

Program Progress Report
Institutional Quality Assurance Program (IQAP) Review
MATHEMATICS M.SC. AND PH.D. PROGRAMS

Date of Site Visit: February 12-13, 2018

Progress Report Prepared by: Matheus Grasselli, Chair, Mathematics and Statistics

Please outline below how recommendations from the initial program review have been addressed.

Recommendation: 1. Enhance TA training
Responsibility for Implementation: TA coordinator, Associate Chair (Undergraduate), Associate Chair (Graduate)
Anticipated Timeline for Completion: 2018-2019
Additional Notes/Commentary: This recommendation included: <ul style="list-style-type: none"> • Creating a training course for TAs focused on teaching skills • Providing all TAs receive teaching evaluations from students (where appropriate), from their peers and that a faculty member evaluates their teaching • Providing ESL (English as a Second Language) training as appropriate • Designing specific pedagogy training for math TAs
Progress (check one) <input checked="" type="checkbox"/> Completed <input type="checkbox"/> In Progress <input type="checkbox"/> Other (please explain)
Department's Comments: The issue of TA training was extensively discussed by the Graduate and Undergraduate Committees in the Department, with input from several faculty members involved in pedagogical research and initiatives, as well as the MacPherson Institute. In addition, Drs. Bartek Protas and Miroslav Lovric attended a weeklong workshop <i>Improving The Preparation of Graduate Students to Teach Undergraduate Mathematics</i> (June 10-12) at the Mathematical Sciences Research Institute (MSRI) in Berkeley, with the purpose of comparing and discussing best practices for TA training across universities in North America.

As a result, beginning in Fall 2019, the Department introduced a one-hour training session for all incoming graduate students during the Graduate Welcome Day in September conducted by the MacPherson Institute, with a focus on specific skills for teaching math and stats.

Beginning in 2020-21, we have extended this training to include a one-hour follow up session for all incoming and continuing graduate students at the start of the Winter term. This is also conducted by the MacPherson Institute and is focused on providing targeted feedback after the students have had experience in their first (or more) terms as TAs.

From 2021-22 onwards, these two modules of training (one hour in Fall, one hour in Winter) are to be extended by the mandatory 5-hour TA training being offered to all incoming graduate students at McMaster, consisting of one hour on "TA Professionalism, Rights and Responsibilities", two hours on "Anti-oppression", and two additional hours on topics to be selected by the students from a list provided by the university (for example, "mental health", "active learning", etc.).

ESL training has also been expanded with the creation of the MERGE (McMaster English Readiness for Graduate Excellence) program in 2019, an intensive 200-hour summer program specifically designed for graduate students. This program is now recommended to graduate students in the Department who might benefit from such training; a number of them have taken advantage of it, including a few recipients of a special scholarship by the Provost Office covering the cost of tuition in the program. We envisage that, with the increase in the number of international students in our graduate programs, more students might want to enrol in MERGE. If available, targeted funding to offset the cost of tuition for this program (currently \$7,500) could be very effective.

Finally, the Graduate Student Handbook (available online at the Department website and updated regularly since 2018) summarizes these training opportunities and also offers information on teaching evaluation from students, professors, and the TA coordinator.

Dean's Comments:

The department has outlined several steps to enhance the TA training of students. We fully support their efforts. The new, mandatory TA training offered by McMaster to all students is a significant step towards improving the quality of training and addressing equity and diversity issues. Funding models for MERGE are being discussed at the senior leadership level of the university (Provost's Council).

QAC Comments (to be filled in by Quality Assurance Committee):

QAC reviewed this report and had no further comments or concerns.

Recommendation: 2. Faculty renewal
Responsibility for Implementation: Chair on advice from the Department and the Appointments Committee
Anticipated Timeline for Completion: Next five years
Additional Notes/Commentary: Submit proposals to the Faculty for new faculty positions needed to support the Department's academic plan and teaching/research needs.
Progress (check one) <input checked="" type="checkbox"/> Completed <input type="checkbox"/> In Progress <input type="checkbox"/> Other (please explain)
Department's Comments: Since the site visit, the following hires have been completed: Dr. Anas Abdallah (Assistant Professor, teaching stream, Actuarial Sciences), January 2019 Dr. Siyuan Lu (Assistant Professor, tenure track, Differential Geometry), July 2019 Dr. Noah Forman (Assistant Professor, tenure track, Probability and Statistics), July 2019 Dr. Jenna Rajchgot (Assistant Professor, tenure track, Algebraic Geometry), July 2020 Dr. Cameron Franc (Assistant Professor, tenure track, Number Theory), July 2020 Dr. Erin Clements (Assistant Professor, teaching stream, Mathematics), July 2020 Dr. Caroline Junkins (Assistant Professor, teaching stream, Mathematics), July 2020 Dr. Pratheepa Jeganathan (Assistant Professor, tenure track, Statistics and Data Science), January 2021 Dr. Blaise Bourdin (Professor, tenured, Mathematical Analysis and Applications), July 2021 In addition, the Faculty of Science approved a tenure-track Assistant Professor position in Data Science in Actuarial and Financial Mathematics and a teaching-stream Assistant Professor position in Statistics, both to start in July 2022. These new hires greatly expanded the teaching and graduate supervisory capacity in the Department.
Dean's Comments: Faculty of Science is committed to supporting the Department of Mathematics and Statistics in their teaching, graduate training, and research missions. This is reflected in approving many new faculty positions since the IQAP review three years ago. These hires have been made as part of a process established by the Dean by which every department in Science submits applications each year outlining hiring of faculty in areas according to their strategic priorities. These submissions are evaluated by a committee with representation from all departments and recommendations are considered by the dean for inclusion in the yearly budget submission.

QAC Comments (to be filled in by Quality Assurance Committee):

See above

Recommendation: **3. Student input in scheduling of grad courses**

Responsibility for Implementation: Associate Chair (Graduate)

Anticipated Timeline for Completion: 2018-2019

Additional Notes/Commentary:

Include a graduate student on the Graduate Committee; poll graduate students for suggestions for graduate courses; explore other ways to better engage graduate students in the planning of the graduate programme.

Progress (check one)

☒ Completed

☐ In Progress

☐ Other (please explain)

Department's Comments:

The Math and Stats Grad Student Association (MS-GS) was created in 2019 as an official McMaster Graduate Student Association (GSA) Club. The President of the MS-GSA is now a regular member of the Graduate Committee. One of the tasks of the Association is to poll graduate students in the Fall term and ask which courses they intend to take the following academic year, including both core and optional courses. This gives an indication of the actual demand for graduate courses based on the current cohort of students and helps the Chair and Associate Chair (Graduate) choose which courses should be offered when deciding on teaching assignments around January-February of each year, in advance of the preparation of the budget for the next fiscal year (starting in March).

Taking into account courses that are needed to be offered every year for the purpose of core requirements and comprehensive exam preparation, as well as established rotations of specific sequences (e.g. Geometry and Topology courses), the Chair has committed to select at least one Pure Math, one Applied Math, and one Statistics course each year from the top polling courses suggested by graduate students.

Dean's Comments:

The department has acted on this recommendation by taking student input into account when offering courses every year and building a framework for the continued consultation of

graduate students. This annual practice will ensure that students have input into graduate course offerings.

QAC Comments (to be filled in by Quality Assurance Committee):

See above

Recommendation: **4. More staff resources**

Responsibility for Implementation: Chair, Associate Chair (Graduate)

Anticipated Timeline for Completion: 2018-2019

Additional Notes/Commentary: Develop a proposal for at least one new staff position dedicated to the Departmental graduate programmes.

Progress (check one)

☒ Completed

☐ In Progress

☐ Other (please explain)

Department's Comments:

Soon after the site visit, we obtained approval for an additional half-time Graduate Admin Assistant position, which was filled in September 2018 by Hanadi Attar-Elbard. After the retirement of Diana Holmes -- the long-time staff member mentioned in the Final Assessment Report as the sole Graduate Admin Assistant at the time of the site visit -- in July 2021, the position of Hanadi Attar-Elbard was converted to full time and we also obtained approval to hire another full time Graduate Admin Assistant, Hania Zahid, starting September 2021. These two positions now provide support to all graduate programs in the Department (math, stats, financial math), as well as the Computational Science and Engineering (CSE) program.

Dean's Comments:

Staffing resources in the Faculty of Science are considered as part of our yearly budget submission process. All departments submit forward facing budget plans and requests which are then considered in the development of the budget for the Faculty of Science. The Math and Stats department has been very collaborative and comprehensive in the development and submission of their budget and the resourcing available is reflective of that process.

QAC Comments (to be filled in by Quality Assurance Committee):

See above

Recommendation: 5. Modify funding model for graduate students
Responsibility for Implementation: Chair, Associate Chair (Graduate)
Anticipated Timeline for Completion: 2018-2019
Additional Notes/Commentary: Explore funding models for graduate students that are more sustainable and better balanced for the Department and supervisors.
Progress (check one) <input type="checkbox"/> Completed <input checked="" type="checkbox"/> In Progress <input type="checkbox"/> Other (please explain)
Department's Comments: <p>A comprehensive review of graduate finances was conducted in 2018-19 and revealed a structural deficit of the order of \$3,000 per student on average, that is to say, close to \$200,000 in total. Among alternative solutions presented to the Dean for a sustainable funding model, the preferred one was to increase the amount of research funding provided by the Faculty of Science to the Department. Beginning in fiscal 2020-21, the Dean agreed to increase the research support by the amount of \$375,000, equivalent to the contribution of researchers towards the Postdoctoral Program, with flexibility towards the use of these funds, provided that the graduate program budget be balanced.</p> <p>After extensive consultation with Department members, including an ad-hoc committee tasked with evaluating scenarios for the use of these research funds, it was agreed that it should be used to balance the graduate program budget each year, with the remaining funds being equally distributed as research support towards the salary of postdoctoral fellows.</p> <p>This has been done in 2020-21 and budgeted for 2021-22, with considerable success. We will continue to monitor the finances of both the graduate and postdoctoral programs and re-examine the use of the additional funds after the first 5 years of implementation of this scheme in order to assess its long-term sustainability.</p>
Dean's Comments: <p>The Department has been very effective and collaborative in their engagement with the budgeting process. The provision of additional funds was made after careful evaluation of a variety of benchmark data in different units in Science including but not limited to student enrolment and success, faculty complement, research impact, and space utilization. The rapidly changing funding situation and the pressures of the pandemic will require us to closely monitor this situation in the coming years.</p>

QAC Comments (to be filled in by Quality Assurance Committee):

See above

Recommendation: **6. Increase intake of international students**

Responsibility for Implementation: Chair, Associate Chair (Graduate)

Anticipated Timeline for Completion: 2018-2019

Additional Notes/Commentary: Explore ways to lower the costs to supervisors and the Department so that we may increase the number of international graduate students.

Progress (check one)

☐ Completed

X In Progress

☐ Other (please explain)

Department's Comments:

Part of the comprehensive review of graduate finances mentioned in Recommendation V above considered whether it was advisable to harmonize grant contributions across different programs (e.g. Masters versus PhD, domestic versus international). It was decided that the current differences in contributions are justified in terms of program duration and level of engagement with supervisor. In particular, members of the Department do not think that the (small) difference in grant contribution for domestic and international students is a material deterrent to being able to supervise international students. Since the announcement of equalization of tuition fees for international PhD students in 2018 there has been a steady increase in admissions of such students across the Faculty of Science in general and in Math & Stats in particular, still taking into account the overall financial sustainability of the graduate programs.

Dean's Comments:

As pointed out by the program, since 2018 McMaster University has equalized the tuition of international and domestic PhD students. This has made it possible for programs to recruit excellent candidates regardless of their nationality. The fiscal costs of the equalization of the tuition difference is currently covered by the Faculty of Science since the incentive is not funded by the province. We are continuing to monitor the financial impact at that Faculty level due to a gradual increase in our international Ph.D. student count and remain engaged with every program to support them as best as possible.

<p>QAC Comments (to be filled in by Quality Assurance Committee):</p> <p>See above</p>
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<p>Recommendation: 7. Schedule Department meetings sufficiently in advance</p>
<p>Responsibility for Implementation: Chair</p>
<p>Anticipated Timeline for Completion: 2018-2019</p>
<p>Additional Notes/Commentary: Ensure that at least one week's notice is given for all Department meetings. Schedule a regular meeting time that does not conflict with faculty teaching schedules</p>
<p>Progress (check one)</p> <p><input checked="" type="checkbox"/> Completed</p> <p><input type="checkbox"/> In Progress</p> <p><input type="checkbox"/> Other (please explain)</p>
<p>Department's Comments:</p> <p>Monthly Department meetings are now scheduled at the start of each academic year and their dates and times are announced by the Chair to all members of the Department. In addition, the Chair sends a reminder about the upcoming meeting at the end of each month, together with other important updates on matters of relevance to the Department.</p>
<p>Dean's Comments:</p> <p>The steps taken by the department in response to the recommendation are appropriate.</p>
<p>QAC Comments (to be filled in by Quality Assurance Committee):</p> <p>See above</p>

<p>Recommendation: 8. Ensure TAs are given a range of assignments during their time at McMaster</p>
<p>Responsibility for Implementation: TA coordinator, Associate Chair (Graduate)</p>

Anticipated Timeline for Completion: 2018-2019
Additional Notes/Commentary: Communicate the current procedure to the TAs more effectively, including through an explanation in the Graduate Student Handbook (also see recommendation IX below).
Progress (check one) <input checked="" type="checkbox"/> Completed <input type="checkbox"/> In Progress <input type="checkbox"/> Other (please explain)
Department's Comments: As mentioned in the Final Assessment Report, it was already a common practice for the Department to give TAs a range of assignments during their time at McMaster. The remaining part of the recommendation, namely to communicate this procedure effectively, was implemented by including this information in the Graduate Student Handbooks (see Recommendation I).
Dean's Comments: We support the department in addressing the recommendation and find the steps appropriate.
QAC Comments (to be filled in by Quality Assurance Committee): See above

Recommendation: 9. Make it clear to students the criteria needed to teach a class
Responsibility for Implementation: Associate Chair (Graduate)
Anticipated Timeline for Completion: Immediately
Additional Notes/Commentary: Add a section to the Graduate Student Handbook fully explaining how TA duties are assigned and evaluated, and what experience students need to be selected to teach a class (see also Recommendations I and VIII above).
Progress (check one) <input checked="" type="checkbox"/> Completed

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| <input type="checkbox"/> In Progress
<input type="checkbox"/> Other (please explain) |
| Department's Comments:

This is now included in the Graduate Student Handbook (see Recommendations I and VIII). |
| Dean's Comments:

The departmental response to the recommendation is appropriate. |
| QAC Comments (to be filled in by Quality Assurance Committee):

See above |