

# Two Year Progress Report

## Mathematical Studies (BMath)

### MAY 2021

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#### Background

In accordance with the University of Waterloo's Institutional Quality Assurance Process (IQAP), the Mathematical Studies program underwent an external review by Dr. Timothy Sibbald (Nipissing University) and Dr. Gerda de Vries (University of Alberta) on November 16<sup>th</sup> & 17<sup>th</sup>, 2017. The final assessment report for the program was completed in January 2019.

#### Progress on Implementation Plan

#### Recommendations

1. Recommendation: We strongly recommend the appointment of a Director for the Mathematical Studies program. The Director needs to be someone who has the time and authority to evolve the program, solve problems (for example, to work with departments to resolve simple course scheduling conflicts or to resolve course sequencing issues), and advocate for students in the program.

**Status:** completed

**Details:** In November 2018, a Mathematical Studies Committee was formed and the Associate Dean Undergraduate Studies was the Director of the program. In February 2021, a new Director of Mathematical Studies, with no other administrative duties, was appointed, and a new Mathematical Studies Committee was formed.

2. Recommendation: The stigmatization of students in this program and the program itself needs to be addressed. We recognize that this will be a challenge since the institution promotes high-performing students while many students in the Mathematical Studies program are there because of low averages or exceeding the maximum number of failed/excluded courses for departmental programs

**Status:** completed

**Details:** We have undertaken several initiatives to reduce negative perceptions of the program.

As will be addressed in Recommendation 3, the program will attempt to remove some of the plan's stigma by celebrating its graduates in a public setting.

After discussions with some Mathematical Studies students and analyzing results of a recent survey of Mathematical Studies students (see Recommendation 6), much of the negative perception of the program by students in the program are caused by:

- students enrolled in other Faculty of Mathematics baccalaureate plans being forced into

- Mathematical Studies once they earned more than four failures.
- students in the program feel that there is a lack of career direction.

To address the first concern, we are changing the messaging to students enrolled in other plans once they earn more than four failures. In particular, we will be providing students with their options and offer career and academic advice. We feel that this new messaging changes the focus from the student being punished for getting more than four failures to one of showing our goal of helping them succeed and of looking ahead to their future. We also believe that giving the students some agency in the decision will greatly increase the likelihood of them working hard to succeed in whatever option they choose.

To address the second concern, we have greatly increased the number of academic advisors for the Mathematical Studies plan and we have updated the Mathematical Studies webpage to include information from the Centre for Career Action. The Mathematical Studies committee will continue to work with the Centre for Career Action and with Co-operative Education so that we can provide Mathematical Studies students with help in career planning and co-op opportunities.

3. **Recommendation:** To aid with the removal of the stigma, we recommend that the Faculty reviews its Calendar entry and promotional material for the program to highlight the opportunities that students have to personalize this program (for example by adding the Business Specialization and/or Minor). Celebrating successful students in the program (especially those who may have struggled at the outset) should also help.

**Status:** ongoing

**Details:** The Mathematical Studies Committee has revised some of the promotional material, the messaging for some students enrolling in the program (as in Recommendation 2), and the Mathematical Studies webpage. The MS committee intends to review all of these regularly.

To celebrate successful students who have graduated from Mathematical Studies, the program hosted a Mathematical Studies Career Panel discussion November 7, 2018. To do this, several graduates from the plan were invited to talk to students currently in the plan and answer their questions about career options for the future. The next career panel is being planned for July 2021.

4. **Recommendation:** The Faculty may wish to consider making the Mathematical Studies program the point of entry for all students, from which students can launch into departmental programs if they so desire.

**Status:** in progress

**Details:** In November 2018, the Mathematics Undergraduate Affairs Committee (UAC) decided to form a committee that will discuss the possibility of having all BMath students start in a plan that is either Mathematical Studies or similar to Mathematical Studies. Unfortunately, due to other issues arising, a committee was never formed. This has been brought to the attention of the Associate Dean Undergraduate Studies who brought the issue back to UAC in April 2021. Further discussions will occur.

5. Recommendation: It will be a worthwhile endeavor for the Faculty to review the prerequisite structure of its courses. Are there unintended or outdated barrier to certain courses that can be removed? Perhaps some courses can have multiple entry points (for example, either a specific specialist course or a combination of non-specialist courses). Alternatively, a prerequisite waiver system (whereby students gain permissions to take a certain course upon approval by the instructor and program Director) might address issues surrounding course sequencing.

**Status:** in progress

**Details:** The Mathematical Studies Committee is working with the Associated Dean Undergraduate Studies and UAC to see if any prerequisites can be modified.

The University of Waterloo already has a course override procedure in place, so trying to introduce an additional waiver system has been determined to be unfeasible. However, it is likely that not all students are aware of the existing procedure or other options that are available to them. We intend to rectify this by providing information on the Mathematical Studies webpage and through academic advising.

Additionally, the Mathematical Studies Committee is looking into having tools created that will help students with academic planning so that they can much more easily see what courses are available to them and how taking a certain course might restrict or open up future courses. Additionally, we have added a graduation checklist to the Mathematical Studies website.

6. Recommendation: We recommend that the Faculty invests in getting to know the students in the Mathematical Studies program, and evolve its curriculum accordingly. How did the students arrive in the program? What needs to the different constituencies have? We expect that the needs of students who purposely choose the program for its flexibility are different than the needs of students who are forced into the program due to low averages or exceeding the maximum number of failed/excluded courses for departmental programs. Likewise, the needs of students in the program who started in the Faculty may be different than the needs of students who transferred from another Faculty. For students who were forced into the program, are there support systems that can be put in place to help them adjust and succeed?

**Status:** ongoing

**Details:** The formation of the Mathematical Studies Committee has provided an opportunity for Mathematical Studies advisors and Mathematical Studies students to voice their concerns about Mathematical Studies and important issues going on with these students.

In March 2021, the Mathematical Studies students were surveyed to determine their feelings of the program and for their suggestions on how to improve the program. Analysis of the results have led to several new initiatives including forming a Mathematics Studies students' community and looking at creating courses specifically designed for the Mathematical Studies program.

With the help of the Math Undergraduate Office and the Student Success Office, we are collecting and

analyzing data regarding the journey of Mathematical Studies students to better understand what factors have helped to contribute to their success but also to learn what we can do differently to better support our students.

**Updated Implementation Plan:**

	Recommendations	Proposed Actions	Responsibility for Leading and Resourcing (if applicable) the Actions	Timeline for addressing Recommendations
1.	We strongly recommend the appointment of a Director for the Mathematical Studies (MS) plan.	<ol style="list-style-type: none"> <li>1. Appoint a new director.</li> <li>2. Form a Mathematical Studies Committee.</li> </ol>	<p>ADUG</p> <p>Director</p>	<p>Completed February 2021</p> <p>Completed February 2021</p>
2.	The stigmatization of students in this plan and the plan itself needs to be addressed.	<ol style="list-style-type: none"> <li>1. Celebrate MS success stories of previous graduates. See recommendation 3.</li> <li>2. Change messaging for students enrolling in the program.</li> <li>3. Increase amount of career, and academic support to students.</li> </ol>	<p>MS Committee</p> <p>MS Committee</p> <p>MS Committee</p>	<p>Completed November 2018. Next panel scheduled for July 2021</p> <p>Completed April 2021</p> <p>Completed April 2021</p>
3.	We recommend that the Faculty reviews its calendar entry and promotional materials for the plan to highlight the opportunities that students have to personalize this plan.	<ol style="list-style-type: none"> <li>1. Update promotional materials, the MS website, the Mathematics Advisor website</li> <li>2. Organize a MS Career Panel where alumni share their experiences and answer questions from the current students.</li> </ol>	<p>MS Committee</p> <p>MS Committee</p>	<p>Completed April 2021 and ongoing</p> <p>Completed November 2018 and ongoing</p>

4.	The Faculty may wish to consider making the Mathematical Studies plan the point of entry for all students.	1. The Faculty's Undergraduate Affairs Committee (UAC) will discuss the advantages and disadvantages of having direct entry of all Math students into	UAC	December 2021
5.	Review the prerequisite structure of the Faculty's courses or consider a prerequisite waiver system.	<ol style="list-style-type: none"> <li>1. Look at modifying prerequisites of certain courses</li> <li>2. Increase student awareness of options regarding course overrides or retaking courses</li> <li>3. Create a graduation check-list to help MS students track their progress</li> <li>4. Create an online tool to help MS students navigate pre-req chains</li> </ol>	MS Committee and UAC  MS Committee  MS Committee  MS Committee	December 2021  June 2021  Completed March 2021  December 2021
6.	We recommend that the Faculty invests in getting to know the students in the Mathematical Studies plan, and evolve its curriculum accordingly.	<ol style="list-style-type: none"> <li>1. Create a survey to get feedback from MS students on the program and courses.</li> <li>2. Gather data to look at the distribution of students in this plan to better understand how students end up in the plan and what factors most contribute to their success.</li> </ol>	MS Committee  MS Committee	Completed March 2021  July 2021


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

**Report on anything else you believe is appropriate to bring to Senate concerning this program: N/A**


Date of next program review: \_\_\_\_\_ **2021-22**  
Date

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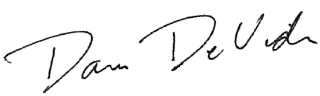
**Signatures of Approval:**

 Dan Wolczuk  
Director of Math Studie  
Chair/Director  
May 19, 2021  
Date

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AFIW Administrative Dean/Head (For AFIW programs only) Date  
 Mark Giesbrecht  
Dean, Faculty of Mathematics  
Faculty Dean  
May 18, 2021  
Date

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 Dan DeVida  
Associate Vice-President, Academic  
(For undergraduate and augmented programs)  
June, 2021  
Date

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Associate Provost, Graduate Studies  
(For Graduate and augmented programs) Date

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