

Two-Year Progress Report

Quantum Information Collaborative Graduate Program (MAsc, MMath, MSc, PhD)

May 2020

Background: A site visit to the University took place on October 30 and 31, 2017. The external reviewer's stated:

"The program is in excellent standing. It has a fantastic international reputation: the program is able to attract top talent internationally, and graduates are able to find excellent job opportunities all over the world. It also appears that most graduates seem to have no difficulty finding attractive opportunities in academia. The program appears to be very well set up and thought out from the beginning".

The Final Assessment Report, which included the reviewer's recommendations, was accepted at Senate Graduate and Research Council, October 2019 and then Senate November 2019.

Progress on Implementation Plan

Recommendations

The recommendations advanced by the review team, along with the responses to these recommendations presented in this report, are listed below.

1. We suggest that a review be conducted to determine if better transportation between the campuses can be arranged.

Status: Completed

Details: At the urging of IQC faculty, the University has greatly increased the level of service. There is now a night-time safety shuttle, managed by the campus police, that services RAC after normal business hours.

2. It might be beneficial for the students at IQC to implement a weekly journal club meeting (if this is not already in place). Such a meeting could encourage more student interactions but this may increase the total number of seminars and talks offered at the Institute, thereby diluting the importance of each.

Status: **Completed**

Details: There is a weekly journal club that takes place at RAC on Fridays. We have also restarted the IQC Student Seminar which takes place weekly and provides students an opportunity to present short (~15 min) talks on their own research.

3. We have obtained hearsay evidence that there are not enough seminars that are more mathematically focused.

Status: **Completed**

Details: There are many mathematically focused seminars given by IQC students, postdocs, faculty, and visitors. For example, we run an annual conference “Quantum Innovators in Computer Science and Mathematics” which includes about 15 talks, each one hour in length, given by early career researchers working on theoretical aspects of quantum information science. Every PhD student enrolled in the QI graduate program, including students working on mathematical aspects of quantum information, is required to present two research-level seminars as part of their studies. The IQC Colloquium Committee routinely issues invitations to researchers in all areas of quantum information science, including mathematically focused areas. In addition, seminars at Perimeter Institute and in departmental seminar series and colloquia (such as C&O’s Tutte Seminar) often feature talks on mathematical aspects of quantum information. It is therefore difficult to take this bit of hearsay evidence as a basis for further action.

4. We have been told that international students would very much appreciate increased help from the university regarding administrative procedures for obtaining visas.

Status: **Completed**

Details: IQC naturally supports both its international student members and the request on their behalf for administrative help from the university concerning visas. As a specific action, we have added links to the IQC Graduate Studies webpage that connect students to University resources supporting international students including the “[International Student Guide](#)” and the “[International Student Resources](#)” page of the Student Success Office. An instruction to maintain the visibility of international student resources has been added to the IQC website project management documentation.

5. We have heard that in some departments TA assignments to graduate students especially for introductory courses require an excessive amount of time; however, in most departments this seemed not to be an issue.

Status: **Completed/Ongoing**

Details: While TA assignments are a departmental responsibility, we feel it is important for our students in different departments to feel like equal citizens. Accordingly, IQC will seek to help graduate students who feel that their TA assignments are out of alignment with their peers, by advocating to the departments on their behalf.

6. We heard that, for some departments, it can take substantial time to provide an offer letter to a graduate student after the prospective advisor has accepted the student. Such a delay can be a problem in a competitive environment where one tries to hire the best students on the market. We recommend looking into this issue, as streamlining this process could provide a competitive advantage to the University of Waterloo.

Status: **Completed/Ongoing**

Details: IQC agrees that graduate student offer letters should be sent to accepted graduate students as soon as possible, and makes every attempt to work with the departments and schools to do this in a timely manner. However, IQC does not handle graduate student admissions. IQC will, however, make sure that no IQC process slows down the generation of offer letters.

7. We were told that restrictions in some departments on the composition of the thesis committee put unnecessary constraints in bringing in members outside the department. In an interdisciplinary operation like IQC this seems to be an inappropriate limitation.

Status: **Completed/Ongoing**

Details: This is a departmental/faculty issue which is difficult for IQC to address directly. However, it is clear that allowing more interdisciplinary committees would be of benefit to the IQC program and students. Where possible, IQC will advocate to the departments and faculties for this.

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

8. As self-identified need, IQC has committed to increasing gender equity and parity within the faculty and the Institute in general.

Status: **Completed/Ongoing**

Details: IQC is actively recruiting female faculty, with promising results. The “Quantum Innovators” workshops held each fall invites top postdocs to IQC for a pair of conferences (one oriented towards science/engineering and one towards math/computer science). Many of our faculty hires first come to IQC to attend these workshops. Over the last few years, we have

actively pursued gender equity and parity goals in inviting and recruiting participants. We achieved gender parity for the first time in 2018 and have maintained that. This has been very effective in recruiting female faculty, with IQC hiring three new female faculty members in the last five years, all of whom participated in Quantum Innovators before applying to IQC.

We have also succeeded in reaching gender parity in our other major recruiting and outreach programs, including the USEQIP summer school for undergraduates and the QCSYS summer school for grade 11 and 12 students. Beyond outreach and education, both of these programs are relevant to recruiting for our graduate program.

IQC is also a sponsor of the Canadian Conference for Undergraduate Women in Physics (CCUWiP). We have further partnered with groups like the Canadian Association for Girls in Science (CAGIS) for multiple workshops, as well as presented at workshops for high-school students hosted by the Department of Physics & Astronomy and the Centre of Education in Mathematics and Computing.

Updated Implementation Plan

	Recommendations	Proposed Actions	Responsibility for Leading and Resourcing (if applicable) the Actions	Timeline for addressing Recommendations
1.	Review transportation between RAC and QNC.	After-hours shuttle service has already been implemented. Satisfaction will continue to be monitored.	Na Young Kim (IQC faculty member); Kevin Resch (IQC Executive Director)	Completed
2.	Implementation of weekly journal club for students	There already is a weekly journal club and, in addition, we have implemented a student research seminar.	Norbert Lutkenhaus (IQC faculty member) is managing the student seminar.	Completed
3.	Increase the number of mathematically focused seminars	No follow-up required, the number of mathematically focused seminars is deemed ample.	n/a	Completed
4.	Offer help to international students in obtaining visas.	No follow-up is required. This issue is outside of IQC's scope, and affects all international students at the university.	Communications staff will maintain links to appropriate information.	Completed
5.	Investigate time requirements for introductory course TA assignments.	IQC will help graduate students who feel that their TA assignments are excessive.	Chris Wilson (IQC Graduate Director)	Completed/Ongoing
6.	Investigate graduate student offer letter timeliness	IQC will assure that no IQC process slows the production of offer letters.	Chris Wilson (IQC Graduate Director)	Completed/Ongoing
7.	Investigate thesis committee membership compositions	Where possible, IQC will advocate for more liberal policies on interdisciplinary committees	Chris Wilson (IQC Graduate Director)	Completed/Ongoing
8.	Take steps toward achieving gender equity [self-identified need].	Continue to prioritize hiring women faculty members and bringing in female researchers to give colloquia and seminars. Maintain gender balance in the recruiting events Quantum Innovators and USEQIP.	Kevin Resch (IQC Executive Director); IQC colloquium committee; IQC Equity and Inclusivity Committee; IQC conference committee; QCSYS, USEQIP and Quantum Innovators organizing committees	Completed/Ongoing

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



2022-2023

Date of next program review: -

Date

Signatures of Approval:

Digitally signed by John Watrous
ou= University of Waterloo, Institute for
Quantum Computing, o= University of
Waterloo, l= Waterloo, st= Ontario, c=
CA, email=john.watrous@uwaterloo.ca
Date: 2021.06.01 15:10:56 EDT

Chair/Director

Date

AFIW Administrative Dean/Head (For AFIW programs only)

Date

Mark Giesbrecht
Dean, Faculty of Mathematics

June 3, 2021

Faculty Dean of Mathematics

Date

June 4, 2021

Faculty Dean of Engineering

Date

Faculty Dean of Science

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.

October 28, 2020

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

Date