

# Final Assessment Report

## Computer Science (BCS, BMath, Minor, MMath, PhD), Computer Science – Data Science (BCS), Business Administration and Computer Science (BBA/BCS), Computing (Option)

### September 2022

---

#### Executive Summary

External reviewers found that the Computer Science (BCS, BMath, Minor, MMath, PhD), Computer Science – Data Science (BCS), Business Administration and Computer Science (BBA/BCS), Computing (Option) delivered by the David R. Cheriton School of Computer Science were in good standing.

*The programs examined in this review are excellent and have national recognition for content and execution. The co-op programs are attractors nationally to first-rate students and industrial partners.*

A total of four recommendations were provided by the reviewers, regarding community building, equity, diversity and inclusion, and curriculum review. In response, the program created a plan outlining the specific actions proposed to address each recommendation as well as a timeline for implementation. The next cyclical review for this program is scheduled for 2027-2028.

#### Enrollment over the past three years

	BCS Honours	BCS Honours Co-op	BMath Honours	BMath Honours Co-op	CS Minor
<b>2021-2022</b>	187	2490	42	125	7
<b>2020-2021</b>	217	2584	44	180	27
<b>2019-2020</b>	297	2126	58	180	107

Based on Active Student Extract in Quest, accessed September 9, 2022.

	<b>CS – Data Science Honours (BCS)</b>	<b>CS - Data Science Honours Co-op (BCS)</b>	<b>Business Admin and CS (BBA/BCS)</b>	<b>Computing Option</b>
<b>2021-2022</b>	5	43	504	58
<b>2020-2021</b>	8	54	391	120
<b>2019-2020</b>	10	49	364	112

Based on Active Student Extract in Quest, accessed September 12, 2022.

	<b>CS MMath - Research</b>	<b>CS MMath – Research Co-op</b>	<b>CS MMath - Coursework</b>	<b>CS MMath - Coursework Co-op</b>	<b>CS PhD</b>
<b>2021-2022</b>	199	19	21	6	205
<b>2020-2021</b>	176	21	21	8	190
<b>2019-2020</b>	183	15	35	24	172

Based on Active Student Extract in Quest, accessed September 12, 2022.

---

## Background

In accordance with the University of Waterloo’s Institutional Quality Assurance Process (IQAP), this final assessment report provides a synthesis of the external evaluation and the internal response of the Computer Science (BCS, BMath, Minor, MMath, PhD), Computer Science – Data Science (BCS), Business Administration and Computer Science (BBA/BCS), Computing (Option) programs delivered by the David R. Cheriton School of Computer Science (the School). A self-study (Volumes I, II, III) was submitted to the Associate Vice-President, Academic and Associate Vice-President, Graduate Studies and Postdoctoral Affairs on 13 October 2020. The self-study (Volume I) presented the program descriptions and learning outcomes, an analytical assessment of the programs, including the data collected from a student survey, along with the standard data package prepared by the Office of Institutional Analysis & Planning (IAP). The CVs for each faculty member with a key role in the delivery of the program(s) were included in Volume II of the self-study.

From Volume III, two arm’s-length external reviewers were selected by the Associate Vice-President, Academic and Associate Vice-President, Graduate Studies and Postdoctoral Affairs: Dr. Carolyn Watters, Professor Emeritus, Faculty of Computer Science, Dalhousie University, and Dr. Hanan Luftiyya, Professor, Department of Computer Science, University of Western Ontario.

Reviewers appraised the self-study documentation and conducted a site visit to the University between January 31, 2022 and February 4, 2022. An internal reviewer from the University of Waterloo, Su-Yin Tan, Lecturer, Geography and Environmental Management, University of Waterloo, was selected to accompany the external reviewers. The visit included interviews with the Vice-President, Academic & Provost; Associate Vice-President, Graduate Studies and

Postdoctoral Affairs; Dean of the Faculty of Mathematics; Faculty Associate Dean of Undergraduate Studies; Faculty Associate Dean of Graduate Studies; Faculty Associate Dean of Cooperative Education; Director of Computer Science, as well as faculty members, staff and current undergraduate and graduate students. The Review Team also had an opportunity to meet with representatives from the library, and Co-operative Education.

Following the site visit, the external reviewers submitted a report on their findings, with recommendations. Subsequently, the program responded to each recommendation and outlined a plan for implementation of the recommendations. Finally, the Dean responded to the external reviewers' recommendations, and endorsed the plans outlined by the program.

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

## **Program Characteristics**

### **Undergraduate programs**

#### **Bachelor of Computer Science (BCS)**

The School's flagship undergraduate degree program is the Bachelor of Computer Science (BCS), which is direct entry from high school and can be completed in either a regular or co-op stream. It allows students to develop a solid understanding of computer science with the flexibility to choose from a wide range of courses in this area.

#### **Bachelor of Mathematics – Major in Computer Science [BMath (CS)]**

The School also offers a Bachelor of Mathematics with a Major in Computer Science [BMath (CS)], which allows students to study Computer Science with a larger combination of Math courses (and is offered in both regular and co-op). The BMath/CS is a direct-entry program.

The differences between the BCS and the BMath(CS) are summarized [here](#). Students are able to switch from one program to the other.

#### **BCS (Data Science)**

Beginning in September 2017, the University of Waterloo introduced two Data Science programs: the [BCS \(Data Science\)](#) and the [BMath \(Data Science\)](#). Both programs are offered jointly by the Department of Statistics and Actuarial Science and by the David R. Cheriton School of Computer Science. Students in the two plans graduate with a background in both computer science and statistics, taking a combination of required and elective courses that together provide a solid foundation in this emerging area.

It should be noted that the BCS (Data Science) is administered by the School of Computer Science, hence its inclusion in this review, while the BMath (Data Science) is administered by the Department of Statistics and Actuarial Science, and is included in their academic program review.

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

The [BBA/BCS Double Degree](#) allows students to earn two degrees in five years in both computer science and business. Graduates from the BBA/BCS receive a full Bachelor of Computer Science from Waterloo and a full Bachelor of Business Administration from Wilfrid Laurier University.

### **Specializations**

In addition, the School administers a number of specializations that enhance these degrees. Specializations are small packages of courses that customize a student's undergraduate experience and end up as added text in their degree. The Software Engineering Specialization can be combined with the BCS. The Artificial Intelligence, Bioinformatics, Business, Computational Fine Art, Digital Hardware, and Human-Computer Interaction Specializations can be combined with either the BCS or the BMath (CS).

### **Computer Science Minor / Computing Minor**

The School maintains a [Computer Science Minor and a Computing Minor](#) (formerly known as the Computing Option), and 13 non-specialist courses that target these students and students in other degrees that require CS content. The Computer Science Minor and the Computing Minor have different plan requirements, as outlined [here](#).

### **Graduate programs**

The School offers graduate programs leading to the following degrees:

#### **Master of Mathematics (MMath) in Computer Science**

- **MMath Thesis option:** the basic requirements for the Thesis option are four one-term graduate courses and a thesis based upon directed research or scholarly work. The thesis should be equivalent to four one-term courses in effort required, and the results must be presented at a public seminar.
- **MMath Research Paper option:** this option requires the completion of seven one-term courses and a research paper. There is no direct entry to this option. Rather, students in the MMath Thesis or Coursework option may transfer to the Research Paper option with the support of their supervisor(s). Work on the research paper should be done during the third and fourth terms of study. Students must present their paper or a related study in an appropriate seminar or class.
- **MMath Coursework option:** the basic requirements for this option are eight one-term courses, in addition to any remedial work. Students may enroll in this option on either a full or part-time basis. Unlike the Thesis and Research Paper options, Coursework

students are not guaranteed financial support. However, some TA assignments may be available on a term-by-term basis.

### **Doctor of Philosophy in Computer Science (PhD)**

The PhD program in Computer Science combines coursework; seminars; Comprehensive I requirement, by which the candidate demonstrates a breadth of knowledge by taking a number of advanced courses in a broad range of categories and areas in Computer Science; and a Comprehensive II exam, by which the candidate demonstrates a depth of knowledge in the chosen research area, leading to a thesis.

The PhD course requirements differ depending on when the student starts the program after having completed a Master's or a Bachelor's degree. If a student holds a Master's degree, they must complete four one-term graduate courses, with at least one course at the 800-level and at most one course at the 600-level. If a student holds only a Bachelor's degree, they must complete eight one-term graduate courses, with at least three courses at the 800-level and at most three courses at the 600-level.

### **Specialized Degree in Quantum Information**

This unique interdisciplinary master's and doctoral program is a collaboration between the [Institute for Quantum Computing](#), the David R. Cheriton School of Computer Science, and departments in the Faculty of Mathematics and the Faculty of Engineering. This program is designed to provide students with knowledge of quantum information, including both theory and its implementations, advanced expertise in quantum information science, and in home-program disciplines, as well as training in research. This program is not part of this review and will be assessed separately.

More details on the School's graduate programs are available here: <https://cs.uwaterloo.ca/current-graduate-students/overview-degree-programs>

## **Summary of Strengths, Challenges and Weaknesses based on Self-Study**

### **Strengths**

- The School provides one of the best Computer Science undergraduate programs in Canada, and certainly the largest.
- The flexibility of the School's programs and the benefits of co-operative education.
- The School has a strong research culture, which informs teaching, and attracts substantial research funding, both from government and private-sector sources.
- Graduates from the School's academic programs are in high demand.

### **Challenges**

- How to sustain the School's position as one of the leading providers of undergraduate and graduate programs in Computer Science; how to ensure they have the teaching resources necessary to meet the demand for undergraduate and graduate-level courses.
- How to compete internationally in attracting top-quality applicants to their graduate programs.
- How to attract and retain more top-quality faculty members, especially in areas of high demand, such as AI, machine learning, and systems & networking.
- How to increase gender diversity in their undergraduate and graduate programs beyond the current (improved) levels.
- How to increase gender diversity in their faculty complement.
- How to diversify the international demographics of their undergraduate program.

### **Weaknesses**

- While the School's technical education is good, they are falling short on providing a well-rounded experience, particularly for their undergraduate students.
- The School still relies heavily on sessional instructors for course delivery. While this has the advantage of providing good opportunities for graduate and post-doctoral training, it is problematic in terms of quality control and continuity.
- Undergraduate students lack a sense of community and cohesiveness.

## **Summary of Key Findings from the External Reviewers**

### **Commendations**

1. National and international rankings continue to recognize both the undergraduate and graduate programs.
2. The quality of the faculty and staff is high and the support provided is best practice.
3. The research in the School is nationally and internationally recognized for its excellence.
4. The students admitted to these programs are highly skilled and highly motivated.
5. The content and delivery of the programs of study at both the undergraduate and graduate levels are excellent.
6. The excellence and commitment of the teaching faculty and support staff are recognized by the students.
7. The co-op program continues to build the reputation of the School and provide a high-quality experience for both students and employers.
8. Students, faculty, staff, and administration are proud to be members of the University of Waterloo and the Cheriton School.

### **Chief strengths of the program**

The programs examined in this review are excellent and have national recognition for content and execution. The co-op programs are attractors nationally to first-rate students and industrial partners.

The support layer for both undergraduate and graduate programs use best practices, including graduate advocacy, undergraduate advising, course co-ordinators, undergraduate lecturers, director of women in CS, EDI committee, cooperative education, and library.

The research impact of the faculty is outstanding, notable given the pressure of enrollment growth. The presence and impact of the CS Computer Facilities group as a separate entity from the university IT provides local IT infrastructure and support within the university overall IT model that is aligned with the research IT environment required by modern research in CS.

### **Major challenges and weaknesses**

Several high-level challenges have been identified, which may require a strategic School-wide approach.

The first is the capacity to maintain faculty growth in the context of increasing student enrollment and the current very competitive hiring market. A strategic approach that also factors in future disciplinary needs, including interdisciplinary areas, and diversity of hires is difficult, but necessary.

The strategic plan of the School is at a level that is sparse with few clear actions and measures to gauge the success in meeting the aspirations and goals for student success, competitive research, diversity, and interdisciplinary goals.

Many of the current policies and processes slow the progress of the School in reaching EDI goals across the board including those related to faculty hires, student admission, student transfers, and interdisciplinarity.

An ongoing challenge is balancing the imperative of the co-op terms with the need for building of a community within the undergraduate student body.

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

- 1. Community Building.** The need for student community and cohort building has been expressed by both undergraduate students and graduate students, with recognition of the negative impact of the competitive environment amongst students for best co-ops and

jobs. Although success in building student communities and cohorts is difficult in the context of complex co-op schedules, there are opportunities for improving the situation.

- *More discussion with students about problems with cohorts.*
- *Increase the designation of and availability of shared space for undergraduate students on campus for social and academic interaction.*
- *Increase the course opportunities for undergraduate students to work in teams on assignments over all years.*
- *Strengthen community interaction and building across multiple co-op terms.*

### **Program Response**

We recognize the benefits of improved community building. However, it is important that all stakeholders also understand the disadvantages of cohorts. We will consult with students on that matter and review the experiences of a prior trial of forming cohorts in the first year. We will align these efforts with a corresponding strategic initiative for the entire Faculty of Math. If possible, we will explore options to offer optional cohorts at the expense of academic flexibility, at least for the first three study years. Space allocation is done at the faculty and university level, but we need to argue for more shared space along this recommendation. The Faculty of Math currently plans a new building with significant shared student space. The addition of CS 346 recently and CS 136L forthcoming provide opportunities for teamwork, which adds to teamwork components in CS 246 and various 4th-year courses (CS 445, CS 449, CS 452). We will continue to add such opportunities, for example in our redesigned capstone project course.

### **Dean's Response**

As noted, some notion of cohorts are being developed at the Faculty level, and CS shares a common first year with the rest of the faculty. The new building has a significant number of student-focused spaces which will address the needs of computer science. The faculty is investing in community relations, initially through a strategic plan activity which has now been made permanent with a full-time Community Well-being & Engagement Officer.

2. **EDI.** Success in addressing EDI strategic goals depends on both identifying and executing proactive initiatives and identifying and reducing potential barriers lurking in the current processes and decision making in CS, including admission and hiring processes, impact of very restricted transfer policies, and openness of course assignments to teamwork and interdisciplinary perspectives.

- *Capitalize on the appointment of the Director of Women in Computer Science and the establishment of an EDI Committee to develop a strategic plan to remove barriers through revised admission criteria from high school and current restrictions to transfer into BCS program to capture a wider diversity of experience in the undergraduate*



*programs.*

- *Review undergraduate core courses and integrate additional opportunities for team work on assignments and assignments that reflect broader student perspectives.*
- *Review all hiring and promotion processes to ensure a seamless and consistent application of EDI best practices.*
- *Examine carefully the unintended consequences of moving gender hires to “open” slots.*
- *Review the results of faculty search decisions that are unsuccessful in attracting top choices to the School and develop strategies for use during both decision making and negotiation to increase success in diverse hires.*

### **Program Response**

We agree with most of the above recommendations and outline our implementation plan below. We also want to point out the Faculty of Math’s and the university’s activities in terms of promoting EDI. For example, the university is about to start a deep EDI review of all admissions processes. We believe that the recommendation about gender hires is based on a misunderstanding and does not apply. This is further explained below (see page 11).

### **Dean’s Response**

The Faculty of Math is in full concordance and support of the School of CS’s activities and plans. In support of all EDI activities, we have recently hired a full-time Faculty Equity Officer to facilitate and help lead faculty-wide activities around equity, diversity, inclusion and indigenization as well as anti-racism, and to interface with departmental/School, as well as university-wide initiatives. This role also includes equity training for faculty and staff hiring and evaluation of institutional processes with an EDI-R lens.

**3. Curriculums and Programs.** The current core curriculum is well tested and well supported. It is not as clear that the School engages in a robust cyclical review of the core curriculum topics and course content and timely rotation of professors in teaching these courses. Enriched courses and new electives, service courses.

- *Go ahead with soft skills new course in first or second year.*
- *Course and program learning outcomes should be measured and made available as a quality assessment.*
- *A strategic review of undergraduate program options is advised in order to project future demand.*
- *An examination of the number of specializations is needed result in streamlining of offerings.*
- *As new professional course based masters are developed, systematic consideration should be given to retiring fading programs.*
- *Consideration should be given to changing the name of the thesis masters degree from MMath to MCS to reflect and clarify the value of the degree.*

### **Program Response**

Given the magnitude and expected difficulty of some of them, implementation will require careful planning and a staged approach as outlined in the implementation plan. On the graduate program side, we are in the processes of creating a master's program in cybersecurity (jointly with the C&O department), but we will not engage in the development of any further masters' programs until we achieve a comprehensive understanding of how various programs compete for limited resources. On the other hand, we are in the process of phasing out programs already. In particular, the discontinuation of our course-based general master's program in Computer Science is in the calendar approvals process, currently at the Senate Graduate Council level. We appreciate the suggestion for a name change, but we note that such a change involves many stakeholders.

### **Dean's Response**

Math has been a major driver in the new Complementary Teaching Assessment Project which will be used to assess teaching and curriculum university-wide. As noted, our new faculty-level professional master's program in cybersecurity and privacy will be led by CS and C&O, and will hopefully be coming online in the next year or two.

**4. Research Group Structure.** The Research Group structure reinforces research-based *de facto* silos of interest. This may have unintended ramifications going forward on engaging interdisciplinary perspectives, building community amongst grad students and faculty across research groups, and hiring outcomes.

- *Establish a rapid task force to examine the role of the research groups and impact of structure on increasing inter-group and interdisciplinary collaboration and on hiring practices.*

### **Program Response**

We accept this recommendation and intend to implement it as suggested. We believe that the level of inter-group and interdisciplinary collaboration is strong and commensurate with a research unit of our size and stature but will nonetheless evaluate all aspects of internal structuring as part of this process.

### **Dean's Response**

I concur that inter-group and inters-disciplinary collaboration is strong and groups in CS are light-weight and "organic" in their construction. The Faculty and School will also be looking to facilitate connections to university-level initiatives around interdisciplinarity.

**Recommendations                      Not                      Selected                      for                      Implementation**

Regarding the recommendation under EDI to “Examine carefully the unintended consequences of moving gender hires to “open” slots” – we believe this recommendation arises from a misunderstanding. Underrepresented groups are given priority in all targeted and open slots. However, it turns out that the number of qualified female applicants for the open slots is so high that we often only interview female candidates for open slots. That anecdote might have led to a misunderstanding that we somehow only consider gender priority for open slots.

**Implementation Plan**

	Recommendations	Proposed Actions	Responsibility for Leading and Resourcing (if applicable) the Actions	Timeline for addressing Recommendations
1.	<p><b>Community Building.</b> The need for student community and cohort building has been expressed by both undergraduate students and graduate students, with recognition of the negative impact of the competitive environment amongst students for best co-ops and jobs. Although success in building student communities and cohorts is difficult in the context of complex of co-op schedules, there are opportunities for improving the situation.</p> <ul style="list-style-type: none"> <li>• <i>More discussion with students about problems with cohorts.</i></li> <li>• <i>Increase the designation of and availability of shared space for undergraduate students on campus for social and academic interaction.</i></li> <li>• <i>Increase the course opportunities for opportunities for undergraduate students to work in teams on assignments over all years.</i></li> </ul>	<p>A) Cohorts: Create an ad-hoc committee to review previous attempts at forming cohorts, to coordinate with the corresponding faculty- level initiative, and to engage undergraduate students. Derive recommendations and document the trade-offs involved with cohorts from the students’ perspective.</p> <p>B) Space: Review existing space under SCS purview (computer labs) for potential re-allocation to social and academic interaction. Engage the Faculty and University to add appropriate space to future space development projects.</p> <p>C) Teamwork: Redesign 4th-year capstone project course to make it more accessible to a larger group of students.</p> <p>D) Community: Based on the outcome of Item A), an ad-hoc committee will investigate an optional cohort scheme available to students who are willing to trade off academic flexibility.</p>	<p>A) Director of Undergraduate Studies</p> <p>B) Associate Director of School</p> <p>C) Director of Undergraduate Studies</p> <p>D) Director of Undergraduate Studies</p>	<p>A) Fall 2023</p> <p>B) Fall 2024</p> <p>C) Fall 2024</p> <p>D) Fall 2024</p>

	<ul style="list-style-type: none"> <li>Strengthen community interaction and building across multiple co-op terms.</li> </ul>			
2.	<p><b>EDI.</b> Success in addressing EDI strategic goals depends on both identifying and executing proactive initiatives and identifying and reducing potential barriers lurking in the current processes and decision making in CS, including admission and hiring processes, impact of very restricted transfer policies, and openness of course assignments to teamwork and interdisciplinary perspectives.</p> <ul style="list-style-type: none"> <li>Capitalize on the appointment of the Director of Women in Computer Science and the establishment of an EDI Committee to develop a strategic plan to remove barriers through revised admission criteria from high school and current restrictions to transfer into BCS program to capture a wider diversity of experience in the undergraduate programs.</li> </ul>	<p>A) Admissions: WiCS/EDI joint subcommittee to review CS admissions procedures and practices in coordination with the corresponding university-level activities.</p> <p>B) Perspectives: In addition to Item 1.C), the Undergraduate Academic Plans Committee (UAPC) will study how course assignments can reflect broader student perspectives.</p> <p>C) Hiring/Promotion: Senior faculty member to review hiring and promotion processes and document their findings in a written report.</p> <p>D) Gender Hires: N/A</p> <p>E) Review: Institute a formal process by which each year’s hiring committee convenes after the hiring season is concluded to review the results and document the potential reasons for unsuccessful hires.</p>	<p>A) Director of WiCS, Chair of EDI Committee</p> <p>B) Director of Undergraduate Studies</p> <p>C) Director of School</p> <p>D) N/A</p> <p>E) Chair of School Advisory Committee on Appointments (SACA)</p>	<p>A) Review: Fall2023; Recommendations: Fall 2024</p> <p>B) Fall 2023</p> <p>C) Fall 2023</p> <p>D) N/A</p> <p>E) Spring 2023</p>



	<ul style="list-style-type: none"> <li>• Review undergraduate core courses and integrate additional opportunities for team work on assignments and assignments that reflect broader student perspectives.</li> <li>• Review all hiring and promotion processes to ensure a seamless and consistent application of EDI best practices.</li> <li>• Examine carefully the unintended consequences of moving gender hires to “open” slots.</li> <li>• Review the results of faculty search decisions that are unsuccessful in attracting top choices to the School and develop strategies for use during both decision making and negotiation to increase success in diverse hires.</li> </ul>			
3.	<p><b>Curriculums and Programs.</b> The current core curriculum is well tested and well supported. It is not as clear that the School engages in a robust cyclical review of the core curriculum topics and course content and timely rotation of professors in teaching these</p>	<p>A) Soft Skills: Plan for a dedicated soft-skills course.</p> <p>B) Outcomes: The Undergraduate Academic Plans Committee (UAPC) will review existing mechanisms in other programs. Afterwards, a</p>	<p>A) Director of Undergraduate Studies</p> <p>B) Director of Undergraduate Studies</p>	<p>A) Fall 2025</p> <p>B) Fall 2025</p>

<p>courses. Enriched courses and new electives, service courses.</p> <ul style="list-style-type: none"> <li>• <i>Go ahead with soft skills new course in first or second year.</i></li> <li>• <i>Course and program learning outcomes should be measured and made available as a quality assessment.</i></li> <li>• <i>A strategic review of undergraduate program options is advised in order to project future demand.</i></li> <li>• <i>An examination of the number of specializations is needed result in streamlining of offerings.</i></li> <li>• <i>As new professional course based masters are developed, systematic consideration should be given to retiring fading programs.</i></li> <li>• <i>Consideration should be given to changing the name of the thesis masters degree from MMath to MCS to reflect and clarify the value of the degree.</i></li> </ul>	<p>UAPC subcommittee will formulate a specific plan towards the objective of measuring program learning outcomes.</p> <p>C) Options: We will establish an ad-hoc committee to review our program options, both considering viability of the specializations and determining what updates are needed.</p> <p>D) Specializations: We have established an ad-hoc committee, which is currently reviewing our specializations, both considering viability of the specializations and determining what updates are needed.</p> <p>E) Retiring Programs: Discontinuation of the course-based master’s program in Computer Science in progress.</p> <p>F) Program Name: Survey the opinions of the constituents in the school (faculty, graduate students, alumni) to determine the desire for a name change, then potentially discuss with other stakeholders. Report to School.</p>	<p>C) Director of Undergraduate Studies</p> <p>D) Director of Undergraduate Studies</p> <p>E) Director of Graduate Studies</p> <p>F) Director of Graduate Studies</p>	<p>C) Fall 2024</p> <p>D) Fall 2023</p> <p>E) Spring 2023</p> <p>F) Fall 2023</p>
--	--	---	---



4.	<p><b>Research Group Structure.</b> The Research Group structure reinforces research-based <i>de facto</i> silos of interest. This may have unintended ramifications going forward on engaging interdisciplinary perspectives, building community amongst grad students and faculty across research groups, and hiring outcomes.</p> <ul style="list-style-type: none"><li>• <i>Establish a rapid task force to examine the role of the research groups and impact of structure on increasing inter-group and interdisciplinary collaboration and on hiring practices.</i></li></ul>	Establishing a task force to examine the role of research groups, particularly in our hiring process. Report to School.	Director of School	Fall 2023
----	--	---	--------------------	-----------

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



Date of next program review \_\_\_\_\_ **2027-28** \_\_\_\_\_  
Date

### Signatures of Approval

Raouf Boutaba,  
Director

Digitally signed by Raouf Boutaba, Director  
DN: cn=Raouf Boutaba, Director, o=University of Waterloo,  
ou=Cheriton School of Computer Science, email=cs-  
director@uwaterloo.ca, c=CA  
Date: 2023.09.21 16:30:28 -04'00'  
Adobe Acrobat version: 2020.005.30524

21 September 2023

Chair/Director \_\_\_\_\_ Date

AFIW Administrative Dean/Head (*For AFIW programs only*) \_\_\_\_\_ Date

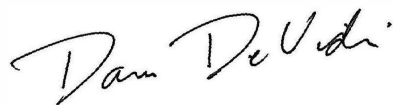


Mark Giesbrecht  
Dean, Faculty of Mathematics

26 September 2023

Faculty Dean \_\_\_\_\_ Date

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



July 11, 2023

Associate Vice-President, Academic \_\_\_\_\_ Date

(For undergraduate and augmented programs)

On behalf of the Associate Vice-President, Graduate Studies and Postdoctoral Affairs



UNIVERSITY OF  
**WATERLOO**