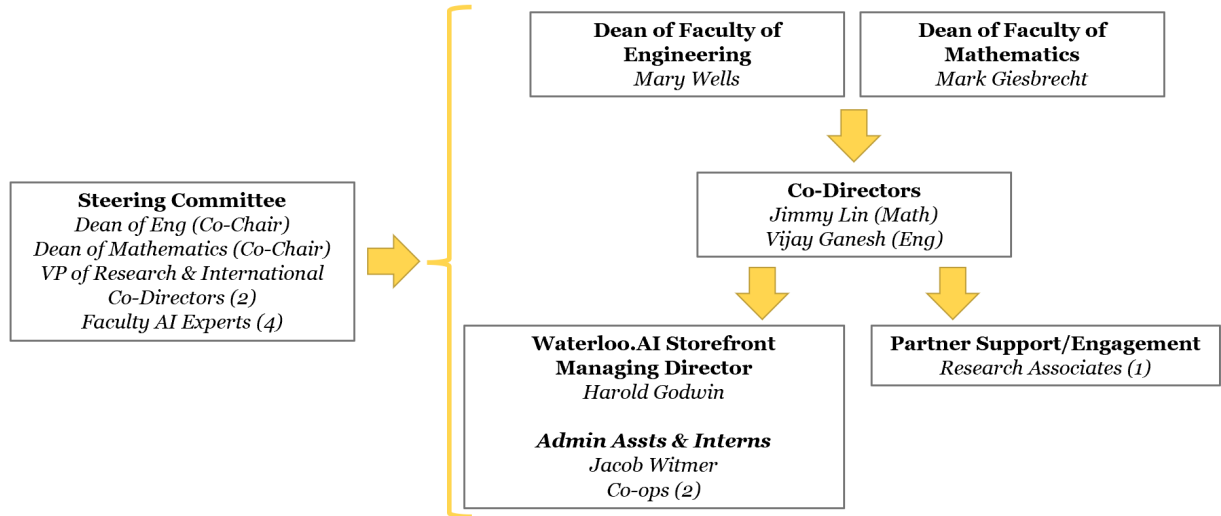
Additionally, the Institute's focus on specifically developing a stream of projects related to AI for Social Good has resonated with our external partners. This has generated much excitement, with a number of external partners interested in providing support through additional funding. This initiative also aligns well with the United Nations' Sustainable Development Goals (SDG). A project in this regard at the University is the one led by Professor Alex Wong from Systems Design Engineering titled "Farming Crickets for Food", an effort that has been designated as a top-10 global SDG project by the United Nations for the year 2021. We are currently in the process of discussing additional projects that support the UN SDG agenda and AI for Social Good.

4.3.2 Increase Engagement with University of Waterloo Institutes

The University of Waterloo has many excellent institutes on campus that serve a variety of communities of researchers such as the Waterloo Institute for Nanotechnology (WIN), the Cybersecurity and Privacy Institute (CPI), the Waterloo Institute for Sustainable Aeronautics (WISA), and others. Unsurprisingly, AI cross-cuts all these areas of research and therefore it is but natural for the Institute to engage in meaningful collaborations and partnerships with these institutes. We already have strong collaborations with WIN with whom we co-organized the AI for Science Workshop in 2022, which in turn has led to engagement with the University of Bordeaux in France. We are exploring partnerships with the CPI in the context of trustworthy and secure AI, as well as the WISA in regards to the use of AI to create digital twins for aeronautical systems. In the medium to long term, we plan to continue to increase our engagement with these institutes with the aim of creating new research and funding opportunities for our members.

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5. ORGANIZATIONAL STRUCTURE

The organizational structure of the Institute is shown in the following diagram.

Dean of Faculty of Engineering *Mary Wells*	**Dean of Faculty of Mathematics** *Mark Giesbrecht*

Steering Committee
Dean of Eng (Co-Chair)
Dean of Mathematics (Co-Chair)
VP of Research & International
Co-Directors (2)
Faculty AI Experts (4)

Co-Directors
Jimmy Lin (Math)
Vijay Ganesh (Eng)

Waterloo.AI Storefront Managing Director
Harold Godwin

Admin Assts & Interns
Jacob Witmer
Co-ops (2)

Partner Support/Engagement
Research Associates (1)

5.1 Steering Committee

As per University of Waterloo Policy 44 "Research Centres and Institutes", the Steering Committee is the Institute's governing body. It provides oversight for the planning and implementation of the Institute's development; establishes processes to manage/monitor its financial affairs; and establishes and enforces rules governing the Institute's activities, consistent with university policies, procedures and guidelines.

The Steering Committee will be co-chaired by the Deans of Engineering and Mathematics. There will be four faculty members on the Steering Committee and one further member representing the Office of Research. The Steering Committee will continue to meet at least once per year and additionally, as appropriate. Meetings of the Steering Committee will be made available to the Institute's members. The powers of the Steering Committee are those granted under 10.3.8 of Policy 44.

5.2 Institute Leadership

The Institute's leadership consists of two Co-Directors and the Managing Director. The Waterloo.AI's Co-Directors, will be in place normally for four years, renewable once, and will carry out the Institute's mandate. They will be accountable to the Steering Committee and will be of academic stature, appointed for their intellectual and administrative abilities and commitment to research, education and Waterloo.AI's mission and vision.

The **Co-Directors** will be tenured Associate or Full Professors with one each from the Faculties of Engineering and Mathematics with the ability to:
1. create an environment conducive to cross-disciplinary and cross-sectoral advances in data science and artificial intelligence;
2. associate productively with institute members, both internal and external;
3. maintain the confidence and co-operation of Waterloo colleagues; and
4. represent and affect the institute's overall vision, mission, and initiatives.

The Co-Directors manage staff, as relevant, and overall shall be governed by prevailing Faculty and university policies and practices. Any significant changes to institute practices and procedures will proceed only after wide consultation. The Co-Directors will also confer with the respective Deans on research-personnel, space, computing, budget development; partner outreach; or activities such as workshops, seminars, and public lectures. and other resource allocations, to be accessed by the Institute, that may impact and come under the purview of the respective Faculties.

The Co-Directors will be appointed by the Deans of Math and Engineering. In making its decision on the appointment of the Waterloo.AI Co-Directors, the Deans of Math and Engineering will solicit input from the Waterloo.AI membership and may form an advisory committee. The Waterloo.AI Co-Directors will normally serve for a period of four years, renewable for a second term of four years with the support of the Deans of Math and Engineering.

The **Managing Director (MD)** is responsible for aspects of the overall business leadership, partnership development, and day-to-day operations of the Waterloo.AI and is appointed by the Co-Directors of Waterloo.AI. This position is central to advancing the University of Waterloo as a leading centre for Artificial Intelligence (AI) research. The overriding objective is to manage, promote, and increase the large base of research activity and funding in AI at the University of Waterloo. A principal component of the Institute's structure and a key role of the MD will be the fostering and management of a collaborative partner network that draws from both the private and public sectors.

5.3 Institute Staff

The Administrative Associate (AA) shall report to the Managing Director. The AA shall assist the Managing Director and the two Co-Directors with administration, accounts management and budgeting, events management, and communications for the Institute. The AA plays a key role within the Institute structure and is generally the first point of contact. Further, the AA position is designed to bridge and maintain working relationships across campus, notably with Institute faculty members, the Office of Research, and Finance. The incumbent shall continually develop

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and maintain a database to track contacts and funding for past, present and potential WAII research partners. Careful management of the finances of the Institute, its relationship with faculty and staff involved in its research programs, oversight of its other research and education activities, and liaison with internal and external agencies and partners will ensure the Institute's continued and successful operation.

Administratively, Waterloo.AI operates under both Engineering and Mathematic faculties, and draws on both as required to support broader needs related to human resources, budget/finances, and communications. Further, in areas of funding for non-research and social good funding, Waterloo.AI receives on-going support from Engineering and Central Advancement.

5.4 External Partners

Levels of engagement for partners is based on their targeted outcomes and budget. With a "pull" type model, we convert partner's challenges/problems into an Applied Research project with research levels starting at the Silver level partnership. This level will provide a dedicated master's student focused on one project for two years under the supervision of the Principal Investigator. For more complex project(s) with 2 or more master's or PhD students, the membership levels would increase to Gold or Platinum level respectively. The Bronze level partnership serves as an initial "foot-in-the-door" for external partners who primarily are seeking "Talent Transfer" opportunities and engagement with our Waterloo.AI Graduates.

The following table summarizes the Waterloo AI Institute partnership levels:

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Level	Annual Budget ($CAN)	Term	Research Access	Added Benefits	AI Job Fair	Decision Makers Seminars	Partner Meeting Spots
Platinum	$250K	4 year min.	• 4-5+ Research Projects • Regular meetings w/ Investigators (PIs) & graduate students • Regular meetings, updates & report on findings	• Position on Advisory Board • Branding for all events & scholarships	✓	6	4
Gold	$100K-250K	4 year min.	• 2-3 Research projects • Regular meetings, updates & report on findings	• Position on Advisory Board • Branding for all events & scholarships	✓	4	3
Silver	$50K-100K	2 year min.	• 1-2 Research projects • Regular meetings, updates & report on findings	• Branding on Waterloo.AI Website only	✓	3	2
Bronze	$10K	2 year min.	• No Research component req'd	• Branding on Waterloo.AI Website only	✓	2	1

5.5 Advisory Board

Under the University's Policy 44, an Advisory Board is required to be established for Waterloo institutes or centres that have affiliate membership. The Board will be representative of the Institute's membership and stakeholders (membership initially proposed to be established through Internal Academic Members and Industry Affiliate Members; see Section 5 and Appendix 2). The Board will serve in an advisory capacity on matters of general research management of the Waterloo AI Institute.

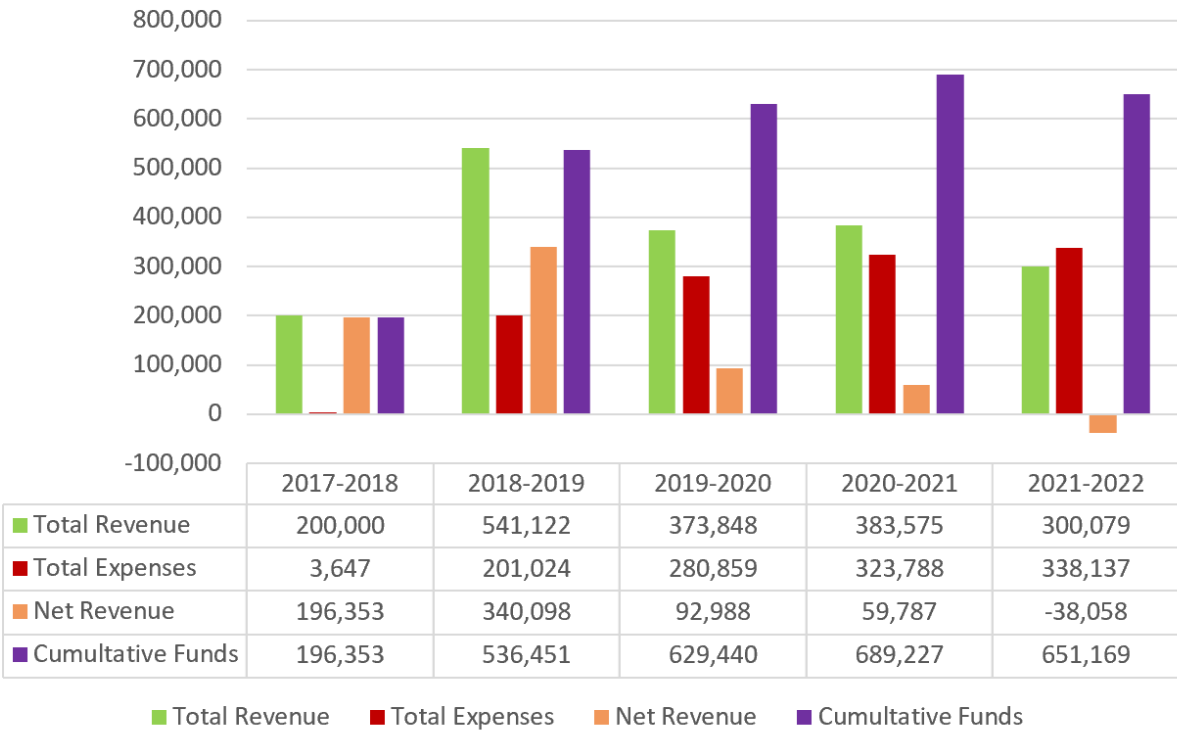The Advisory Board is comprised of:
- The institute's Co-Directors, plus
- Representatives from each of our Platinum and Gold level partnerships. Currently, including the Co-Directors, there are 11 members on the Advisory Board with representatives from: Blackberry, Bank of Montreal, General Motors, Loblaws, Magna, Manulife, Microsoft, Nutrien, and Scotiabank.

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6. FINANCES

The Waterloo AI Institute was launched in Fiscal Year (FY) 2018 with a commitment of $1.0M over 5 years, with the UW Provost contributing $100K per year, matched by $50K per year from both the Faculty of Mathematics and the Faculty of Engineering.

The Institute has been able to attract a total of $5.8M additional funding from industry (partner contributions) and government matching. The summary of the financial for the first 5 years of the Institute is shown in Table 6.1 below. Roughly 10% of the partner contributions ($635K) flowed directly to the Institute with the remainder supporting projects for AI applied research ($4.0M) and AI for social good ($1.1M).

Table 6.1 Revenues & Expenses FY 2018 - FY 2022

	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
Total Revenue	200,000	541,122	373,848	383,575	300,079
Total Expenses	3,647	201,024	280,859	323,788	338,137
Net Revenue	196,353	340,098	92,988	59,787	-38,058
Cumultative Funds	196,353	536,451	629,440	689,227	651,169

■ Total Revenue   ■ Total Expenses   ■ Net Revenue   ■ Cumultative Funds

The outlook for the next 5 years looks promising, starting with a carry forward of $651K along with a renewed commitment of $1.0M total from the Provost, the Faculty of Mathematics, and the Faculty of Engineering. These funds combined with the increasing number of partnership inquiries will create a financial runway that bodes well for an increased number of applied research and social good projects, as well as the investment in various strategic initiatives outlined in the previous sections (approximately $1.0M).

Table 6.2 below shows a combination of committed and a conservative estimate for projected partnership funds, which can be matched further with government funds in many instances.

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Beyond the overall revenues and expenses of the Institute, the overall industry and government funding for applied research and social good projects is projected to roughly double; we aim to attract a total of $12M in funding over the next 5 years.

Table 6.2 Projected Revenues & Expenses FY 2023 - FY 2027
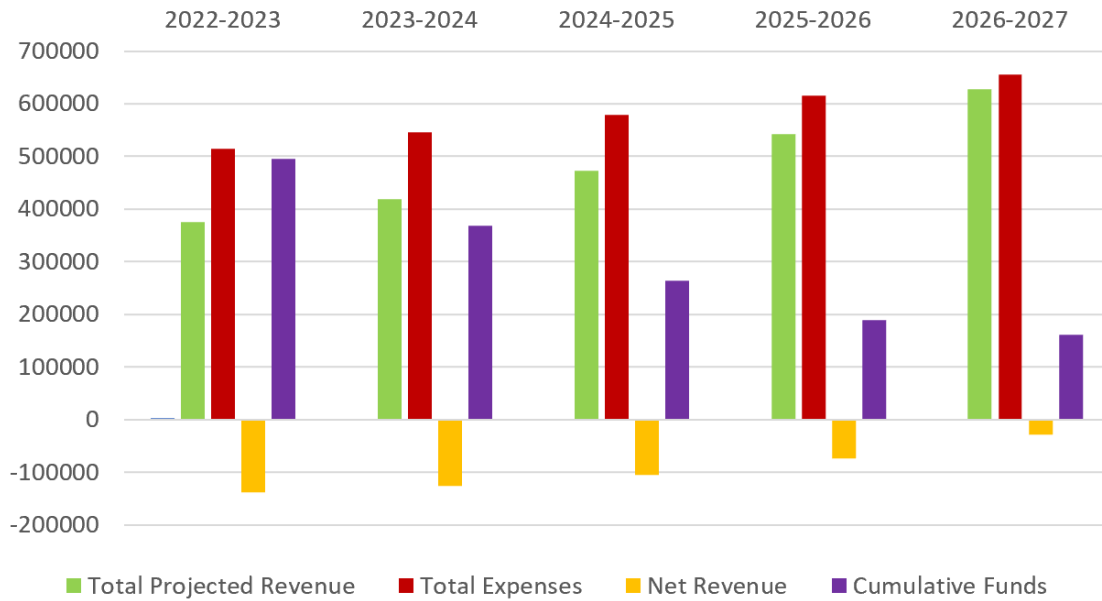
Further details of the projected revenues and expenses are detailed below:

Table 6.3 Projected Revenues & Expenses FY 2023 - FY 2027					
Period	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027
UW Funding	200,000	200,000	200,000	200,000	200,000
Projected Industry Partner Funds	175,000	218,750	273,438	341,797	427,246
Total Projected Revenue	375,000	418,750	473,438	541,797	627,246
Expenses					
Salaries & Benefits	279,270	289,001	299,121	309,646	320,591
Operations	40,000	44,000	48,400	53,240	58,564
Scholarships	20,000	20,000	20,000	20,000	20,000
Strategic Initiatives	175,000	192,500	211,750	232,925	256,218
Total Expenses	514,270	545,501	579,271	615,811	655,373
Net Revenue	-139,270	-126,751	-105,833	-74,014	-28,127
Cumulative Funds	495,730	368,979	263,146	189,132	161,005

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7. CLOSING

AI is transforming our world, and while there are many reasons to be optimistic about the future, there are challenges visible on the horizon as well. In these pages, we have outlined what we view to be the key issues moving forward and we have presented a coherent plan for how the Waterloo.AI Institute can seize emerging opportunities and address challenges associated with AI.

The University's Strategic Plan calls for developing talent for a complex future, advancing research for global impact, and strengthening sustainable and diverse communities. We see that data science and AI have central roles in all these themes, and the Waterloo AI Institute will be instrumental in achieving these goals. Building on the solid foundation that the Institute has laid down over the past 5 years, we are poised to help channel the powerful forces of innovation in data science and artificial intelligence to enhance the prosperity and well-being of humankind and position the University of Waterloo as a leading centre for AI research and learning.

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APPENDIX 1. Complete List of Institute Faculty
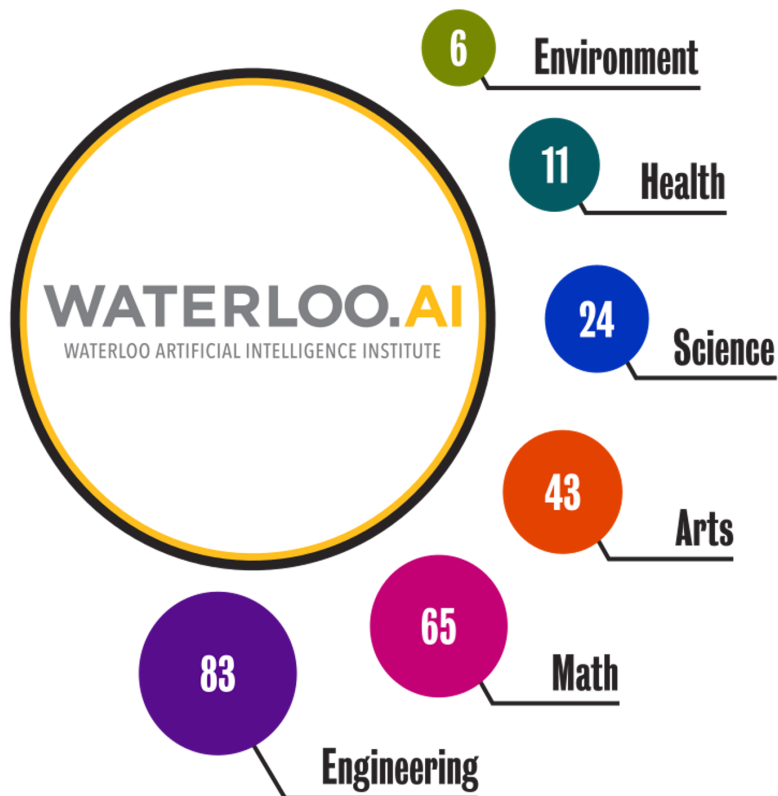
Faculty of Engineering

- Eihab Abdel-Rahman (Professor, Systems Design Engineering)
- Nasser Abukhdeir (Associate Professor, Chemical Engineering)
- Sibel Alumur Alev (Associate Professor, Management Sciences)
- Arash Arami (Assistant Professor, Mechanical and Mechatronics Engineering)
- Ali Ayub (Postdoctoral Research Fellow)
- Nasser Lashgarian Azad (Associate Professor, Systems Design Engineering)
- Otman Basir (Professor, Electrical and Computer Engineering)
- Philip Beesley (Professor, School of Architecture)
- Jennifer Boger (Systems Design Engineering)
- Hector Budman (Professor, Chemical Engineering)
- Catherine Burns (Professor, Systems Design Engineering)
- Zhongwei Chen (Professor and Tier 1 Canada Research Chair in Advanced Materials for Clean Energy, Chemical Engineering)
- David Clausi (Professor, Systems Design Engineering)
- Mark Crowley (Assistant Professor, Electrical and Computer Engineering)

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- Krzysztof Czarnecki (Professor, Electrical and Computer Engineering)
- Kerstin Dautenhahn (Professor, Electrical and Computer Engineering)
- Stan Dimitrov (Associate Professor, Management Sciences)
- Samir Elhedhli (Professor, Management Sciences)
- Baris Fidan (Associate Professor, Mechanical and Mechatronics Engineering)
- Paul Fieguth (Professor, Systems Design Engineering)
- Sebastian Fischmeister (Associate Professor, Electrical and Computer Engineering)
- Roydon Fraser (Professor, Mechanical and Mechatronics Engineering)
- Liping Fu (Professor, Civil and Environmental Engineering)
- Vijay Ganesh (Professor, Electrical and Computer Engineering)
- Vincent Gaudet (Professor, Electrical and Computer Engineering)
- Bissan Ghaddar (Adjunct Assistant Professor, Management Sciences)
- Saeed Ghadimi (Assistant Professor, Management Sciences)
- Moojan Ghafurian (Research Assistant Professor, Electrical and Computer Engineering)
- Lukasz Golab (Associate Professor, Management Sciences)
- Arie Gurfinkel (Associate Professor in Engineering)
- Fatma Gzara (Associate Professor, Management Sciences)
- Kaan Inal (Associate Professor, Mechanical and Mechatronics Engineering)
- Soo Jeon (Associate Professor, Mechanical and Mechatronics Engineering)
- Ning Jiang (Assistant Professor, Systems Design Engineering)
- Nachiket Kapre (Associate Professor, Electrical and Computer Engineering)
- Fakhri Karray (Professor, Electrical and Computer Engineering
- Amir Khajepour (Professor, Mechanical and Mechatronics Engineering)
- Behrad Khamesee (Professor, Mechanical and Mechatronics Engineering)
- Joyce Kim (Assistant Professor, Civil and Environmental Engineering)
- Na Young Kim (Associate Professor, Institute for Quantum Computing)
- Jonathan Kofman (Associate Professor, Systems Design Engineering)
- Dana Kulic (Associate Professor, Electrical and Computer Engineering)
- Hyock Ju Kwon (Associate Professor, Mechanical and Mechatronics Engineering)
- Yuning Li (Professor, Chemical Engineering)
- Juliane Mai (Research Assistant Professor, Civil and Environmental Engineering)
- Ravi Mazumdar (Professor, Electrical and Computer Engineering)
- John McPhee (Systems Design Engineering)
- Hossein Abouee Mehrizi (Associate Professor, Management Sciences)
- William Melek (Professor, Mechanical and Mechatronics Engineering)
- Katja Mombaur (Professor and Canada Excellence Research Chair in Human-Centred Robotics and Machine Intelligence, Mechanical and Mechatronics Engineering)
- Behzad Moshiri (Adjunct Professor, Electrical & Computer Engineering)
- Sriram Narasimhan (Professor, Civil and Environmental Engineering)
- Apurva Narayan (Adjunct Assistant Professor, Systems Design Engineering)
- Chrystopher L. Nehaniv (Professor, Systems Design Engineering)

- Yash Vardhan Pant (Assistant Professor, Electrical and Computer Engineering)
- Mehrdad Pirnia (Continuing Lecturer)
- Omar Ramahi (Professor, Electrical and Computer Engineering)
- Sirisha Rambhatla (Assistant Professor)
- Derek Rayside (Associate Professor, Electrical and Computer Engineering)
- Carolyn Ren (Professor, Mechanical and Mechatronics Engineering)
- Joe Naoum Sawaya (Adjunct Assistant Professor, Management Sciences)
- Oliver Schneider (Assistant Professor, Management Sciences)
- Javad Shafiee (Research Assistant Professor, Systems Design Engineering)
- George Shaker (Adjunct Assistant Professor, Electrical and Computer Engineering)
- Shady Shehata (Adjunct Assistant Professor, Electrical and Computer Engineering)
- John Simpson-Porco (Assistant Professor, Electrical and Computer Engineering)
- Stephen Smith (Associate Professor, Electrical and Computer Engineering)
- Mark Smucker (Associate Professor, Management Sciences)
- Hamid Tizhoosh (Professor, Systems Design Engineering)
- Bryan Tolson (Associate Professor, Civil and Environmental Engineering)
- Bryan Tripp (Associate Professor, Systems Design Engineering)
- Olga Vechtomova (Associate Professor, Management Sciences)
- Zhou Wang (Professor, Electrical and Computer Engineering)
- Andrew Wong (Distinguished Professor Emeritus)
- Alex Wong (Associate Professor, Systems Design Engineering)
- Yimin Wu (Assistant Professor, Mechanical and Mechatronics Engineering)
- John Yeow (Professor, Systems Design Engineering)
- Chul Min Yeum (Assistant Professor, Civil and Environmental Engineering)
- Alfred Yu (Electrical and Computer Engineering)
- Seyed Majid Zahedi (Assistant Professor, Electrical and Computer Engineering)
- John Zelek (Associate Professor, Systems Design Engineering)
- Qinqin Zhu (Assistant Professor, Chemical Engineering)
- Weihua Zhuang (Professor, Electrical and Computer Engineering)

Faculty of Math

- Omid Abari (Assistant Professor, School of Computer Science)
- Paulo Alencar (Adjunct Professor, School of Computer Science)
- Chris Bauch (Professor, Applied Mathematics)
- Peter van Beek (Professor, School of Computer Science)
- Shai Ben-David (Professor, School of Computer Science)
- Christian Boudreau (Research Associate Professor, Statistics and Actuarial Science)
- Raouf Boutaba (Professor, School of Computer Science)
- Yuri Boykov (Professor, School of Computer Science)
- Forbes Burkowski (Associate Professor Emeritus, School of Computer Science)

- Shoja'eddin Chenouri (Associate Professor, Statistics and Actuarial Science)
- Charles Clarke (Professor, School of Computer Science)
- Richard J Cook (Professor, Statistics and Actuarial Science)
- Gordon Cormack (Professor, School of Computer Science)
- Don Cowan (Distinguished Professor Emeritus, School of Computer Science)
- William Cowan (Professor, School of Computer Science)
- Khuzaima Daudjee (Research Associate Professor, School of Computer Science)
- Liqun Diao (Assistant Professor, Statistics and Actuarial Science)
- Joel Dubin (Associate Professor, Statistics and Actuarial Science)
- Ben Feng (Assistant Professor, Statistics and Actuarial Science)
- Peter Forsyth (Distinguished Professor Emeritus, School of Computer Science)
- Ricardo Fukasawa (Associate Professor, Combinatorics and Optimization)
- Ali Ghodsi (Professor, Statistics and Actuarial Science)
- Maura Grossman (Research Professor, School of Computer Science)
- Urs Hengartner (Associate Professor, School of Computer Science)
- Jesse Hoey (Associate Professor, School of Computer Science)
- Marius Hofert (Associate Professor, Statistics and Actuarial Science)
- Gautam C. Kamath (Assistant Professor, School of Computer Science)
- Lila Kari (Professor, School of Computer Science)
- Martin Karsten (Associate Professor, School of Computer Science)
- Achim Kempf (Professor, Applied Mathematics)
- Mohammad Kohandel (Associate Professor, Applied Mathematics)
- George Labahn (Professor, School of Computer Science)
- Kate Larson (Professor, School of Computer Science)
- Edith Law (Assistant Professor, School of Computer Science)
- Yuying Li (Professor, School of Computer Science)
- Ming Li (Professor, School of Computer Science)
- Jimmy Lin (Professor, School of Computer Science and Co-Director, Waterloo.ai)
- Jun Liu (Associate Professor, Applied Mathematics)
- Martin Lysy (Associate Professor, Statistics and Actuarial Science)
- Bin Ma (Professor, School of Computer Science)
- Riley Metzger (Lecturer, Statistics and Actuarial Science)
- Kirsten Morris (Professor, Applied Mathematics)
- Mei Nagappan (Assistant Professor, School of Computer Science)
- Jeff Orchard (Associate Professor, School of Computer Science)
- Pascal Poupart (Professor, School of Computer Science)
- Matthias Schonlau (Professor, Statistics and Actuarial Science)
- Hans De Sterck (Professor, Applied Mathematics)
- Chengnian Sun (Assistant Professor, School of Computer Science)
- Chaitanya Swamy (Professor, Combinatorics & Optimization)
- Ken Seng Tan (Professor, Statistics and Actuarial Science)

- Stephen Vavasis (Professor, Combinatorics & Optimization)
- Olga Veksler (Professor, School of Computer Science)
- Daniel Vogel (Associate Professor, School of Computer Science)
- Michael Wallace (Assistant Professor, Statistics and Actuarial Science)
- Justin Wan (Professor, School of Computer Science)
- Ruodu Wang (Associate Professor, Statistics and Actuarial Science)
- Stephen Watt (Professor, School of Computer Science)
- Pengyu Wei (Statistics and Actuarial Science)
- Chengguo Weng (Associate Professor, Statistics and Actuarial Science)
- Tony Wirjanto (Professor, Statistics and Actuarial Science)
- Henry Wolkowicz (Professor, Combinatorics & Optimization)
- Yaoliang Yu (Assistant Professor, School of Computer Science)
- Hongyang Zhang (Assistant Professor, School of Computer Science)
- Jian Zhao (Assistant Professor, School of Computer Science)
- Mu Zhu (Professor, Statistics and Actuarial Science)

Faculty of Arts

- Greg Andres (Lecturer, Philosophy)
- Joel Blit (Associate Professor, Economics)
- Efrim Boritz (Professor, School of Accounting and Finance)
- Tao Chen (Associate Professor, Economics)
- Phil Curry (Associate Professor, Economics)
- Hsiao D'Ailly (Associate Professor, Social Development Studies)
- Mathieu Doucet (Associate Professor, Philosophy)
- Chris Eliasmith (Professor, Philosophy)
- Colin Ellard (Professor, Psychology)
- Anna Esselment (Associate Professor, Political Science)
- Carla Fehr (Associate Professor, Philosophy)
- Craig Fortier (Assistant Professor, Social Development Studies)
- Doreen Fraser (Associate Professor, Philosophy)
- Igor Grossmann (Associate Professor, Psychology)
- Randy Harris (Professor, English Language and Literature)
- Paul Heidebrecht (Adjunct Assistant Professor, Peace and Conflict Studies)
- Goetz Hoeppe (Associate Professor, Anthropology)
- Alan Huang (Associate Professor, School of Accounting and Finance)
- Svetlana Kaminskaia (Associate Professor, French Studies)
- Alexander Lanoszka (Assistant Professor, Political Science)
- Jennifer Liu (Associate Professor, Anthropology)
- Kristina Llewellyn (Associate Professor, Social Development Studies)
- Patricia Marino (Professor, Philosophy)

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- John McLevey (Assistant Professor, Sociology and Legal Studies)
- Ashley Mehlenbacher (Assistant Professor, English Language and Literature)
- Teferi Mergo (Adjunct Assistant Professor, Economics)
- Ian Milligan (Associate Professor, History)
- Bessma Momani (Professor, Political Science)
- Lennart Nacke (Associate Professor, Communication Arts)
- Marcel O'Gorman (Professor, English Language and Literature)
- Mikko Packalen (Associate Professor, Economics)
- Neil Randall (Associate Professor, English Language and Literature)
- Evan Risko (Associate Professor, Psychology)
- Horatiu Rus (Associate Professor, Economics)
- Julia Seirlis (Lecturer, International Development, Indigenous Studies, and Human Rights)
- Anindya Sen (Professor, Economics)
- James Skidmore (Associate Professor, Germanic & Slavic Studies)
- Theo Stratopoulos (Associate Professor, School of Accounting and Finance)
- Paul Thagard (Professor Emeritus, Philosophy)
- Jessica Thompson (Assistant Professor, Stratford School of Interaction Design and Business)
- Jane Tingley (Assistant Professor, Stratford School of Interaction Design and Business)
- Ken Vetzal (Associate Professor, School of Accounting and Finance)
- Jennifer Whitson (Assistant Professor, Stratford School of Interaction Design and Business)

Faculty of Science

- Trevor Charles (Professor, Biology)
- Jeff Chen (Professor, Physics and Astronomy)
- Kyung Choi (Assistant Professor, Physics and Astronomy)
- Kim Cuddington (Associate Professor, Biology)
- Andrew Doxey (Associate Professor, Biology)
- Scott Hopkins (Associate Professor, Chemistry)
- Subha Kalyaanamoorthy (Assistant Professor, Chemistry)
- Vassili Karanassios (Professor, Chemistry)
- Vasudevan Lakshminarayanan (Professor, Optometry & Vision Science)
- Brendan McConkey (Associate Professor, Biology)
- Terrance McMahon (Professor, Chemistry)
- Roger Melko (Professor, Physics and Astronomy)
- Josh D. Neufeld (Professor, Biology)
- Marcel Nooijen (Professor, Chemistry)
- Janusz Pawliszyn (Professor, Chemistry)
- Evan Risko (Associate Professor, Psychology)

- Martin Ross (Associate Professor, Earth and Environmental Sciences)
- Pierre-Nicholas Roy (Professor, Chemistry)
- Derek Schipper (Assistant Professor, Chemistry)
- Rodney Smith (Assistant Professor, Chemistry)
- Shirley Tang (Professor, Chemistry)
- Andre Unger (Associate Professor, Earth and Environmental Sciences)
- Stan Woo (Professor, Optometry & Vision Science)
- David Yevick (Professor, Physics and Astronomy)

Faculty of Health

- Zahid A. Butt (Assistant Professor, School of Public Health and Health Systems)
- Ashok Chaurasia (Assistant Professor, School of Public Health and Health Systems)
- Helen Chen (Professor of Practice, School of Public Health and Health Systems)
- John Hirdes (Professor, School of Public Health and Health Systems)
- Sharon Kirkpatrick (Associate Professor, School of Public Health and Health Systems)
- Irene Lambraki (Postdoctoral Fellow, Assistant Professor Adjunct)
- Scott Leatherdale (Associate Professor, School of Public Health and Health Systems)
- Laura Middleton (Associate Professor, Kinesiology)
- Plinio Morita (Assistant Professor, School of Public Health and Health Systems)
- Paul Stolee (Professor, School of Public Health and Health Systems)
- Jim Wallace (Associate Professor, School of Public Health and Health Systems)

Faculty of Environment

- Christopher Fletcher (Associate Professor, Geography and Environmental Management)
- Peter Johnson (Associate Professor, Geography and Environmental Management)
- Jonathan Li (Professor, Geography and Environmental Management)
- Zhao Pan (Assistant Professor, Mechanical and Mechatronics Engineering)
- Olaf Weber (Professor and University Research Chair in Sustainable Finance, School of Environment, Enterprise and Development)
- Nancy Worth (Assistant Professor, Geography and Environmental Management)

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APPENDIX 2. Complete List of External Partners

Waterloo.AI Partners	
Anaergia	
BlackBerry	
Bank of Montreal (BMO)	
Borealis AI	
Chubb	
Electronic and Telecommunications Research Institute (ETRI)	
General Motors	
Huawei	
Intact Insurance	
Loblaw Companies Ltd.	
Magna	
Manulife Insurance	
Microsoft	
Musashi AI	
Naver Labs - Europe	
Nexxt Intelligence	
Nutrien	
Pinterest	
Primal	
Rogers	
Scotiabank	
Scribendi	
YOURIKA	

APPENDIX 3. Complete List of Institute Projects

AI Applied Research Projects

1. Versatile Deep Learning Based Application for Time Series Imputation to Improve Forecasting
2. Incremental Progressive Machine Learning Model
3. Recent Progress in Continual Learning: Achievements, Challenges and Future Directions
4. Factor Investing and Machine Learning: A Canadian Market Application
5. Adapting Neuroscience Methods to Explain Deep Network Function
6. Pre-and-Post-Release Bug Prediction
7. Incremental Progressive Machine Learning Model
8. General federated learning and/or graph learning
9. AI Tools for Supply Chain
10. Learning fine-grained latent representations of meaning for natural language understanding
11. Predicting Disability Claims
12. AI Driven Methods and Imaging Systems for Agriculture Intelligence
13. Flexible Mineveyor Project
14. Adaptive Robotic Soil Sampling
15. Sense and Sentiments: Public Goods Provision and Political Stability
16. Bayesian Deep Reinforcement Learning and Optimization in Game Theoretic Problems
17. Machine Learning for Financial Services
18. Structured Semantic Embeddings
19. Grammatical Error Correction with Constrained Generation by Metropolis-Hastings Sampling
20. Concept Networks and Preference-based Offline Reinforcement Learning for Automated Editing
21. Data Driven Constraint Generation for Behavioural Planning in Autonomous Vehicles
22. Multimodal Representational Learning
23. Optimization of Waste-to-Resource Plants with Machine Learning and Multi-Objective Reinforcement Learning
24. Reinforcement Learning for Non-Myopic and Non-Stationary Real Time Bidding in Digital Marketing
25. Towards Question Answering in the Insurance Domain

AI for Social Good Projects

1. Emotion Discovery for Autistic Individuals
2. AI for Mortality Prediction
3. Machine Learning to Improve Projections of Earth's future climate
4. Explainable and Actionable AI for Identifying and Predicting Homelessness
5. Multilingual Adaptation for NER in the Social Sciences
6. AI for Autonomous Human Monitoring and Activity Recognition for Safety and Health Improvement
7. Hybrid Neural-Physical Models for Streamflow Prediction
8. Machine Learning Analysis of Locus and Barriers to Innovation
9. Wearables for Elderly Parkinson's Patients
10. Wildfire Management: Disaster Response and Climate Change
11. Physiologically Based Engagement Optimization
12. Aging and Health such as Fall Detection
13. Fairness, Interpretability and Learning under Data Drift
14. Using Deep Learning to Advance our Understanding of Dietary Patterns and Their Implication for Health and Health Equity
15. AI for Heart Failure Diagnosis and Management
16. Generative Adversarial Networks to Enable Low-Dose PET
17. Machine Learning for Optimal Material Design in CO_2 Capture
18. A Probabilistic Deep Learning Model to Project the Location and Timing of Future Big Wildfires
19. Employment that Cares: Leveraging AI to enhance job matches for family caregivers and potential employers
20. AI-Assisted Design of Adaptive Neurofeedback Games for Autistic Children
21. Automatic Identification of Algae using Deep Learning

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APPENDIX 4. Co-Directors of Waterloo.AI

The Waterloo AI Institute was founded in 2017 under the leadership of Drs. Peter Van Beek from the Faculty of Math and Fakhri Karray from the Faculty of Engineering, both of whom served as the Founding Co-Directors from 2017-2021.

Dr. Peter Van Beek, Professor and Founding Co-Director of Waterloo.AI

Peter is a Professor in the Cheriton School of Computer Science at the University of Waterloo. He received his PhD in 1990 from the University of Waterloo and at that time joined the faculty at the University of Alberta. Ten years later he returned to Waterloo. His research interests span the field of Artificial Intelligence with a focus on representation and reasoning, constraint programming, constraint satisfaction, and applied machine learning. He has co-authored seven research papers which have won awards, and has served on the program committees of many conferences and on the editorial boards of several journals. From 2005-2009,he was the Editor-in-Chief of the journal Constraints, a forum for research in constraint programming and constraint satisfaction and optimization. In 2008, he was named a Fellow of the Association for the Advancement of Artificial Intelligence (AAAI), and again in 2019, named a Fellow of the Canadian Artificial Intelligence Association (CAIAC).

Dr. Fakhri Karray, Professor and Founding Co-Director of Waterloo.AI

Fakhri is the Loblaws Research Chair Professor in Artificial Intelligence in the department of Electrical and Computer Engineering at University of Waterloo. He is a Fellow of the IEEE, a Fellow of the Canadian Academy of Engineering, a Fellow of the Engineering Institute of Canada, Fellow of the Kavli Frontiers of Science, and a Fellow at the Balsillie School of International Affairs. He served as a Distinguished Lecturer for the IEEE and is a Fellow of the Kavli Frontiers of Science.

Fakhri Is the Associate Editor of IEEE Access, Springer's Information Fusion, the IEEE Transactions on Cybernetics, the IEEE Transactions on Neural Networks and Learning Systems, and served as an AE for the IEEE Transactions on Mechatronics, the IEEE Computational Intelligence Magazine.

Recent work of Fakhri and his research team's work on deep learning-based driver behaviour recognition and prediction has been featured on The Washington Post, Wired Magazine, Globe and Mail, CBC radio and Canada's Discovery Channel.

He is the Co-founder and Chief Scientist of Yourika.ai and Serves on the advisory board of Victory Square Technologies Inc. and Shomei Inc, as well as the President of the Association for Image and Machine Intelligence. His education includes 1984, Ing. Dip

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(M.Sc), Electrical Engineering, Universite de Tunis, Ecole Nationale d'Ingnieurs, and 1989, Doctorate, Systems and Control, University of Illinois at Urbana-Champaign.

During the Spring of 2021, Co-Directors Drs. Jimmy Lin and Vijay Ganesh from the Faculties of Math and Engineering respectfully took over the leadership of Waterloo.AI for a 3-year term.

Dr. Jimmy Lin, Professor and Co-Director of Waterloo.AI
Professor Jimmy Lin holds the David R. Cheriton Chair in the David R. Cheriton School of Computer Science at the University of Waterloo. For a quarter of a century, Lin's research has been driven by the quest to develop methods and build tools that connect users to relevant information. His work mostly lies at the intersection of information retrieval and natural language processing, with a focus on two fundamental challenges, those of understanding and scale.

Dr. Vijay Ganesh, Associate Professor and Co-Director of Waterloo.AI
Dr. Vijay Ganesh is an associate professor at the University of Waterloo and the Co-Director of the Waterloo Artificial Intelligence Institute. Prior to joining Waterloo in 2012, he was a research scientist at MIT (2007-2012) and completed his PhD in computer science from Stanford in 2007. Vijay's primary area of research is the theory and practice of SAT/SMT solvers aimed at AI, software engineering, security, mathematics, and physics. In this context he has led the development of many SAT/SMT solvers, most notably, STP, Z3 string, MapleSAT, and MathCheck. He has also proved several decidability and complexity results in the context of first-order theories. He has won over 25 awards, honors, and medals to-date for his research, including an ACM Impact Paper Award at ISSTA 2019, ACM Test of Time Award at CCS 2016, and a Ten-Year Most Influential Paper citation at DATE 2008. He is the Editor-in-Chief of the Springer book series "Progress in Computer Science and Applied Logic" (PCSAL) and has co-chaired many conferences, workshops, and seminars including a Simons Institute semester @ Berkeley on Boolean Satisfiability in 2021.

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APPENDIX 5. Letters of Support

See below for letters of support from the following:

- Dr. Mary Wells, Dean, Faculty of Engineering
- Dr. Mark Giesbrecht, Dean, Faculty of Mathematics
- Dr. Bob Lemieux, Dean, Faculty of Science
- Dr. Jean Andrey, Dean, Faculty of Environment
- Dr. Douglas Peers, Dean, Faculty of Arts
- Dr. Lili Liu, Dean, Faculty of Public Health
- Dr. Sushanta Mitra, Executive Director, Waterloo Institute for Nanotechnology
- Dr. N. Asokan, Executive Director, Waterloo Cybersecurity and Privacy Institute
- Dr. Suzanne Kearns, Founding Director, Waterloo Institute for Sustainable Aeronautics
- Dr. Ann Fitz-Gerald, Director, Balsillie School of International Affairs

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UNIVERSITY OF WATERLOO

FACULTY OF ENGINEERING | Office of the Dean
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April 4, 2022

Senate Graduate and Research Council
University of Waterloo

Re: Letter of Support for the renewal of the Waterloo Artificial Intelligence Institute Agreement

Dear SGRC,

The Faculty of Engineering enthusiastically supports renewing our agreement with the Waterloo Artificial Intelligence Institute (Waterloo.AI) in partnership with the Faculty of Mathematics.

Artificial Intelligence (AI) is the notion of machines that exhibit intelligence and mimic cognitive functions that are usually associated with humans, such as learning, reasoning, predicting, planning, recognizing, and problem solving. With the advent of big data driven by the explosion of computing capacity and speed, AI tools are being increasingly integrated in technological solutions that are central to our everyday life, business, society and the environment.

The Waterloo Artificial Intelligence Institute is dedicated to fostering and promoting research in all aspects of artificial intelligence (AI) and machine learning (ML). Waterloo.AI's membership exceeds 200 faculty members and their research associates, over 250 graduate students spanning all six of the faculties at the University of Waterloo in more than 35 departments and schools. Our researchers tackle many of the most challenging problems in foundational and applied AI and ML, including its social, ethical, and policy implications.

Our continued vision through the Waterloo.AI is to build on the outstanding reputation of the University of Waterloo and its strong history of entrepreneurship and partnership. Waterloo.AI holds a unique position in advancing the research frontiers and effective delivery of AI innovation for non-profits and businesses.

Waterloo.AI plays a vital role in shaping the way we work, travel, treat disease, communicate, and learn through our focus on key technologies and harnessing foundational breakthroughs to make them a reality to help everyone, everywhere.

Engineering is committing $50K/year for another five years to continue our partnership and support of Waterloo.AI.

We are confident that Waterloo.AI will accelerate in visibility and recognition in AI and ML which in turn will generate additional external research funding to expand research activities and graduate student support.

Yours very truly,

Mary Wells

Mary Wells, Dean
Faculty of Engineering

E7-7302, 200 UNIVERSITY AVENUE WEST, WATERLOO, ON, CANADA N2L 3G1

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UNIVERSITY OF WATERLOO

March 15, 2022

James Rush
Vice President, Academic and Provost

Re: Support of the Waterloo Artificial Intelligence Institute

Dear Professor Rush,

The Faculty of Mathematics enthusiastically requests the Senate Graduate & Research approval the renewal of the Waterloo Artificial Intelligence Institute (WAII) in partnership with the Faculty of Engineering.

Artificial Intelligence (AI) is a core computer science discipline represented in the Faculty of Mathematics by strong research groups in the David R. Cheriton School of Computer Science (e.g., the AI and the Machine Learning research groups), in the Department of Statistics and Actuarial Science (e.g., classification, pattern recognition, statistical learning, stochastic process models and inference, time series), and the Combinatorics and Optimization department (e.g., discrete and continuous optimization, operations research, algorithmic game theory, etc.). Altogether 65 faculty in Mathematics are members of the WAII including CRC, URC and IRC holders, and contribute their expertise to developing and extending both the foundations of AI, Machine Learning and Data Science, as well as their applications across many verticals (e.g., health, energy, environment, water, manufacturing, etc.). Our researchers engage in extensive multi-disciplinary work with researchers in other faculties, who apply AI to create new technologies or investigate new application domains. The Waterloo AI Institute has developed into a vibrant hub for exciting collaborative opportunities and partnerships that is essential to maintain our leadership in Canada, improving our world ranking in this key area, and better positioning Waterloo for industrial partnerships, governmental programs and enhanced knowledge mobilization.

WAII's plan to expand to encompass Data Science more broadly is essential to its future growth and success. This will include transformative areas such as Data Systems, Data Driven Healthcare, Financial Technologies and Risk, and Climate Modelling, and many exceptional researchers in Math and across the UW where we are truly world-leading.

Mathematics is again committing $50K/year for five years as a contribution towards the operations of the Waterloo AI Institute. We expect that the institute's activities will continue to create opportunities for cross-faculty collaborations, for the researchers to work in the industry, and for generating external research funding from industry and government at both the provincial and federal levels. I strongly encourage the Council to recommend the renewal of the Waterloo Artificial Intelligence Institute.

Yours truly,

Mark Giesbrecht
Dean, Faculty of Mathematics
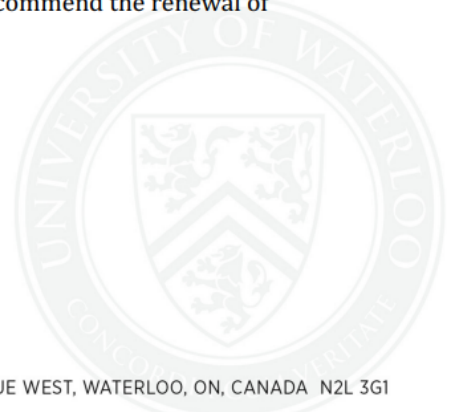
200 UNIVERSITY AVENUE WEST, WATERLOO, ON, CANADA N2L 3G1

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March 23, 2022

Dr. Charmaine Dean
Vice-President, Research & International
University if Waterloo

Dear Charmaine:

It gives me great pleasure in writing this strong letter of support to accompany the renewal application of the Waterloo Artificial Intelligence Institute (Waterloo.AI). From its inception in 2018 to today, Waterloo.AI has grown to be one of the largest and most vibrant institutes on campus, providing vital support to our faculty members who do cross-disciplinary research in AI.

As you are well aware, AI is one of the strategic priorities for the University, and there is considerable research at the intersection of AI and Science happening at the University. The Waterloo.AI Institute has provided support to the Faculty of Science in the form of funding from industry partners, organizing workshops (e.g., the recently concluded "AI for Science" 2022 workshop), help facilitate partnerships with other universities such University of Bordeaux, and enabled interactions between our faculty members and colleagues in Math, Engineering, and other faculties who are interested in AI. Further, we are very supportive of the proposed collaborative program in AI, as well as online training in AI via WatSpeed, initiatives being led by Waterloo.AI.

Overall, my colleagues and I at the Faculty of Science have benefitted greatly thanks to the excellent work done by the Waterloo.AI Institute and hence we strongly support their renewal. We wish Waterloo.AI continued success in all their endeavours going forward.

Sincerely,

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

![University of Waterloo logo]

March 31, 2022

Dr. Charmaine Dean
VP Research & International
University of Waterloo

Dear Dr. Dean,

I am pleased to provide this letter of support to accompany the renewal application of the Waterloo Artificial Intelligence Institute (Waterloo.AI). From its inception in 2018 to today, Waterloo.AI has grown to be one of the largest and most vibrant institutes on campus, providing support to faculty members and students who do cross-disciplinary research in AI.

As you are well aware, AI is a strategic priority for the University, and there is considerable research at the intersection of AI and Environmental Sciences happening at the University. The Waterloo.AI Institute has provided support to the Faculty of Environment in the form of funding from industry partners, organizing AI workshops, and as a facilitator of interactions between our members and colleagues in Math and Engineering. In addition, one of our students recently received scholarship support for his work in the field of geomatics, which is a core strength of the Geography department.

Further, we are supportive of the proposed collaborative program in AI as well as online training in AI via WatSpeed initiatives being led by Waterloo.AI. Overall, my colleagues and I at the Faculty of Environment benefit from the excellent work done by the Waterloo.AI Institute and hence we strongly support their renewal. We wish Waterloo.AI continued success in all their endeavours going forward.

Sincerely,

Dr. Jean Andrey
Dean, Faculty of Environment
University of Waterloo
200 University Avenue West
Waterloo, ON, N2L 3G1
jandrey@uwaterloo.ca
519-504-7985

4 April 2022

Professor Charmaine Dean
VP Research and International
University of Waterloo

Re: Renewal of the Waterloo Artificial Intelligence Institute (Waterloo. AI)

Dear Professor Dean,

I write to express my strong support for the renewal of the Waterloo Artificial Intelligence (AI). The AI institute promotes research in artificial intelligence and machine learning emphasizing an interdisciplinary approach. AI members tackle foundational and applied problems in artificial intelligence, including its social, ethical, and policy implications. For the next five years, the AI institute intends to maintain its strong commitment to AI technologies being developed in a responsible manner, with inclusion of equity, and governance mechanisms that ensure public trust in AI. The Faculty of Arts wholeheartedly supports this endeavour.
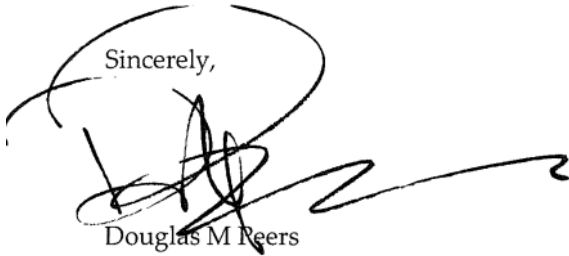
The Faculty of Arts is broadly represented in the AI institute by 43 researchers from 13 different departments and two schools (School of Accounting and Finances and the Stratford School of Interaction Design and Business). Professors Ian Milligan (History) and Joel Blit (Economics) have undertaken projects partially sponsored through the *AI For Social Good* initiative undertaken by the AI and Microsoft. Professor Milligan's project, co-authored with Jimmy Lin (Computer Sciences) - will improve the efficiency of Named Entity Recognition (NER), which has wide application within Social Sciences. Professor Blit's project – coauthored with Mikko Packalen (Economics) - will apply AI algorithms that summarize the complex information in patents to develop a technology space that accelerates our understanding of innovation. Further two students, Qi Tang (PhD, School of Accounting and finances) and Natalie Heisler (MA, Political Science)

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have benefited from a $5,000 scholarship from the institute to pursue interdisciplinary research in AI.

I look forward to the continued growth of the Waterloo AI institute and its ongoing collaboration with the Faculty of Arts.

Sincerely,

Douglas M Peers
Acting Dean, Faculty of Arts

Cc: Professor Ana Ferrer, Associate Dean Research, Faculty of Arts
  Professor Jimmy Lin and Professor Vijay Ganesh, Co-Directors AI

UNIVERSITY OF WATERLOO

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April 4, 2022

Professor Charmaine Dean
Vice-President, Research & International
University of Waterloo

Re: Renewal of the Waterloo Artificial Intelligence Institute (Waterloo.AI)

Dear Prof. Dean,

I am pleased to provide this letter to express my strong support for the renewal of the Waterloo Artificial Intelligence Institute (Waterloo.AI) at the University of Waterloo. The Waterloo AI Institute has been actively promoting interdisciplinary collaboration and supporting AI in health research across faculties on campus, and researchers and students at the Faculty of Health have benefited from the collaboration, computing resources and training opportunities facilitated by Waterloo.AI.

Through the recent pandemic, the world has seen how critical it is to identify a public health crisis before it can take hold in global populations. AI-powered technologies hold particular promise in public and population health, with the potential to radically revolutionize precision public health, shifting the focus from the individual to populations, to deliver "the right intervention at the right time, every time to the right population." AI methods can further contribute to population health to improve health and health equity in rural, vulnerable and first nations populations. The field requires professionals from AI and health fields to be trained and work in an interdisciplinary environment.

Waterloo AI Institute has been actively engaging researchers in the application of AI to public and population health. Through the Institute's seminars, podcasts, and other ideation events, UW AI researchers from different faculties and disciplines have a greater awareness of the Faculty of Health's research needs and strengths in AI for public and population health. It also played an important role in fostering partnership in AI for health fields. In past few years, the AI institute connected Faculty of Health researchers with government agencies and industry research team to identify common research interests in information and emergent disease surveillance and mental health research. In addition, the computing credits provided by the AI institute have been a timely and helpful resource for Faculty of Health researchers to train large AI models using health data to understand health texts and social media data in Digital Intelligence for health communities in the Faculty of Health.

The Faculty of Health and Waterloo.AI share the common goal of strengthening Waterloo's core competency in AI for health ranging from research collaboration and professional training opportunities. Waterloo.AI's communication platform and seed funding opportunities are very beneficial for initiating meaningful AI-Health research collaboration. Such collaboration is vital to building the competency and capacity necessary to fully utilize health data to generate insights and meaningful AI models that solve public and population health problems.

We believe AI is an important tool in health studies and Faculty of Health plans to enhance AI for health research and train our students with better AI skills to best utilize big data and generate data-based insights, innovations and interventions.

I fully support the renewal of Waterloo.AI. The Faculty of Health is looking forward to strengthening our relationship with Waterloo.AI, and bringing greater awareness of the institute's activities for our faculties and students to take full advantage of the opportunities offered by Waterloo.AI in the years to come!

Sincerely,

Lili Liu, Ph.D.
Dean of Health
University of Waterloo

Cc: Helen Chen, School of Public Health Sciences,
Vijay Ganesh, Director, Waterloo.AI,
Harold Godwin, Managing Director, Waterloo.AI,
Jimmy Lin, Co-Director, Waterloo.AI

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Friday 1 April 2022
Professor Charmaine Dean
Vice-President, Research & International
University of Waterloo

RE: Renewal of the Waterloo Artificial Intelligence Institute (Waterloo.AI)

Dear Charmaine,

It is with great pleasure that I write this letter of support for the renewal of the Waterloo Artificial Intelligence Institute (Waterloo.AI) at the University of Waterloo. Since its inception in 2018, Waterloo.AI has been dedicated to fostering and promoting research in all aspects of artificial intelligence (AI) and machine learning (ML), working to solving many scientific, social and ethical challenges we face today.

The Waterloo Institute for Nanotechnology (WIN) and Waterloo.AI share many important objectives with similar mandates – to become leading centres of excellence worldwide in our respective fields, partnering with the best institutions nationally and internationally, and recognizing the importance of interdisciplinary research in today's climate to tackle increasingly complex problems. In my opinion, Waterloo.AI has been doing an excellent job in achieving these goals, creating a community to foster new ideas and support new partnerships in this very prominent field.

Nanotechnology and AI research go hand-in-hand, with over 20 WIN faculty also members of Waterloo.AI. This is not surprising with the considerable overlap of the two disciplines; AI has direct applications in all four key theme research areas of WIN – smart & functional materials, connected devices, next generation energy systems, and therapeutics & theranostics. These applications are transforming our daily lives in countless ways, in how we work, travel, communicate, and how we treat disease. In fact, the use of AI and ML is becoming increasingly more popular and an important tool in materials science, chemical synthesis and characterization, creating a new paradigm in materials discovery and optimization. AI/ML can facilitate and improve current data analysis, knowledge extraction and experiment-selection techniques.

In January 2022, WIN and Waterloo.AI joined forces to host a virtual workshop in AI for Scientific and Engineering applications, which also featured many prominent researchers from the University of Bordeaux (UB). The main goal of the workshop was to bring together strong teams for joint UW-UB research projects in this space, and provide seed-funding to kickstart collaborations. This collaboration is timely, as the French government is developing a federal funding program titled "Discovery Acceleration for the Deployment of Emerging Materials" (DIADEM) with an envelope of several million Euros. It is set for launch in 2024, and we expect many of the joint UW-UB collaborators to apply. Such opportunities would not have been available to our researchers without such partnership-building activities.

QNC 3606, 200 UNIVERSITY AVENUE WEST, WATERLOO, ON, CANADA N2L 3G1

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The future of Waterloo.AI is very promising, and WIN looks forward to strengthening our relationships with the institute and its members to capitalize on the upcoming opportunities in this exciting, and rapidly growing area of research and development. Under the leadership of Co-Directors Professors Vijay Ganesh and Jimmy Lin, Waterloo.AI is continuing to expand its impact and outreach, and with this momentum, I know the institute will continue to flourish over the next term.

I strongly support the renewal of Waterloo.AI and I wish the Institute continued and ongoing success in the years to come!

Sincerely,

Dr. Sushanta Mitra, PEng
FASME, FCSME, FEIC, FCAE, FINAE, FNASI, FRSC, FAPS, FAAAS
Executive Director, Waterloo Institute for Nanotechnology
Professor, Mechanical & Mechatronics Engineering
Professor, Chemical Engineering (Cross-Appointed)
Professor, Electrical & Computer Engineering (Cross-Appointed)
Professor, Physics & Astronomy (Cross-Appointed)
Professor, Chemistry (Cross-Appointed)

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27 March 2022

Dr. Charmaine Dean,

Vice-President, Research & International

University of Waterloo

Dear Charmaine,

I am delighted to write this letter to express my strong support for the renewal of the Waterloo Artificial Intelligence Institute (Waterloo.AI). I became aware of Waterloo.AI shortly after my arrival at Waterloo in 2019. I was invited to participate in their industry events twice. Since you appointed me as the Executive Director of Waterloo Cybersecurity and Privacy Institute (CPI) last year, I have met with Waterloo.AI's directors several times to find ways in which both institutes can productively collaborate.

As you well know, both AI and cybersecurity/privacy are strategic priorities for the university. Both themes are changing the face of every type of human activity. Several UWaterloo academics are members of both institutes and some of them, me included, are actively working in topics that lie at the intersection of AI and cybersecurity/privacy. On the one hand, AI can revolutionize cybersecurity/privacy techniques and solutions just as it is doing in many other fields. Detecting intrusions or malware, making user authentication mechanisms easy and intuitive, or efficiently identifying potential vulnerabilities in software and hardware systems are some of the examples of this type of work. On the other hand, a pre-requisite for engendering trust in AI-based solutions is to understand and improve security and privacy concerns that are inherent in AI-based systems. Preventing leakage of sensitive information from AI models, or disincentivizing bad actors from trying to "steal" AI models are examples of this type of work. Research collaboration between the two institutes is already being spearheaded by members who work in themes like the ones listed above.

Both institutes are also engaged in revitalizing training in the respective areas. Waterloo.AI is involved in several joint activities with WatSPEED. CPI and WatSPEED collaborated in a training proposal currently under submission to the National Cybersecurity Consortium (NCC). Although Waterloo.AI and CPI have not yet directly collaborated on training, individual faculty members are already developing training initiatives that touch both areas, such as a graduate research

200 UNIVERSITY AVENUE WEST, WATERLOO, ON, CANADA N2L 3G1

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seminar (CS 858) running right now. I see the potential for both institutes to collaborate further in training by leveraging on their respective collaborations with WatSPEED as well as by building on existing courses in a bottom-up manner.

Both Waterloo.AI and CPI are up for renewal shortly. I strongly believe that tighter collaboration between the two institutes is both necessary and mutually rewarding for both institutes, leading up to their respective renewals and during the post-renewal phase. Therefore, I strongly support the renewal of Waterloo.AI without any reservations, and look forward to closer collaboration between the two institutes.

Sincerely,

N. Asokan

Professor and David R. Cheriton Chair
E-mail: nasokan@uwaterloo.ca

Web: https://asokan.org/asokan
Twitter: @nasokan

Executive Director, CPI
E-mail: ecpi@uwaterloo.ca
Assistant: contact-cpi@uwaterloo.ca
Web: https://cpi.uwaterloo.ca/
Twitter: @UWaterloo_CPI

Brief bio:

N. Asokan is a Professor of Computer Science at the University of Waterloo (since 2019) where he holds a David R. Cheriton Chair and serves as the Executive Director of the Waterloo Cybersecurity and Privacy Institute (https://cpi.uwaterloo.ca). He is also an adjunct professor at Aalto University in Finland where he was the founding director of the Helsinki-Aalto Institute for Cybersecurity (https://haic.fi).

Asokan's primary research theme is systems security broadly, including topics like the development and use of novel platform security features, applying cryptographic techniques to design secure protocols for distributed systems, applying machine learning techniques to security/privacy problems, and understanding/addressing the security and privacy of machine learning applications themselves.

Asokan is a Fellow of the Institute of Electrical and Electronics Engineers (IEEE) and the Association for Computing Machinery (ACM).

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March 23, 2022

Dr. Charmaine Dean
Vice-President, Research & International
University of Waterloo, EC5 3111
200 University Avenue West
Waterloo, ON, Canada N2L 3G1

Dear Dr. Dean,

It gives me great pleasure in writing this strong letter of support to accompany the renewal application of the Waterloo Artificial Intelligence Institute (Waterloo.AI). I first became involved with Waterloo.AI after the launch of the institute I founded, the Waterloo Institute for Sustainable Aeronautics (WISA). AI is one of the strategic priorities for the University, however it is also a significant priority beyond campus within the aviation and aerospace sectors. There are limitless opportunities at the intersection of AI and aeronautics happening on and beyond campus – and Waterloo is well positioned to continue our leadership in this area.

When WISA was formulated, it organized its scope of work under three pillars of sustainability: social, environmental, and economic. The economic pillar emphasizes research and education to support the Aeronautics industry with the evidence-based integration of new technologies and practices – of which Artificial Intelligence is of utmost importance to our partners.

As a direct example of this, a few months ago myself and Dr. Shi Cao (who is both an Associate Director of WISA and a member of Waterloo.AI) had exploratory discussions with the Aerospace researchers within the National Research Council (NRC). The NRC is interested in fostering collaborations with Waterloo, with a focus on the use of AI to certify new aircraft designs. Traditional aircraft certification is exceptionally expensive and time-consuming, using traditional physical infrastructure such as wind tunnels. Shi and I requested a meeting with the leadership of Waterloo.AI to ask if they would consider forming a WISA/Waterloo.AI partnership to foster the NRC collaborative discussions. Waterloo.AI responded enthusiastically and we have been developing this opportunity in partnership since that time, including several meetings to refine the scope.

I truly believe that Centres and Institutes at Waterloo should form strong collaborative linkages, such as this partnership modelled by WISA and Waterloo.AI. All Centres and Institutes exist to provide interdisciplinary support and opportunities to the campus community, and we can accomplish the most if we work together without competition. I'm proud of the partnership WISA is building with Waterloo.AI and I hope that through these efforts we can broadly provide support for the air transport sector to integrate AI in an evidence-based manner.

Further, we are very supportive of the proposed collaborative program in AI, as well as online training in AI via WatSPEED, initiatives being led by Waterloo.AI. I believe both educational opportunities would be of interest to aviation and aerospace professionals. Overall, WISA has benefitted greatly thanks to the excellent work done by the Waterloo.AI Institute and hence we strongly support their renewal. We wish Waterloo.AI continued success in all their endeavours going forward.

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Please do not hesitate to reach out if you require additional information.

Sincerely,

Dr. Suzanne Kearns

Associate Professor | Founding Director, Waterloo Institute for Sustainable Aeronautics
Office EV1 238, 200 University Avenue West
suzanne.kearns@uwaterloo.ca

BALSILLIE SCHOOL
OF INTERNATIONAL AFFAIRS

Ann Fitz-Gerald
Director

April 4, 2022

To the Senate Graduate and Research Council (SGRC)
University of Waterloo

Re: Letter of Support for the Renewal of the Waterloo Artificial Intelligence Institute Agreement

Dear SGRC,

As the Director of the Balsillie School of International Affairs (BSIA) I am thrilled to support the Waterloo Artificial Intelligence Institute (Waterloo.AI), in partnership with the BSIA.

The BSIA prides itself in being at the global forefront of the intersection of international affairs and STEM disciplines. As we lead international discussions and collaborations exploring the interconnections of science and politics, Waterloo.AI has been essential to achieving these goals, by actively contributing and collaborating with us in this shared mission to solve humanity's most pressing global crises. Members of Waterloo.AI, including Dr. Vijay Ganesh and Dr. Fahkri Karray, are active participants and members in BSIA research clusters such our 'STEM for Global Resilience' cluster, participate in (online) debates, webinars, and discussions with policy leaders, faculty, and students, and perhaps most importantly, Waterloo.AI has served as focal points for questions, discussions, and brainstorming sessions between staff and faculty of the BSIA concerning the intersection, effect, and overlap of technologies such as AI upon politics at all levels of local and (inter)national governance.

In 2021, the BSIA and Waterloo.AI, alongside colleagues at our partner the Centre for International Governance Innovation (CIGI), collaborated on a workshop and policy briefing entitled 'AI, Global Governance and International Public Policy'. This policy brief, building upon a highly successful interdisciplinary workshop featuring a diverse pool of students, academics, and thought-leaders from all institutions, was a rare but shining example of truly multi-disciplinary engagement and collaboration. The report this workshop generated, which explored the ethical and policy challenges of AI and how best

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to address them in a multi-disciplinary and intersectional context, was extremely well-received by leading scholars and policy-makers connected with the BSIA, hinting at the tremendous collaborative potential that we hope to explore with Waterloo.AI in the future.

We at the BSIA strongly support the renewal of the Waterloo.AI Institute, and I look forward to the positive dialogues, research, and policy-impacts, its multi-disciplinary knowledge will facilitate with us going forth.

Kind Regards,

Ann Fitz-Gerald
Director
Balsillie School of International Affairs

To:	Senate Graduate & Research Council
From:	Charmaine Dean, Vice-President, Research & International Jeff Casello, Associate Vice-President, Graduate Studies and Postdoctoral Affairs
Date:	30 May 2022
Subject:	Senate Governance Review Feedback **Part II**

Senate Graduate and Research Council (SGRC) began discussing its structure and functioning at the 9 May 2022 meeting and memos submitted by the Associate Deans Research (ADR) and Associate Deans Graduate (ADG) formed the basis of, as well as informed this important conversation (see Appendix for summary of discussion). Substantive time at 13 June 2022 SGRC is again being allocated to the topic.

For Action:

In advance of next Monday's meeting, please review Senate Bylaw 2 (section 4) where the membership and powers and duties of SGRC are described, and carefully consider your responses to the following questions. Your advanced preparation will ensure fulsome discussion as we continue to seek input from council members.

Questions
1. How well does SGRC fulfil its Powers and Duties as outlined in section 4.03 of Senate Bylaw 2?
2. What do we each perceive our member roles to be?
3. What is the intersection amongst our member roles?

Options for Addressing Concerns:
1. How could we improve efficacy of existing SGRC through development of new operational models and strategic discussions?
2. Shall we consider other options and/or solutions, including alternate designs / structures of Councils?
3. What would be lost and what would be gained with alternate designs?

Appendix

8 May 2022 Discussion Summary:

Structure and Functioning of Senate Graduate and Research Council

Council members raised a variety of subjects relating to SGRC's operations, including whether it should remain as one council or dissolve into separate research and academic councils. Council members identified that:

- SGRC (or any other University committee[1]) does not serve as a mechanism for essential research content and discussions (e.g., IP, research risk, research security, grants, data management, etc.)
- SGRC business is heavily and disproportionately weighted to academic content
- SGRC is unnecessarily administrative with little time spent in fruitful, substantive, synergistic discussion—whether academic or research-related
- regardless of the future of SGRC, student membership is necessary, but resources are finite

From these discussions, a number of key foci emerged in order to improve SGRC efficacy:

- To identify key strategic research and academic matters for discussion and ensure equitable time for each
- To consider the role of new (sub)committees (e.g., curriculum committee) and/or working groups to delegate appropriate matters elsewhere and allow more time at SGRC for increased engagement on critical research and academic topics and strategic matters
- To refine and improve SGRC agendas (e.g., implement consent agenda) Council

Council agreed to continue discussion at 13 June 2022 SGRC.

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[1] The existing Research Operations Council (ROC) is not a formal or deliberative body of the University.

UNIVERSITY OF WATERLOO
FACULTY OF ENGINEERING

M E M O

TO: Kathy Winter, Assistant University Secretary & Privacy Officer Secretariat

FROM: S. Sivoththaman, Associate Dean, Graduate Studies, Faculty of Engineering

RE: Senate Graduate and Research Council

DATE: May 26, 2022

Please place the following motions forward for approval at the next meeting of the SGRC. These changes were approved by the EFC on May 17, 2022.

Items for Approval:

1. The Conrad School of Entrepreneurship and Business would like to make the following calendar change:
   - Addition of new courses:
     1. BE 660- Business Negotiations
     2. BE 620- Business Strategy
     3. BE 625- Foundations of Venture Creation

Rationale for Request:

1. Graduate engineers often find themselves having to negotiate. It could be negotiating a job offer, or a difficult multi-party negotiation with key stakeholders on a project such as a housing development. The ability to negotiate effectively – that is, creating win-win deals that optimize value for the parties involved – is as much science as art. This course will teach students the science of negotiations (based on extensive research been done at institutions such as Harvard and Northwestern) and give them extensive opportunity to practice it in a "safe" environment, the classroom. We currently have a course, BET 460 Negotiations, that is popular with undergraduate engineering students. We believe a similar, graduate-level course will be equally valuable.

2. Strategy is an essential discipline in business and entrepreneurship. Every business program requires students to take at least one strategy course—for example, MBA programs usually have Strategy as a capstone core course. Conrad needs this course at a

graduate level (we have one at the undergraduate level) to give students taking a Specialization, Certificate, or GDip the opportunity to be exposed to this critical business discipline and to round out our offering of business-related courses.

3. This course helps students incubate their ideas and turn them into viable businesses. As such, it is an excellent complement to graduate project courses where the outcome is hoped to be commercializable. Importantly, students are required to submit their current business idea to the instructor and only those already actively engaged in developing a business will be admitted. The course introduces students to the many resources available to help startups at UW including Concept, Velocity, Watco, Communitech, Accelerator Centre, and more, as well as introduce them to the broader entrepreneurial ecosystem in Canada and abroad. While acceptance to the course will be small by design, a similar undergraduate course (BET 300) has helped launch some of UWs most successful startups. We expect this course to do the same for our graduate students.

2. The department of Electrical and Computer Engineering would like to make the following calendar change:
   - Updating the core course list for the MASc and PhD Computer Software research area to include the following courses:
     1. ECE 606 Algorithm Design and Analysis: ADD or CO 602 Fundamentals of Optimization or CS 666 Algorithm Design and Analysis.
     2. ECE 653 Software Testing, Quality Assurance and Maintenance: ADD or CS 647 Software Testing, Quality Assurance, and Maintenance.
     3. ECE 657A Data and Knowledge Modelling and Analysis: ADD or CS 680 Introduction to Machine Learning or CS 686 Introduction to Artificial Intelligence.
     4. ADD CO 685 The Mathematics of Public-Key Cryptography or CS 658 Computer Security and Privacy or CO 687 Applied Cryptography.

Rationale for Request:
1. Successful completion of the CO/CS course implies that the student would have successfully completed the corresponding ECE course. This change accounts for the heterogeneity of incoming students' backgrounds and focus of research.
2. Acceptable alternative offered in a different term.
3. Successful completion of the CO/CS course implies that the student would have successfully completed the corresponding ECE course. This change accounts for the heterogeneity of incoming students' backgrounds and focus of research.
4. No corresponding graduate course offered in ECE; fills an important gap.

SS/em

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Engineering

Effective date: Term: Fall   Year: 2022

Milestone

Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Choose an item.

☐ Inactivate: Choose an item.

☐ Revise: from Choose an item. to Choose an item.

Course

Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☒ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
                        Course subject code, Course number, Course ID, Course title

☐ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course
                        elements being revised (*e.g. Course description, Course title*):

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: BE

Course number: 660

Course ID:

Course title (max. 100 characters including spaces): Negotiations

Course short title (max. 30 characters including spaces): Negotiations

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Not required

Course description: Individuals and organizations are initiating business deals all the time and everywhere. But while some result in a mutually successful conclusion, others end up as bad deals or no deal at all. Negotiation is central to the deal-making process. It is the art and science of securing agreements between two or more independent parties. This course blends practice (art) with theory (science) through intensive, realistic negotiation exercises. In doing so, it the foundation for creating more harmonious and mutually rewarding business negotiations.

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

Primary meet type: Lecture

Delivery mode: On-campus

Requisites: Anti-Req BE 460

Special topics course: Yes   ☐   No   ☒

Cross-listed course: Yes   ☐   No   ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:
Graduate engineers often find themselves having to negotiate. It could be negotiating a job offer, or a difficult multi-party negotiation with key stakeholders on a project such as a housing development. The ability to negotiate effectively – that is, creating win-win deals that optimize value for the parties involved – is as much science as art. This course will teach students the science of negotiations (based on extensive research been done at institutions such as Harvard and Northwestern) and give them extensive opportunity to practice it in a "safe" environment, the classroom.

We currently have a course, BET 460 Negotiations, that is popular with undergraduate engineering students. We believe a similar, graduate-level course will be equally valuable.

Form completed by: Marc Hurwitz
Department/School approval date (04/13/22):
Reviewed by GSPA (for GSPA use only) ☐ date (mm/dd/yy):
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Engineering

Effective date: Term: Fall   Year: 2022

Milestone
Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Choose an item.

☐ Inactivate: Choose an item.

☐ Revise: from Choose an item. to Choose an item.

Course
Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☒ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
                 Course subject code, Course number, Course ID, Course title

☐ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course
                 elements being revised (*e.g. Course description, Course title*):

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: BE

Course number: 620

Course ID:

Course title (max. 100 characters including spaces): Business Strategy

Course short title (max. 30 characters including spaces): Business Strategy

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Not required

Course description: This course enhances the student's strategic thinking and analytical skills that can be applied at the organizational level. The perspective taken is that of the general manager, with responsibility for all aspects on an organization. Specific topics include strategic management practices, the nature of competitive advantage, specific strategies for different levels of the organization including functional and business levels, and implementing strategy.

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

Primary meet type: Lecture

Delivery mode: On-campus

Requisites:

Special topics course: Yes   ☐   No   ☒

Cross-listed course: Yes   ☐   No   ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:
Strategy is an essential discipline in business and entrepreneurship. Every business program requires students to take at least one strategy course—for example, MBA programs usually have Strategy as a capstone core course. Conrad needs this course at a graduate level (we have one at the undergraduate level) to give students taking a Specialization, Certificate, or GDip the opportunity to be exposed to this critical business discipline and to round out our offering of business-related courses.

Form completed by: Marc Hurwitz
Department/School approval date (05/03/22):
Reviewed by GSPA (for GSPA use only) ☐ date (mm/dd/yy):
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Engineering

Effective date: Term: Fall   Year: 2022

Milestone
Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Choose an item.

☐ Inactivate: Choose an item.

☐ Revise: from Choose an item. to Choose an item.

Course
Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☒ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
                 Course subject code, Course number, Course ID, Course title

☐ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course
                elements being revised (*e.g. Course description, Course title*):

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: BE

Course number: 625

Course ID:

Course title (max. 100 characters including spaces): Foundations of Venture Creation

Course short title (max. 30 characters including spaces): Venture Creation

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Instructor

Course description: This course provides students with an introduction to the processes involved in moving an idea for a new venture from concept through to launch. The theoretical knowledge and practical skills needed to create a successful entrepreneurial enterprise are developed. Topics include definition and evaluation of entrepreneurial opportunities, business planning, funding strategies and early-stage revenue models, legal issues and intellectual property protection.

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

Primary meet type: Lecture

Delivery mode: On-campus

Requisites:

Special topics course: Yes   ☐   No   ☒

Cross-listed course: Yes   ☐   No   ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:
This course helps students incubate their ideas and turn them into viable businesses. As such, it is an excellent complement to graduate project courses where the outcome is hoped to be commercializable. Importantly, students are required to submit their current business idea to the instructor and only those already actively engaged in developing a business will be admitted. The course introduces students to the many resources available to help startups at UW including Concept, Velocity, Watco, Communitech, Accelerator Centre, and more, as well as introduce them to the broader entrepreneurial ecosystem in Canada and abroad. While acceptance to the course will be small by design, a similar undergraduate course (BET 300) has helped launch some of UWs most successful startups. We expect this course to do the same for our graduate students.

Form completed by: Marc Hurwitz
Department/School approval date (05/03/22):
Reviewed by GSPA (for GSPA use only) ☐ date (mm/dd/yy):
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

University of Waterloo

Graduate Studies Program Revision Template

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

Faculty: Engineering
Program: Master of Applied Science (MASc) in Electrical and Computer Engineering
Program contact name(s): Kankar Bhattacharya, Jessica Rossi
Form completed by: Jessica Rossi

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

Updating the core course list for the Computer Software research area to include the following:

1. *ECE 606 Algorithm Design and Analysis:* ***ADD*** *or CO 602 Fundamentals of Optimization or CS 666 Algorithm Design and Analysis.*

2. *ECE 653 Software Testing, Quality Assurance and Maintenance:* ***ADD*** *or CS 647 Software Testing, Quality Assurance, and Maintenance.*

3. *ECE 657A Data and Knowledge Modelling and Analysis:* ***ADD*** *or CS 680 Introduction to Machine Learning or CS 686 Introduction to Artificial Intelligence.*

4. ***ADD*** *CO 685 The Mathematics of Public-Key Cryptography or CS 658 Computer Security and Privacy or CO 687 Applied Cryptography.*

Is this a <u>major modification</u> to the program? No

Rationale for change(s):

1. *Successful completion of the CO/CS course implies that the student would have successfully completed the corresponding ECE course. This change accounts for the heterogeneity of incoming students' backgrounds and focus of research.*
2. *Acceptable alternative offered in a different term.*
3. *Successful completion of the CO/CS course implies that the student would have successfully completed the corresponding ECE course. This change accounts for the heterogeneity of incoming students' backgrounds and focus of research.*
4. *No corresponding graduate course offered in ECE; fills an important gap.*

Proposed effective date: Term: Fall   Year: 2022

Current <u>Graduate Studies Academic Calendar (GSAC)</u> page (include the link to the web page where the changes are to be made):

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:

Degree requirements
 	
• **Courses**
    o The requirements for the program consist of at least 5 courses (0.50 unit weight per course) of graduate credit. A minimum of 3 courses must be taken from within the Faculty of Engineering. A maximum of 2 courses may be taken from outside the Faculty but must be from the Faculties of Math and/or Science. At least 2 of the courses must be from the list of approved core courses (updated by the Department annually) in one of the approved areas of specialization as specified in the student's letter of admission. All MASc students are required to take a minimum of 2 ECE courses toward their degree requirements. Core courses may count towards this 2 course minimum. The choice of courses must meet with the approval of the supervisor.
    o Core courses:
        ▪ Computer Software
            ▪ ECE 606 Algorithm Design and Analysis
            ▪ ECE 652 Methods and Principles of Safety-critical Embedded Software
            ▪ ECE 653 Software Testing, Quality Assurance and Maintenance
            ▪ ECE 654 Software Reliability Engineering
            ▪ ECE 656 Database Systems
            ▪ ECE 657A Data and Knowledge Modelling and Analysis
	Degree requirements
	
	• **Courses**
	    o The requirements for the program consist of at least 5 courses (0.50 unit weight per course) of graduate credit. A minimum of 3 courses must be taken from within the Faculty of Engineering. A maximum of 2 courses may be taken from outside the Faculty but must be from the Faculties of Math and/or Science. At least 2 of the courses must be from the list of approved core courses (updated by the Department annually) in one of the approved areas of specialization as specified in the student's letter of admission. All MASc students are required to take a minimum of 2 ECE courses toward their degree requirements. Core courses may count towards this 2 course minimum. The choice of courses must meet with the approval of the supervisor.
	    o Core courses:
	        ▪ Computer Software
	            ▪ ECE 606 Algorithm Design and Analysis <u>or CO 602 Fundamentals of Optimization (cross-listed with CM 740 and CS 795) or CS 666 Algorithm Design and Analysis</u>
	            ▪ ECE 652 Methods and Principles of Safety-critical Embedded Software
	            ▪ ECE 653 Software Testing, Quality Assurance and Maintenance <u>or CS 647 Software Testing, Quality Assurance, and Maintenance</u>
	            ▪ ECE 654 Software Reliability Engineering
	            ▪ ECE 656 Database Systems

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:
	- ECE 657A Data and Knowledge Modelling and Analysis or CS 680 Introduction to Machine Learning or CS 686 Introduction to Artificial Intelligence - CO 685 The Mathematics of Public-Key Cryptography or CS 658 Computer Security and Privacy or CO 687 Applied Cryptography

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

All students, regardless of when they began their program, will be able to take the courses recommended in the core course changes above and apply them to their degree requirements.

Departmental approval date (mm/dd/yy): 02/17/22
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 04/05/22
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 Studies
Program Revision Template

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.

Faculty: Engineering
Program: Doctor of Philosophy (PhD) in Electrical and Computer Engineering
Program contact name(s): Kankar Bhattacharya, Jessica Rossi
Form completed by: Jessica Rossi

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).

Updating the core course list *for the Computer Software research area to include the following:*

1. *ECE 606 Algorithm Design and Analysis:* **ADD** *or CO 602 Fundamentals of Optimization or CS 666 Algorithm Design and Analysis.*

2. *ECE 653 Software Testing, Quality Assurance and Maintenance:* **ADD** *or CS 647 Software Testing, Quality Assurance, and Maintenance.*

3. *ECE 657A Data and Knowledge Modelling and Analysis:* **ADD** *or CS 680 Introduction to Machine Learning or CS 686 Introduction to Artificial Intelligence.*

4. **ADD** *CO 685 Public-Key Cryptography or CS 658 Computer Security and Privacy or CO 687 Applied Cryptography.*

Is this a major modification to the program? No

Rationale for change(s):

1. *Successful completion of the CO/CS course implies that the student would have successfully completed the corresponding ECE course. This change accounts for the heterogeneity of incoming students' backgrounds and focus of research.*
2. *Acceptable alternative offered in a different term.*
3. *Successful completion of the CO/CS course implies that the student would have successfully completed the corresponding ECE course. This change accounts for the heterogeneity of incoming students' backgrounds and focus of research.*
4. *No corresponding graduate course offered in ECE; fills an important gap.*

Proposed effective date: Term: Fall   Year: 2022

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

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:

Degree requirements
 	
• **Courses**
  ○ The coursework associated with the program is intended to provide a foundation for advanced learning in the chosen field of research. A minimum of 4 courses (0.50 unit weight per course) is required for a PhD student holding a MASc degree or equivalent (7 0.50 unit weight courses from a Bachelor program). At least 2 of the courses must be from the list of approved core courses (updated by the Department annually) in one of the approved areas of specialization as specified in the student's letter of admission, unless this course requirement has already been achieved during a University of Waterloo Electrical and Computer Engineering MASc program. The remaining 2 courses may be taken from outside of the Department but must be from the faculties of Engineering, Math, and/or Science (unless otherwise approved). All PhD students are required to take a minimum of 2 ECE courses toward their degree requirements. Core courses may count towards this 2 course minimum. The choice of courses must meet with the approval of the supervisor. The faculty supervisor will consider the level and adequacy of each student's preparation in drawing up the candidate's program. It is expected that candidates will maintain a 78% minimum cumulative average in their course work. To obtain credit, an individual course must be passed with at least 75%.
  ○ Core courses:
    ▪ Computer Software
      ▪ ECE 606 Algorithm Design and Analysis
      ▪ ECE 652 Methods and Principles of Safety-critical Embedded Software
      ▪ ECE 653 Software Testing, Quality
	Degree requirements
	
	• **Courses**
	  ○ The coursework associated with the program is intended to provide a foundation for advanced learning in the chosen field of research. A minimum of 4 courses (0.50 unit weight per course) is required for a PhD student holding a MASc degree or equivalent (7 0.50 unit weight courses from a Bachelor program). At least 2 of the courses must be from the list of approved core courses (updated by the Department annually) in one of the approved areas of specialization as specified in the student's letter of admission, unless this course requirement has already been achieved during a University of Waterloo Electrical and Computer Engineering MASc program. The remaining 2 courses may be taken from outside of the Department but must be from the faculties of Engineering, Math, and/or Science (unless otherwise approved). All PhD students are required to take a minimum of 2 ECE courses toward their degree requirements. Core courses may count towards this 2 course minimum. The choice of courses must meet with the approval of the supervisor. The faculty supervisor will consider the level and adequacy of each student's preparation in drawing up the candidate's program. It is expected that candidates will maintain a 78% minimum cumulative average in their course work. To obtain credit, an individual course must be passed with at least 75%.
	  ○ Core courses:
	    ▪ Computer Software
	      ▪ ECE 606 Algorithm Design and Analysis <u>or CO 602 Fundamentals of Optimization (cross-listed with CM 740 and CS 795) or CS 666 Algorithm Design and Analysis</u>

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:
Assurance and Maintenance ▪ ECE 654 Software Reliability Engineering ▪ ECE 656 Database Systems ▪ ECE 657A Data and Knowledge Modelling and Analysis	▪ ECE 652 Methods and Principles of Safety-critical Embedded Software ▪ ECE 653 Software Testing, Quality Assurance and Maintenance or CS 647 Software Testing, Quality Assurance, and Maintenance ▪ ECE 654 Software Reliability Engineering ▪ ECE 656 Database Systems ▪ ECE 657A Data and Knowledge Modelling and Analysis or CS 680 Introduction to Machine Learning or CS 686 Introduction to Artificial Intelligence ▪ CO 685 The Mathematics of Public-Key Cryptography or CS 658 Computer Security and Privacy or CO 687 Applied Cryptography

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

All students, regardless of when they began their program, will be able to take the courses recommended in the core course changes above and apply them to their degree requirements.

Departmental approval date (mm/dd/yy): 02/17/22
Reviewed by GSPA (for GSPA use only) ⊠ date (mm/dd/yy): 04/05/22
Faculty approval date (mm/dd/yy):
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):
Senate approval date (mm/dd/yy) (if applicable):

ARTS GRADUATE STUDIES

May 31, 2022

TO: Members, Senate Graduate and Research Council

FROM: Maha Eid, Graduate Studies and Research Officer

RE: Graduate Affairs Group Reports

The attached Arts Graduate Affairs Group reports were approved by the Arts Faculty Council meeting on May 24, 2022 and are now being submitted for approval by the Senate Graduate and Research Council on June 13, 2022.

Maha Eid

Maha Eid

Attach.

Arts Faculty Council Report to

Senate Graduate and Research Council

_____

CURRICULAR ITEMS for approval [bottom right pagination]

A) **History –** deleting the graduate research fields from the MA in History program, because no one is really using them [1-2]; revise HIST 605 [3-4]; revise HIST 612 [5-6]; new course HIST 703 [7-8]; inactivate HIST 705 [9-10]; and inactivate HIST 706 [11-12].

B) **Economics –** add new course ECON 658 [13-14].

C) **English –** update PhD COMPS and Thesis Proposal description and requirements [15-19].

D) **Accounting –** revise course descriptions for the following:
   a. ACC 606 [20-21]
   b. ACC 610 [22-23]
   c. ACC 611 (plus course title) [24-25]
   d. ACC 623 [26-27]
   e. ACC 680 (plus course title) [28-29]
   f. ACC 684 [30-31]
   g. ACC 685 [32-33]

Graduate Studies
Program Revision Template

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 History

Program contact name(s): Dan Gorman, Susan King

Form completed by: Dan Gorman, Susan King

Description of proposed changes:
Note: changes to courses and milestones also require the completion/submission of the SGRC Graduate Studies Course/Milestone Form.

Deleting the graduate research fields from the MA in History program.

Is this a major modification to the program? Yes

Rationale for change(s):

Our students do not select graduate research fields when registering for or completing the MA program. The graduate research fields listed in the Calendar are redundant (leftovers from when programs were required to list research fields), deleting them standardizes our program description with our Tri-University graduate program partners at Guelph and WLU. Removing the fields will also reduce any confusion for students applying to the program.

Proposed effective date: Term: Fall   Year: 2022

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/department-history/master-arts-ma-history

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:
Graduate research fields • Cold War Era History • Medieval History • World History	~~Graduate research fields~~ • ~~Cold War Era History~~ • ~~Medieval History~~ • ~~World History~~

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

There will be no impact on students currently registered in the program.

Department/School approval date (mm/dd/yy): 3/9/2022
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 03/15/22
Faculty approval date (mm/dd/yy): 05/24/22
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):
Senate approval date (mm/dd/yy) (if applicable):

Prior to form submission, review the [content revision instructions](). For questions about the form submission, contact [Trevor Clews](), Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Arts

Effective date: Term: ~~Spring~~ Fall   Year: 2022

Milestone

Note: milestone changes also require the completion/submission of the [Graduate Studies Program Revision Template]().

☐ New: __

☐ Inactivate: __

☐ Revise: from __ to __

Course

Note: some course changes also require the completion/submission of the [Graduate Studies Program Revision Template]().

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
Course subject code, Course number, Course ID, Course title

☒ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

Course description is being revised.

Course elements (complete as indicated above. Review the [glossary of terms]() for details on course elements)

Course subject code: HIST

Course number: 605

Course ID: 012550

Course title (max. 100 characters including spaces): Global Governance in Historical Perspective

Course short title (max. 30 characters including spaces): Global Governance

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Department

Course description:

  Current description: This course examines the various ways global actors have identified and tried to solve global problems in the twentieth century. We will study the interactions between international organizations, state actors, non-governmental organizations, and informal interest groups as they have confronted global issues such as war, immigration, international trade, human rights, and environmental and health crises.

  Revised description: This course examines the history of global governance, focusing on the institutions, issues, and debates that have shaped global governance throughout history. Students will consider how and why state and non-state actors have turned to global governance to tackle pressing challenges and create common frameworks. They will also examine the power dynamics involved in these processes, analyzing the politics of inclusion and exclusion within global governance arenas across different historical periods.

Meet type(s): Seminar

Primary meet type: Seminar

Delivery mode: On-campus

Requisites:

Special topics course: Yes ☐   No ☒

Cross-listed course: Yes ☐   No ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:

This request is to revise the course description (as above) so that it better reflects the current delivery of the course. This course is offered to MA in History and MA in Global Governance students.

Form completed by: Susan King
Department/School approval date: (24/09/2020):
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 10/21/2020
Faculty approval date (mm/dd/yy): 05/24/22
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

UNIVERSITY OF WATERLOO

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Arts

Effective date: Term: ~~Spring~~ Fall   Year: 2022

Milestone

Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: __

☐ Inactivate: __

☐ Revise: from __ to __

Course

Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
                Course subject code, Course number, Course ID, Course title

☒ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

                 Updating the Course title and Course description

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: HIST

Course number: 612

Course ID: 001568

Course title (max. 100 characters including spaces):
        Current title: Indigenous Rights and Claims: A Global Perspective
        Revised title: Global Indigenous Rights in Historical Perspective

Course short title (max. 30 characters including spaces): Global Indigenous Rights

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Department

Course description:

Current description: This course examines the historical and political background of Indigenous rights in comparative and global perspective. It will consider the patterns of Indigenous-Newcomer relations, the nature and origins of treaties, and Indigenous protests against external incursions into traditional territories. The course will focus on developments around the world in the period after World War II, and will examine such themes as the emergence of Indigenous rights movements, the origins and status of legal claims, political accommodations and international efforts to address Indigenous aspirations. Particular attention will be paid to the development of international Indigenous organizations, coordinated protests and challenges to national governments, and the engagement of international organizations (i.e., through the United Nations Declaration on the Rights of Indigenous Peoples).

Revised description: This course examines the historical and political contexts of Indigenous rights movements from around the world. It considers the histories of Indigenous-state relations and Indigenous assertions of rights and sovereignty through cultural, political, and legal means. We will discuss grassroots and global Indigenous rights movements and international efforts to address Indigenous aspirations and decolonization especially following WWII. Attention will be also paid to the formation of Indigenous organizations and the engagement of international forums (i.e., through the United Nations Declaration on the Rights of Indigenous Peoples).

Meet type(s): Seminar

Primary meet type: Seminar

Delivery mode: On-campus

Requisites: None.

Special topics course: Yes ☐   No ☒

Cross-listed course: Yes ☐   No ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:
Adjustments in the course title and description to better reflect the course content and update language.

Form completed by: Susan King
Department/School approval date (mm/dd/yy): October 29, 2020
Reviewed by GSPA (for GSPA use only) ☐ date (mm/dd/yy): 11/24/20
Faculty approval date (mm/dd/yy): 05/24/22
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Arts

Effective date: Term: ~~Spring~~ Fall   Year: 2022

Milestone
Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: ‗‗

☐ Inactivate: ‗‗

☐ Revise: from ‗‗ to ‗‗

Course
Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☒ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
                 Course subject code, Course number, Course ID, Course title

☐ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course
                 elements being revised (*e.g. Course description, Course title*):

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: HIST

Course number: 703

Course ID:

Course title (max. 100 characters including spaces): The History of Global Governance

Course short title (max. 30 characters including spaces): Hist Global Governance

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Department

Course description: This course examines the various ways global actors have identified and tried to solve global problems in the twentieth century. We will study the interactions between international organizations, state actors, non-governmental organizations, and informal interest groups as they have confronted global issues such as war, immigration, international trade, human rights, and environmental and health crises.

Meet type(s): Seminar

Primary meet type: Seminar

Delivery mode: On-campus

Requisites: None.

Special topics course: Yes   ☐   No   ☒

Cross-listed course: Yes   ☐   No   ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:

This course has been run as a section of HIST 605, which is reserved for the Global Governance PhD students. We are creating a distinct class at the PhD level.

Form completed by: Susan King
Department/School approval date (Oct 29/2020):
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 11/24/20
Faculty approval date (mm/dd/yy): 05/24/22
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

UNIVERSITY OF WATERLOO

Senate Graduate & Research Council

Graduate Studies Course/Milestone Form

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Arts

Effective date: Term: ~~Spring~~ Fall   Year: 2022

Milestone
Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: __

☐ Inactivate: __

☐ Revise: from __ to __

Course
Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☒ Inactivate: Complete the following course elements:
                 Course subject code, Course number, Course ID, Course title

☐ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course
                 elements being revised (*e.g. Course description, Course title*):

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: HIST

Course number: 705

Course ID: 001630

Course title (max. 100 characters including spaces): First Minor Area of Concentration

Course short title (max. 30 characters including spaces):

Grading basis: ___

Course credit weight: ___

Course consent required: ___

Course description: N/A

Meet type(s): ___   ___   ___

Primary meet type: ___

Delivery mode: ___

Requisites:

Special topics course: Yes   ☐   No   ☐

Cross-listed course: Yes   ☐   No   ☐

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:

This was a 0.50 credit PhD minor field reading course, which is no longer used in our PhD in History program.

Form completed by: Susan King
Department/School approval date (mm/dd/yy): October 29, 2020
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 11/24/20
Faculty approval date (mm/dd/yy): 05/24/22
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

UNIVERSITY OF WATERLOO

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Arts

Effective date: Term: ~~Spring~~ Fall   Year: 2022

Milestone
Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: __

☐ Inactivate: __

☐ Revise: from __ to __

Course
Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☒ Inactivate: Complete the following course elements:
                 Course subject code, Course number, Course ID, Course title

☐ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: HIST

Course number: 706

Course ID: 001631

Course title (max. 100 characters including spaces): Second Minor Area of Concentration

Course short title (max. 30 characters including spaces):

Grading basis: __

Course credit weight: __

Course consent required: __

Course description: N/A

Meet type(s): __ __ __ __

Primary meet type: __

Delivery mode: __

Requisites:

Special topics course: Yes ☐   No ☐

Cross-listed course: Yes ☐   No ☐

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:

This was a 0.50 credit PhD minor field reading course, which is no longer used in our PhD in History program.

Form completed by: Susan King
Department/School approval date (mm/dd/yy): October 29, 2020
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 11/24/20
Faculty approval date (mm/dd/yy): 05/24/22
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

UNIVERSITY OF WATERLOO

Senate Graduate & Research Council

Graduate Studies Course/Milestone Form

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Arts

Effective date: Term: Fall   Year: 2022

Milestone
Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: __

☐ Inactivate: __

☐ Revise: from __ to __

Course
Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☒ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
                Course subject code, Course number, Course ID, Course title

☐ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course
                elements being revised (*e.g. Course description, Course title*):

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: ECON

Course number: 658

Course ID:

Course title (max. 100 characters including spaces): Water Resource Economics

Course short title (max. 30 characters including spaces): Water Resource Economics

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Not required

Course description: The course combines water economic theory and practice, addressing major global water challenges such as climate change, water scarcity, flood risks, water quality, and resource recovery in a circular economy. Particular attention will be paid to water resource valuation and water pricing. Students will play water games and write an economic assessment paper about the costs and benefits of water, food and energy security related to large-scale water infrastructure such as dam building in a transboundary river basin.

Meet type(s): Lecture

Primary meet type: Lecture

Delivery mode: On-campus

Anti-Requisites: ECON 673 Topic 24

Special topics course: Yes   ☐   No   ☒

Cross-listed course: Yes   ☐   No   ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:

We have been offering this course as a Selected Topics course (ECON 673 Topic 24) since Fall 2017. We will continue to offer this course going forward so it is time it had its own number.

Note: please suppress Topic 24 from ECON 673 once ECON 658 goes into effect.

Form completed by: Phil Curry
Department/School approval date (mm/dd/yy): 03/11/22
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 04/08/22
Faculty approval date (mm/dd/yy): 05/24/22
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

Graduate Studies

Program Revision Template

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

Faculty: Arts

Program: Doctor of Philosophy (PhD) in English

Program contact name(s): John Savarese

Form completed by: John Savarese

Description of proposed changes:

Note: changes to courses and milestones also require the completion/submission of the <u>SGRC Graduate Studies Course/Milestone Form</u>.

Updating the PhD Comprehensive Examination and PhD Thesis Proposal description and requirements.

Is this a <u>major modification</u> to the program? No

Rationale for change(s):

The PhD in English program currently has three area exams: two written and one oral. This is unusual among programs of its sort which most often have a two-stage process (one written and one oral; or one exam and one proposal defence). It is especially unusual among peer programs that our program examines students in a "secondary" area defined as outside of their primary expertise.

The tripartite exam structure was initially created to emphasize the Department's integrated research and teaching culture, which trains students in both literature and rhetoric. Recent discussions and self-studies have cast in doubt whether the exam achieves that aim in terms of student training. The Department remains committed to training students in both language and literature at the curricular level through coursework, and to encouraging a research culture where students undertake projects that combine different areas of English studies.

The three-part exam structure has been identified as a factor negatively affecting students' time to degree completion; student recruitment; and student experience.

By completing a single exam and the dissertation proposal over two terms, students will have more time to devote to that process, and will also begin the dissertation earlier. The proposal defence that had previously taken place in July of year 2 would now take place (approximately) in April of year 2.

Customizing the reading lists will help with dissertation preparation, but will also help students take an exam in the field that is right for them, and solve some problems about areas our lists do not represent (for example, students studying transnational modernism have previously had to choose between British or American field exams).

Proposed effective date: Term: Fall   Year: 2022

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/department-english-language-and-literature/doctor-philosophy-phd-english

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:

Degree requirements
 	
• **PhD Comprehensive Examination**
 o Students are required to meet the University-level PhD Comprehensive Examination minimum requirements outlined in the "Minimum requirements for the PhD degree" section of the Graduate Studies Academic Calendar (GSAC), with certain noted exceptions that are specific to the Faculty of Arts Comprehensive Examination minimum requirements:
  ▪ Comprehensive examination purpose: Consistent with University-level minimum requirements.
  ▪ Timing: Consistent with University-level minimum requirements.
  ▪ Committee: Consistent with University-level minimum requirements with the exception that in the Faculty of Arts, the Graduate Chair can approve the committee for comprehensive examinations.
  ▪ Who Chairs an examination: Consistent with University-level minimum requirements.
  ▪ Format / Content: Consistent with University-level minimum requirements.
	Degree requirements
	
	• **PhD Comprehensive Examination**
	 o Students are required to meet the University-level PhD Comprehensive Examination minimum requirements outlined in the "Minimum requirements for the PhD degree" section of the Graduate Studies Academic Calendar (GSAC), with certain noted exceptions that are specific to the Faculty of Arts Comprehensive Examination minimum requirements:
	  ▪ Comprehensive examination purpose: Consistent with University-level minimum requirements.
	  ▪ Timing: Consistent with University-level minimum requirements.
	  ▪ Committee: Consistent with University-level minimum requirements with the exception that in the Faculty of Arts, the Graduate Chair can approve the committee for comprehensive examinations.
	  ▪ Who Chairs an examination: Consistent with University-level minimum requirements.
	  ▪ Format / Content: Consistent with University-level minimum requirements.

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:
- Academic integrity: Consistent with University-level minimum requirements. - In addition to the University-level and Faculty-level PhD Comprehensive Examination minimum requirements, students in the PhD in English program are also required to meet the following requirements: - At the end of their coursework and preliminary to writing the dissertation, candidates are required to sit ~~three~~ examinations: ~~two~~ written and one oral. ~~One written examination will be drawn from the Literary area and one from the Language area.~~ Normally this will occur in year two. - The ~~first written examination will comprise the candidate's Secondary field, and the second~~ written examination will comprise the candidate's ~~Primary~~ field. The ~~Primary~~ exam will be followed by an oral defence of ~~Primary~~ examination questions and ~~Primary~~ reading lists. ~~Each~~ written exam will be based on a ~~core A-List of readings and a supplemental B-List~~ of readings to be composed by the candidate and their committee. - The written examinations will be administered online in a 7-day take-home format. ~~Literary Areas:~~ ~~American Literature~~ ~~Canadian Literature~~ ~~History of Literary Theory and Criticism~~ ~~Middle English Literature~~ ~~Nineteenth-Century British Literature~~ ~~Postcolonial Literature~~ ~~Renaissance English Literature (16th-17th centuries)~~	- Academic integrity: Consistent with University-level minimum requirements. - In addition to the University-level and Faculty-level PhD Comprehensive Examination minimum requirements, students in the PhD in English program are also required to meet the following requirements: - At the end of their coursework and preliminary to writing the dissertation, candidates are required to sit <u>two</u> examinations: <u>one</u> written and one oral. Normally this will occur in year two. - The written examination will comprise the candidate's <u>dissertation</u> field. The exam will be followed by an oral defence of examination questions and reading lists. <u>The oral defence will take place at the same time as the dissertation proposal defence (see below).</u> - <u>The</u> written exam will be based on a <u>list</u> of readings to be composed by the candidate and their committee. - The written examinations will be administered online in a 7-day take-home format. **PhD Thesis Proposal** - Upon successful completion of the <u>comprehensive</u> examination <u>and proposal defences</u>, candidates begin full-time work on their dissertations. Candidates must first prepare a dissertation proposal which includes a 3000-word description of the proposed research and a working bibliography of the primary and secondary texts that will serve as the source material for that research. These documents should be prepared in consultation with the supervisor and the other members of the candidate's Supervisory Committee. The deadline for submission <u>and defence of the proposal</u> will normally be <u>during the fifth term of study</u>. Candidates who fail their <u>comprehensive</u> examination must first re-sit the examination before submitting the dissertation proposal. Failure to submit a

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:

◦ ~~Restoration and Eighteenth-Century English Literature~~
◦ ~~Twentieth-Century United Kingdom and Ireland Literature~~
• ~~Language Areas:~~
  ◦ ~~Composition Theory and Pedagogy~~
  ◦ ~~Decolonizing, Transnational, and Diaspora Criticism~~
  ◦ ~~Discourse and Text Analysis~~
  ◦ ~~New Media~~
  ◦ ~~Rhetorical Theory and Criticism~~
 	
• **PhD Thesis Proposal**
  ◦ Upon successful completion of the area examination~~s~~, candidates begin full-time work on their dissertations. Candidates must first prepare a dissertation proposal which includes a 3000-word description of the proposed research and a working bibliography of the primary and secondary texts that will serve as the source material for that research. These documents should be prepared in consultation with the supervisor and the other members of the candidate's Supervisory Committee. ~~Upon approval of the proposal, the documents will be submitted to the Graduate Committee of the Department for approval.~~ The deadline for submission ~~to the Graduate Committee~~ will normally be ~~December 1st for the third year of registration in the PhD program, or six months after the completion of the area examinations~~. Candidates who fail ~~one or more of~~ their area examination~~s~~ must first re-sit the ~~relevant area~~ examination ~~or examinations~~ before submitting the dissertation proposal. Failure to submit a dissertation proposal by the deadline will normally result in candidates losing their satisfactory standing in the Doctoral program along with their internal funding. If the submitted dissertation proposal is deemed to be unsatisfactory by ~~the Graduate Committee~~, candidates must revise and resubmit within a period to be determined by the ~~Graduate~~ Committee. Candidates who fail to submit a satisfactory proposal in the second attempt may be
	dissertation proposal by the deadline will normally result in candidates losing their satisfactory standing in the Doctoral program along with their internal funding. If the submitted dissertation proposal is deemed to be unsatisfactory, candidates must revise and resubmit within a period to be determined by the committee. Candidates who fail to submit a satisfactory proposal in the second attempt may be required to withdraw from the program.

Current Graduate Studies Academic Calendar content:	Proposed Graduate Studies Academic Calendar content:
required to withdraw from the program.	

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

These changes will apply to currently registered students. Effective Fall 2022, students that are beginning their second year of the program will not be required to take the secondary exam.

Department/School approval date (mm/dd/yy): 03/25/22
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 04/05/22
Faculty approval date (mm/dd/yy): 05/24/22
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):
Senate approval date (mm/dd/yy) (if applicable)

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Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Arts

Effective date: Term: Winter   Year: 2023

Milestone
Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: ⸱⸱

☐ Inactivate: ⸱⸱

☐ Revise: from ⸱⸱ to ⸱⸱

Course
Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
                        Course subject code, Course number, Course ID, Course title

☒ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course
                        elements being revised (*e.g. Course description, Course title*):

                        Updating the Course description.

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: ACC

Course number: 606

Course ID: 011674

Course title (max. 100 characters including spaces): Business Valuations

Course short title (max. 30 characters including spaces): Business Valuations

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Department

Course description:

Current description: This course will provide the fundamentals of business valuation theory and practice. Students will receive advanced standing in part of the Canadian Insitute of Chartered Business Valuators' Program of Studies.

Revised description: This course will provide the fundamentals of business valuation theory and practice. Successful completion of this course can provide students pursuing a Chartered Business Valuator (CBV) designation with advanced standing in the CBV Institute Program of Studies through course exemptions.

Meet type(s): Lecture

Primary meet type: Lecture

Delivery mode: On-campus

Requisites: N/A

Special topics course: Yes ☐   No ☒

Cross-listed course: Yes ☐   No ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:

The current description is being updated because it is out of date and no longer appropriately reflects the course content.

Form completed by: Jenny Rothwell
Department/School approval date (mm/dd/yy): 01/21/22
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 04/08/22
Faculty approval date (mm/dd/yy): 05/24/22
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

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Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Arts

Effective date: Term: Winter   Year: 2023

Milestone

Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: __

☐ Inactivate: __

☐ Revise: from __ to __

Course

Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
Course subject code, Course number, Course ID, Course title

☒ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

Updating the Course description.

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: ACC

Course number: 610

Course ID: 000003

Course title (max. 100 characters including spaces): Public Accounting Practice

Course short title (max. 30 characters including spaces): Public Accounting Practice

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Department

Course description:

Current description: This course is designed to enhance the students' abilities to apply knowledge of accounting principles, theories, and practices through the use of multi-dimensional case studies.

Revised description: This course will enhance students' technical and communication skills that they have developed through the application and integration of their knowledge in various types of cases. Students will use these skills extensively in their careers as financial professionals.

Meet type(s): Lecture   Tutorial

Primary meet type: Lecture

Delivery mode: On-campus

Requisites: N/A

Special topics course: Yes   ☐   No   ☒

Cross-listed course: Yes   ☐   No   ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:

The current description is being updated because it is out of date and no longer appropriately reflects the course content.

Form completed by: Jenny Rothwell
Department/School approval date (mm/dd/yy): 01/21/22
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 04/12/22
Faculty approval date (mm/dd/yy): 05/24/22
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Arts

Effective date: Term: Winter   Year: ~~2022~~ 2023

Milestone

Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: __

☐ Inactivate: __

☐ Revise: from __ to __

Course

Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
                Course subject code, Course number, Course ID, Course title

☒ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

                Updating the Course title and Course description

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: ACC

Course number: 611

Course ID: 000004

Course title (max. 100 characters including spaces):

        Current title: External Reporting
        Revised title: External Reporting with Integration

Course short title (max. 30 characters including spaces): External Reporting

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Department

Course description:

Current description: This course examines accounting standards in evolution, adopting critical perspectives of current issues.

Revised description: This course emphasizes financial reporting standards, in conjunction with assurance and tax, and their application through the use of scenarios and simulations.

Meet type(s): Lecture

Primary meet type: Lecture

Delivery mode: On-campus

Requisites:

Special topics course: Yes   ☐   No   ☒

Cross-listed course: Yes   ☐   No   ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:

The current course title and description is very out-of-date and no longer appropriately reflects the course. The updated description better reflects the course syllabus.

Form completed by: Jenny Rothwell
Department/School approval date (01/21/22):
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 10/07/21
Faculty approval date (mm/dd/yy): 05/24/22
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Arts

Effective date: Term: Winter   Year: 2023

Milestone

Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: __

☐ Inactivate: __

☐ Revise: from __ to __

Course

Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
                Course subject code, Course number, Course ID, Course title

☒ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

                Updating the Course description.

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: ACC

Course number: 623

Course ID: 011479

Course title (max. 100 characters including spaces): Business Technology Law

Course short title (max. 30 characters including spaces): Business Technology Law

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Department

Course description:

> Current description: This course will address the legal issues related to information technology, including service agreements, intellectual property rights, taxation and other topics.

> Revised description: This course will equip students to manage technology issues of a legal nature by developing their knowledge of intellectual property including the obtaining and enforcement of rights as well as the use of legal tools to create business opportunity as well as to respond to legal risk. Students may also consider other technology law topics such as privacy, tax considerations, and licensing all of which are relevant for technology-oriented businesses.

Meet type(s): Lecture

Primary meet type: Lecture

Delivery mode: On-campus

Requisites: N/A

Special topics course: Yes ☐   No ☒

Cross-listed course: Yes ☐   No ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:

The current description is being updated because it is out of date and no longer appropriately reflects the course content.

Form completed by: Jenny Rothwell
Department/School approval date (mm/dd/yy): 01/21/22
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 04/12/22
Faculty approval date (mm/dd/yy): 05/24/22
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

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Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Arts

Effective date: Term: Winter Year: 2023

Milestone
Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: ⎯

☐ Inactivate: ⎯

☐ Revise: from ⎯ to ⎯

Course
Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
  Course subject code, Course number, Course ID, Course title

☒ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

  Updating the Course title and Course description.

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: ACC

Course number: 680

Course ID: 000028

Course title (max. 100 characters including spaces):

  Current title: Performance Measurement and Control systems for Implementing Strategy
  Revised title: Systems and Analysis for Management Decision-making

Course short title (max. 30 characters including spaces):

Current course short title: Perf Meas/Ctrl Sys for Impl St
Revised course short title: Systems & Analysis for Mang DM

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Not required

Course description:

Current description: This course reviews and integrates theory and practice necessary for those intending to pursue management accounting careers. It provides a comprehensive insight into the problems facing top management accounting executives and includes a number of cases designed to expose students to real world situations requiring qualitative and quantitative analysis.

Revised description: This course reviews and integrates theory, analytical approaches, and processes for those intending to pursue certification as a professional accountant. It provides insight into the problems facing management and executives using cases designed to expose students to real world situations requiring qualitative and quantitative analysis.

Meet type(s): Lecture

Primary meet type: Lecture

Delivery mode: On-campus

Requisites: N/A

Special topics course: Yes ☐   No ☒

Cross-listed course: Yes ☐   No ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:
The current title and description are being updated because they are out of date and no longer appropriately reflect the course content.

Form completed by: Jenny Rothwell
Department/School approval date (mm/dd/yy): 01/21/22

Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 04/12/22
Faculty approval date (mm/dd/yy): 05/24/22
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

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Senate Graduate & Research Council

Graduate Studies Course/Milestone Form

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

Faculty: Arts

Effective date: Term: Winter   Year: 2023

Milestone

Note: milestone changes also require the completion/submission of the [Graduate Studies Program Revision Template](#).

☐ New: __

☐ Inactivate: __

☐ Revise: from __ to __

Course

Note: some course changes also require the completion/submission of the [Graduate Studies Program Revision Template](#).

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
                 Course subject code, Course number, Course ID, Course title

☒ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

                 Updating the Course description.

Course elements (complete as indicated above. Review the [glossary of terms](#) for details on course elements)

Course subject code: ACC

Course number: 684

Course ID: 013327

Course title (max. 100 characters including spaces): Strategy and Business Models

Course short title (max. 30 characters including spaces): Strategy and Business Models

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Department

Course description:

Current description: This course examines concepts within organizational strategy and performance by exploring business models and applying an analysis framework to assess the models' connections with competivenesss and profitability.

Revised description: This course examines concepts within strategy, business models, and performance measurement to explore connections among an organization's competitive environment, business model pattern, and relevant performance measures.

Meet type(s): Seminar

Primary meet type: Seminar

Delivery mode: On-campus

Requisites: N/A

Special topics course: Yes ☐   No ☒

Cross-listed course: Yes ☐   No ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:

The current description is being updated because it is out of date and no longer appropriately reflects the course content.

Form completed by: Jenny Rothwell
Department/School approval date (mm/dd/yy): 01/21/22
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 04/12/22
Faculty approval date (mm/dd/yy): 05/24/22
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

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Prior to form submission, review the content revision instructions. For questions about the form submission, contact Trevor Clews, Graduate Studies and Postdoctoral Affairs (GSPA).

Faculty: Arts

Effective date: Term: Winter   Year: 2023

Milestone

Note: milestone changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: __

☐ Inactivate: __

☐ Revise: from __ to __

Course

Note: some course changes also require the completion/submission of the Graduate Studies Program Revision Template.

☐ New: Complete all course elements below

☐ Inactivate: Complete the following course elements:
                 Course subject code, Course number, Course ID, Course title

☒ Revise: Complete all course elements below to reflect the proposed change(s) and identify the course elements being revised (*e.g. Course description, Course title*):

                 Updating the Course description.

Course elements (complete as indicated above. Review the glossary of terms for details on course elements)

Course subject code: ACC

Course number: 685

Course ID: 013328

Course title (max. 100 characters including spaces): Performance Management

Course short title (max. 30 characters including spaces): Performance Management

Grading basis: Numerical

Course credit weight: 0.50

Course consent required: Department

Course description:

Current description: This course covers advanced management control topics including the design and use of performance metrics, aligning performance measurement with strategy, goal-setting and incentive programs, and risk management.

Revised description: This course covers advanced performance management topics including strategy development and implementation, the design and use of performance metrics, goal setting and incentive programs, risk management, and management accounting decision analyses using customized, real-world cases.

Meet type(s): Seminar

Primary meet type: Seminar

Delivery mode: On-campus

Requisites: N/A

Special topics course: Yes ☐   No ☒

Cross-listed course: Yes ☐   No ☒

Course subject code(s) and number(s) to be cross-listed with and approval status:

Sections combined/held with:

Rationale for request:
The current description is being updated because it is out of date and no longer appropriately reflects the course content.

Form completed by: Jenny Rothwell
Department/School approval date (mm/dd/yy): 01/21/22
Reviewed by GSPA (for GSPA use only) ☒ date (mm/dd/yy): 04/12/22
Faculty approval date (mm/dd/yy): 05/24/22
Senate Graduate & Research Council (SGRC) approval date (mm/dd/yy):

Research Data Management (RDM) Institutional Strategy: An Update to SGRC June 13, 2022
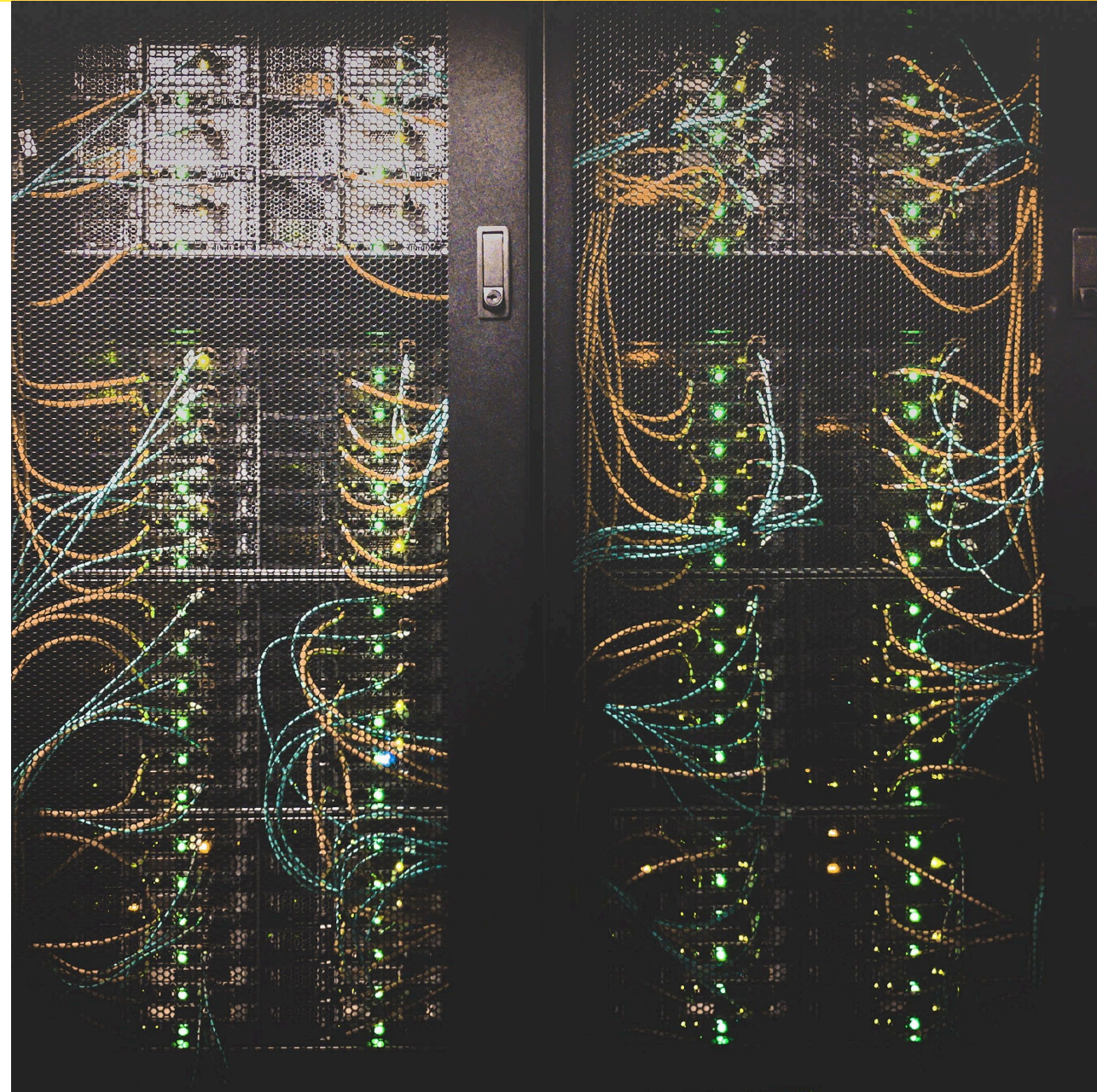
Ian Milligan
Associate Vice-President, Research Oversight and Analysis

Alison Hitchens
Associate University Librarian, Collections, Technology, Scholarly Communication

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Photo by Taylor Vick on Unsplash

RDM: A Brief Recap

- **Tri-Agency Research Data Management Policy**

- The agencies believe that research data collected through the use of public funds should be responsibly and securely managed and be, <mark>where ethical, legal and commercial obligations allow, available for reuse by others</mark>. To this end, the agencies support the FAIR (**F**indable, **A**ccessible, **I**nteroperable, and **R**eusable) guiding principles for research data management and stewardship.

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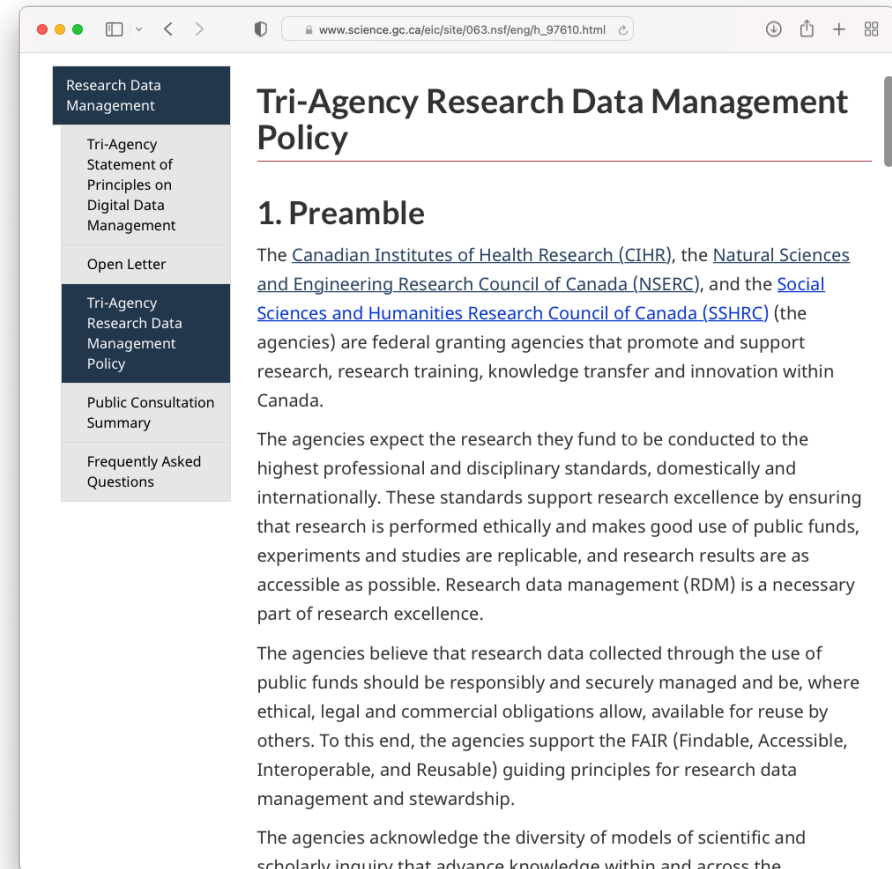
Be FAIR and CARE

- If you're working with Indigenous data, in addition to the FAIR principles and specific Indigenous data sovereignty guidelines please review the CARE principles before starting your research

- Source: The Global Indigenous Data Alliance

We see this as an opportunity beyond box ticking.

- Beyond boilerplate, we want a strategy that **sets researchers up for success.**

- Stewarding your data, describing it, preserving it, and sharing it (if appropriate) – beyond buzzwords, they're things that help foster **research excellence**

  - Thinking about your data architecture at the beginning prevents headaches later down the road (incl. Security, IP debates, etc.)

  - You can access your older data and understand it

  - You can share it with other people so they can build on your work – and vice versa

  - You are protected from… data calamity.

- We don't want to just have researchers putting data on disk for no reason.

TECHSPOT

TRENDING   FEATURES   REVIEWS   THE BEST   DOWNLOADS   VIDEO   PRODUC

SOFTWARE   TECH CULTURE   JAPAN   BACKUP

Japanese university loses 77TB of research data following a buggy software update

34 million files got deleted from Kyoto university's supercomputer due to a backup error

By Humza Aamir January 3, 2022, 6:15 AM | 18 comments

In brief: Losing data to a backup error can mean fretting over the loss of years worth of personal photos or, as in the case of Japan's Kyoto University, losing 77TB of critical research data. The incident occurred with the university's supercomputer that received a faulty

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Tri-Agency Timeline

Spring 2022: Tri-Agency will identify the initial set of funding opportunities subject to the DMP requirement. The agencies will pilot the DMP requirement in targeted funding opportunities before this date.
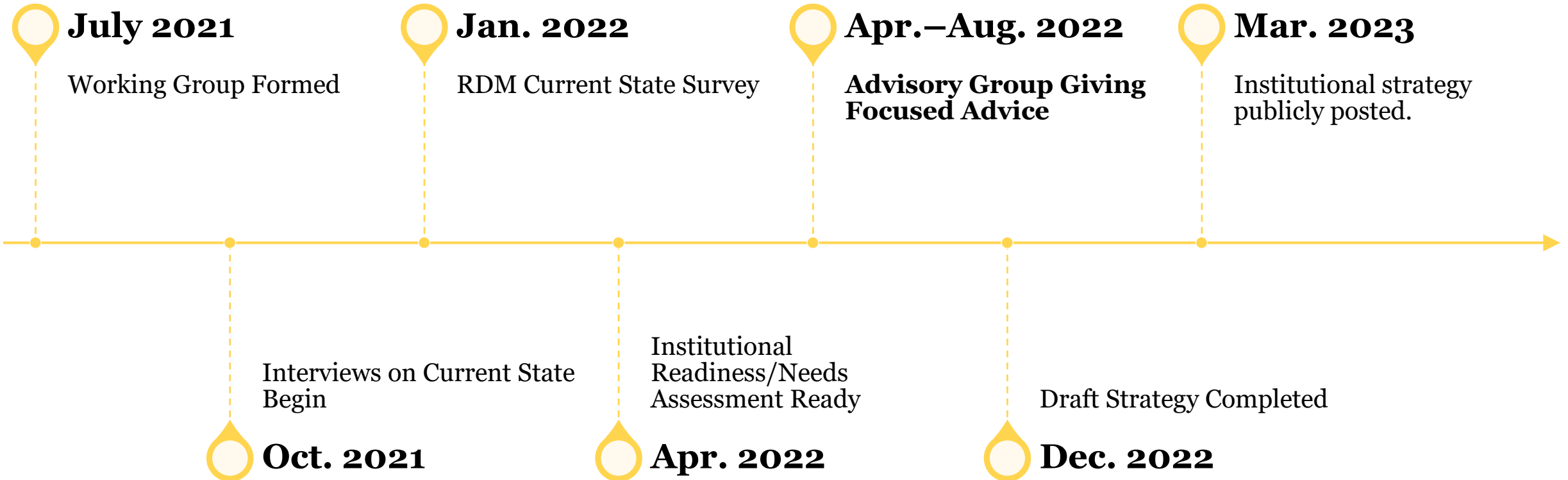
March 2023: Research institutions subject to this requirement must post their RDM strategies and notify the agencies when they have been completed.

The Future: Data deposit, when appropriate, will one day be an integral requirement of Tri-Agency funding.

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Our Timeline

July 2021
Working Group Formed

Jan. 2022
RDM Current State Survey

Apr.–Aug. 2022
Advisory Group Giving Focused Advice

Mar. 2023
Institutional strategy publicly posted.

Interviews on Current State Begin
Oct. 2021

Institutional Readiness/Needs Assessment Ready
Apr. 2022

Draft Strategy Completed
Dec. 2022

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WHAT'S THE STATE OF RDM ON CAMPUS?

Survey and interviews informed the analysis

- **476** responses, of which 254 were faculty (tenured, tenure-track, and lecturers); 166 graduate students; and the rest researchers, postdoctoral fellows, and staff.

- Also interviewed **52** people.

Photo by Aaron Burden on Unsplash

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Challenges managing research data (analysis of comments)
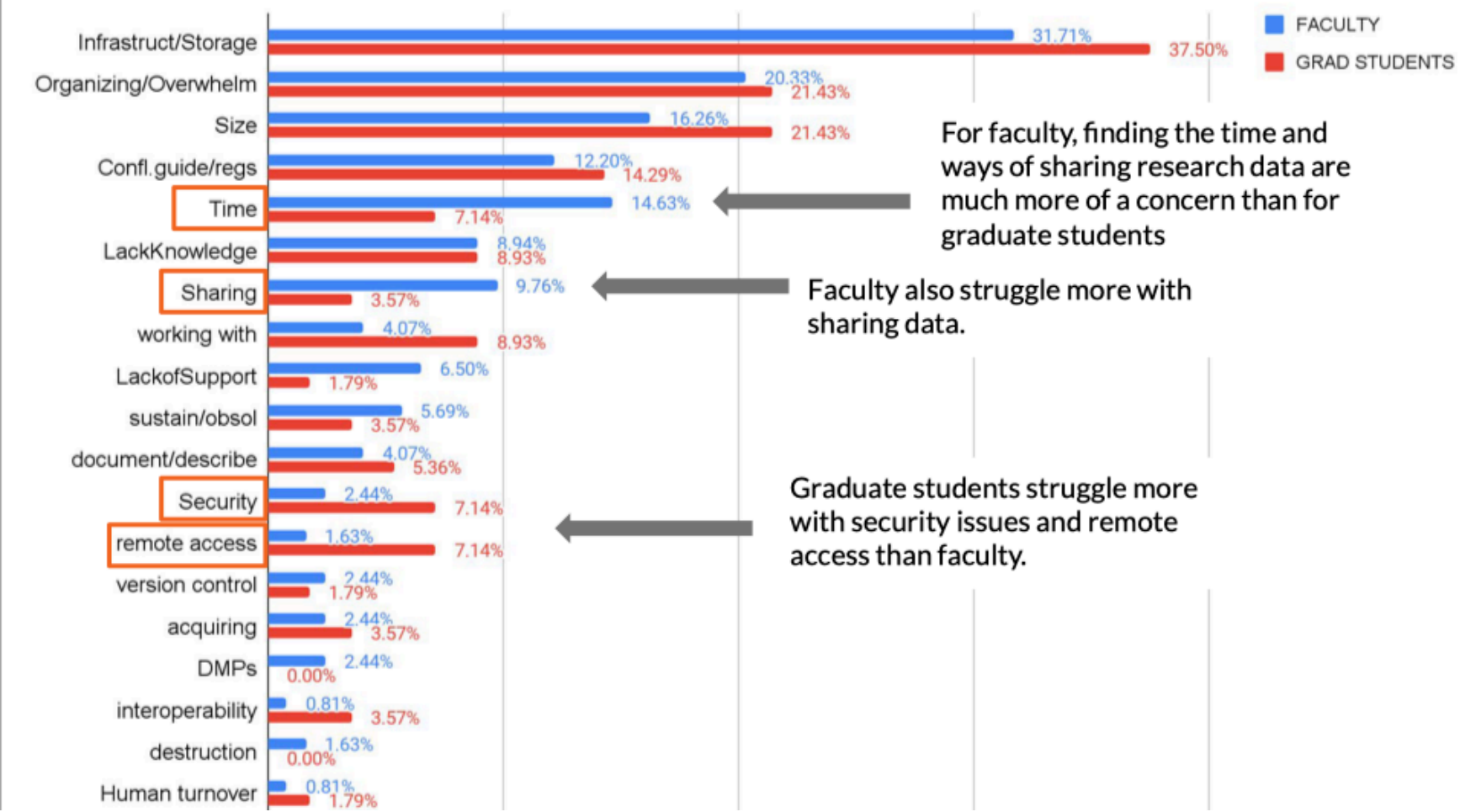
What can we do? (analysis of comments)
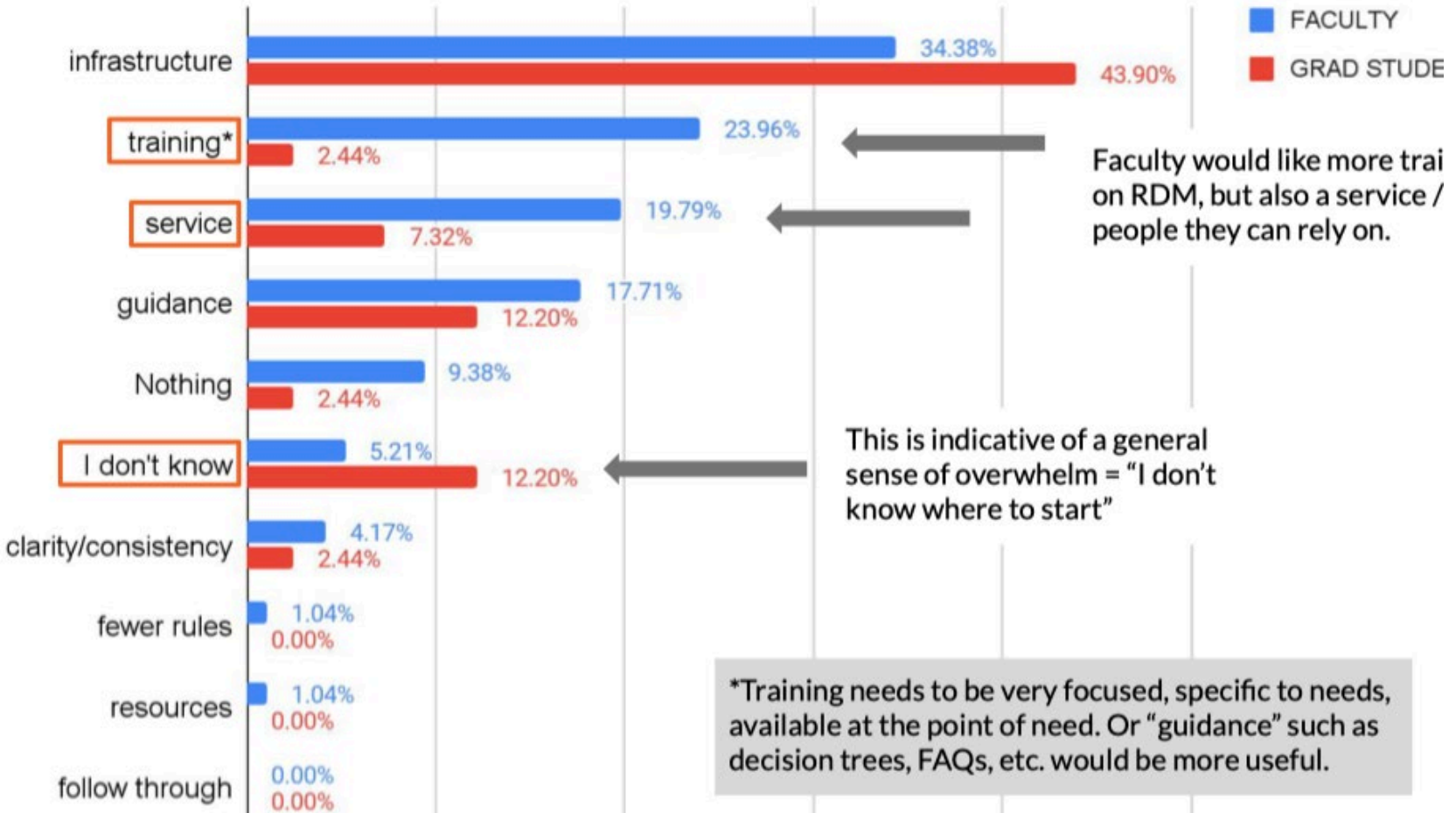
Some key findings

- The Good

  - UW provides high-quality RDM service, mostly from OR, LIB, and dept/faculty IT support, with support from IST. But awareness varies.

  - Centralized services like OR and LIB are well-received, and researchers value decentralization.

  - Departments and faculties w/ their own IT support are happy.

  - We have some impressive examples of strong RDM practices at Waterloo

  - Where there are clear and easy-to-follow policies (human subject/ health data) they are followed

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Some key findings

- The Not-so-Good

  - Researchers are overwhelmed and often don't feel they have time to deal with RDM until it is too late

  - Incentives/compliance requirements of RDM are found at application, project closure, and publication… not the critical points when decisions are made at data architecture.

  - They see DMPs as obstacles to overcome rather than an opportunity to optimize strategy

  - Struggling with storage and sharing of data.

  - Too many confusing and conflicting data-related policies, mandates and expectations. Feeling conflicted between "open data" and IP/privacy/security.

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Some key findings

- And the Mixed

  - While those working with Indigenous communities understand data sovereignty (largely), those starting out need more support.

  - Wide variety of opinion on the need to share data – some see it as a moral responsibility and others worry about being scooped. And many in the middle like the idea in theory, but don't have time to organize/document their data… and see it as risky to release data without that step.

  - Infrastructure requests are common, but technical needs are simple, such as secure file sharing and receiving

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We know where we are <u>now</u>. But where do we want to go?

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Research Excellence and Data Stewardship
Strategic Coordination/Collaboration
Between Existing Centralized and Decentralized Research Support Services
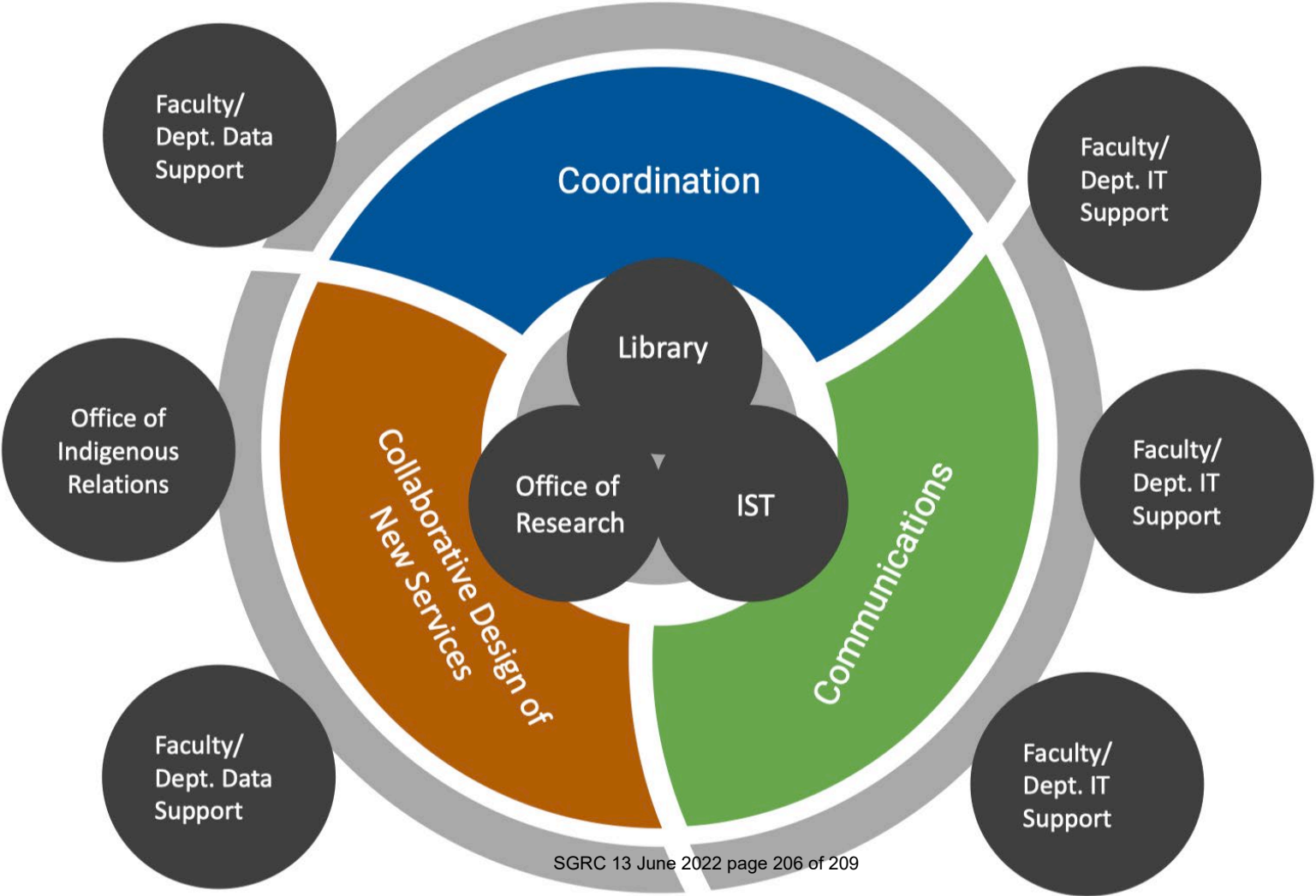
RDM Ideal State: Sample of Opportunities

- Strategy should incorporate both researcher and institutional perspectives

- Promote RDM as research excellence

- Better promotion of current services and tools (e.g., data-finding support, DMP template, One-drive, Dataverse, Survey Research Centre etc.)

- Create clear documentation of guidelines and best practices, and related training

- Formalize some processes (e.g., onboarding/offboarding of graduate students on research teams, getting started with Indigenous research)

- Improve technical infrastructure (e.g., for shared storage, large datasets, etc.)

Our next steps

- Working with our Advisory Board to begin visioning the "ideal state" of campus – how we can get from our current state to where we want to be.

- **We want to know what you want to see in the strategy?**

- **We want to know any questions that you might have?**

Please contact Alison Hitchens or Ian Milligan, co-chairs.

Questions about the Tri-Agency policy? Check out the *Tri-Agency FAQs*

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Thank you!