

UTQAP Cyclical Review: Final Assessment Report and Implementation Plan

1. Review Summary

Program Reviewed:	Master of Biotechnology (MBiotech)
Division/Unit Reviewed OR Division/Unit Offering Program(s):	Institute for Management and Innovation (IMI), University of Toronto Mississauga (UTM) [Program only review]
Commissioning Officer:	Vice-Principal Academic & Dean, UTM
Reviewers (Name, Affiliation):	1. Professor Janice E.A. Braun, Department of Biochemistry & Molecular Biology, University of Calgary 2. Professor Jocelyn Rose, Director, Institute of Biotechnology, Cornell University 3. Professor Reza Salavati, Graduate Program Director, Institute of Parasitology, McGill University
Date of Review Visit:	March 25 – 26, 2019
Date Presented to AP&P:	May 6, 2020

Previous UTQAP Review

Date: May 23-24, 2012

Summary of Findings and Recommendations

1. Graduate Programs

The reviewers observed the following strengths:

- Strong applicants and students
- Innovative program with strong interdisciplinary focus and training
- High quality internships facilitated by strong extramural industrial relationships and support
- Focus on knowledge translation and problem solving

The reviewers made the following recommendations:

- Review the curriculum, including establishing clear knowledge and skills objectives that align with methods of assessment
- Identify prerequisite knowledge and skills in the biological sciences and chemistry to ensure that students can draw on a common body of knowledge
- Coordinate a North America-wide recruitment effort to raise the program's profile and increase the quality of students to an even higher level
- Build relationships between disciplines and with other programs and departments within the University to increase interaction across disciplines, build community for students and drive improvement and sustainability

Faculty/Research

The reviewers observed the following strengths:

- Excellent, engaged and enthusiastic teaching staff

Administration

The reviewers made the following recommendations:

- Adjust governance and administrative structures to facilitate discussion of the program's future directions and scope

Last OCGS review date: August 2007

Current Review: Documentation and Consultation

Documentation Provided to Reviewers

Terms of reference; MBiotech Program Self-Study 2019; Previous review report including the administrative response(s); Access to all course descriptions; Access to the curricula vitae of

faculty; UTM Degree Level Expectations, 2016; UofT Facts & Figures, 2016; UTM Divisional Academic Plan, 2017; UTM Vision Statement, 2017; UTM Academic Calendar, 2018-2019; UTM Viewbook, 2018-2019; UofT Domestic Viewbook, 2018-2019; Tri-Campus Framework.

Consultation Process

The reviewers met with the Vice-Principal, Academic and Dean; the Acting Vice-Dean, Teaching & Learning; the Director of the Institute for Management & Innovation (IMI); the Director of the MBiotech Program; the Associate Director of the MBiotech Program; Science and Management teaching stream faculty members; current students; program alumni; program administrative staff; and IMI administrative staff.

Current Review: Findings and Recommendations

1. Undergraduate Program (n/a)

2. Graduate Program

The reviewers observed the following **strengths**:

- Overall quality
 - Excellence of the MBiotech is widely recognized, both regionally and nationally
- Objectives
 - Effectively prepares students for diverse careers in biotechnology, with particular impact in the pharmaceutical industry
 - Students develop leadership skills to strategically innovate, collaborate, and execute biotechnology projects
 - Program objectives are consistent and clearly articulated
- Admissions requirements
 - Program attracts very high-quality applicants
- Curriculum and program delivery
 - The new Digital Health Technologies field is well conceived and has great potential for training students in an important emerging technology sector
 - Innovation, creativity and team work are evident in the curriculum
 - Successful implementation of collaborative research projects with industry into two mandatory courses and one elective
- Accessibility and diversity
 - Diversity training is available for students
 - Admission requirements, student completion rates and accessibility to physical mental health accommodations have been well considered
- Student engagement, experience and program support services
 - Opportunities for experiential learning beyond the classroom are very strong

- Quality indicators – alumni
 - “high-functioning and high-performing Master’s Degree program”, with 297 out of 303 surveyed graduates fully employed

The reviewers identified the following **areas of concern**:

- Curriculum and program delivery
 - Digital Health Technologies (DHT) field - details of the curriculum, together with the financial and teaching resources needed to support the initiative, should be clarified
- Accessibility and diversity
 - Reviewers expressed concern that the issue of diversity in MBiotech admissions was not addressed in the Self-Study (although constituents expressed enthusiasm during site visit interviews for increasing diversity in the program)

The reviewers made the following **recommendations**:

- Admissions requirements
 - Consider opportunities for MBiotech to take a greater leadership role in recruiting international trainees funded by their home institutions/government
- Curriculum and program delivery
 - Conduct a formal survey of teaching performance and curriculum effectiveness, incorporating feedback from both current students and alumni
 - Discuss and finalize the DHT curriculum with faculty and administrators in a timely manner, and identify course instructors with the necessary expertise
 - Some students felt the program would benefit from increased representation from the agricultural/plant biotechnology sector
 - Better integrate BTC2000 course with job placements that occur later in the program
 - Add ‘health insurance’ as a specific topic
 - Consider introducing separate theory and research-focused courses in the program for each of the three departments (Biology, Management and Chemistry), delivered by a total of six faculty members
 - Research activities and productivity of the program could be improved by providing elective courses, delivered by tenure-stream faculty
 - Include bioethics in the curriculum
- Innovation
 - Explore opportunities to introduce more cutting edge research into the program, such as offering electives in areas like NMR (Nuclear Magnetic Resonance) in the biological context
- Accessibility and diversity
 - Track gender balance in the program
- Student engagement, experience and program support services

- Leverage alumni network and program ‘brand recognition’ to enhance student experience and workplace preparation
- Explore development of an alumni directory, based on self-identification
- Provide a more extensive overview to students of the various types of roles within a company, prior to requesting decisions about internship opportunities

3. Faculty/Research

The reviewers identified the following **areas of concern**:

- Research
 - By design, MBiotech is not aimed at developing “business skills and entrepreneurial aspirations” in students so has limited research activities and related productivity
 - Challenges around identifying new sources of research funding

The reviewers made the following **recommendations**:

- Research
 - Identify and secure new sources of research funding
- Faculty
 - Consider hires in Biology and Management, (in the respective areas of Computational Biology, and Analytics and Business Intelligence) to support the delivery of research-focused courses in the MBiotech program
 - Develop succession plans for teaching

4. Administration

The reviewers observed the following **strengths**:

- Relationships
 - MBiotech has a very strong and positive internal and external identity, and a remarkably positive ‘market brand’
 - Extensive and active alumni network, who view MBiotech as pivotal in their professional careers and wish to remain engaged with the program and support its future development
- Organizational and financial structure
 - Program has strong management and leadership, and a well-articulated vision
- Long-range planning and overall assessment
 - “The University of Toronto is fortunate to have MBiotech as a ‘gem’ that offers remarkably positive recognition in Canada. The unit should be congratulated on recruiting, motivating and training promising and talented graduate students.”
- International comparators

- Unique program with few international comparators, and ranks highly in comparison to the small number of similar programs
- Excellent national reputation, due to program's innovative approach to professional education

The reviewers identified the following **areas of concern**:

- Relationships
 - Little evidence of interdisciplinary student collaboration among the IMI graduate programs
 - Lack of clarity regarding the relationship between MBiotech and IMI
 - Reviewers recognized the challenges faced by the MBiotech administration in overseeing a program involving multiple departments and interacting with six department Chairs, with often competing interests
- Organizational and financial structure
 - The value of the Institute for Management and Innovation (IMI) overseeing MBiotech operations is unclear; while the stated goals of this organizational structure are to increase efficiency and enhance interactions with other IMI programs, relationships and activities associated with admissions and marketing are not well defined
 - The reviewers found the MBiotech financial structure described in the 2019 Self-Study to be unclear and were therefore unable to explicitly comment on it; internal confusion around financial structure and administrative oversight of the budget was also evident during the site visit
 - Lack of transparency regarding financial resources needed to support a national and international MBiotech marketing strategy; limited evidence of a focused and manageable set of marketing priorities; lack of clarity regarding roles and responsibilities for recruitment activities
- Long-range planning and overall assessment
 - No significant private space where staff and students can discuss sensitive matters
 - Challenges identified regarding maintenance of aging laboratory facilities, and strain on equipment and space caused by the large number of students
 - In contrast to the MBiotech program, IMI “does not appear to have a clear mission or strong identity”, although this may be a reflection of its relatively recent establishment

The reviewers made the following **recommendations**:

- Relationships
 - Develop connections with other IMI programs to foster student networking and professional development opportunities
 - Establish a forum to enhance communication between students, alumni, faculty and staff, formalize student/alumni interaction, and provide feedback to program administration

- Establish an Industry Advisory Board for MBiotech to further enhance opportunities for interaction, networking and lobbying
- MBiotech could benefit from an annual retreat involving faculty, staff and possibly alumni, to allow faculty to exchange ideas and strengthen the program's identity
- Implement a formalized system of staff performance reviews and conversations to encourage and enhance career development
- Organizational and financial structure
 - Consider possibility of assigning more budgetary and organizational control to the MBiotech program director and administrative staff
 - Continue exploring plans to transition IMI to an organizational structure that would allow faculty hires with full-time appointments in IMI
 - Reviewers felt strongly that MBiotech alumni represent a significant opportunity for new revenue generation; engage with advancement to explore opportunities to initiate a capital campaign to promote MBiotech activities and sustainability
 - Faculty and program administrators could benefit from an alignment and execution of the MBiotech program around a transparent annual operating budget, to better assess operational effectiveness and target resources to increase their impact, and identify program priorities
 - Assess all financial and personnel needs of the new DHT concentration and secure the necessary resources; consider opportunities to leverage expertise in medical biostatistics that exists in downtown Toronto for teaching in DHT
- Long-range planning and overall assessment
 - Create dedicated space for private interaction between students and staff
 - Promote the 'MBiotech brand' while remaining sensitive to the potential risk of dilution of impact and identity by assimilation within IMI

2. Administrative Response & Implementation Plan



UNIVERSITY OF
TORONTO
MISSISSAUGA

OFFICE OF THE DEAN

February 28, 2020

Professor Susan McCahan
Vice-Provost, Academic Programs
Simcoe Hall
University of Toronto

Dear Professor McCahan:

We are writing to provide an administrative response to the External Review of UTM's Master of Biotechnology (MBiotech) Program, which was held in March of 2019. This is a professional graduate program offered by our Institute for Management & Innovation (IMI). Overall, the reviewers found that the Program offered an innovative approach to professional education, praising their success at training talented and qualified students for diverse careers in biotechnology and highlighting the impressive employment rates of MBiotech graduates across multiple sectors. Additionally, the reviewers noted that the new Digital Health Technologies (DHT) field was well conceived and offered great potential to students in an important and emerging technology sector. This is a strong foundation for the Program to build on as they plan for the next five years and beyond.

Below you will find a brief discussion on specific areas raised by the external reviewers followed by an implementation plan identifying action items and timelines. This response was developed in consultation with the Program, through a Town Hall held on November 27, 2019, as well as from a Director's Administrative Response submitted by Prof. Leigh Revers, Director of MBiotech. Progress checks and monitoring of the implementation plan will occur through Annual Activity Reports submitted to the Director of IMI, with the Director passing on progress in the Annual Activity Reports submitted to the Dean. The next external review of the MBiotech Program is scheduled for the 2025-2026 academic year, with a midway report submitted to your Office in 2022-2023.

The reviewers recommended a more formal survey of teaching performance and curriculum effectiveness, and made a number of recommendations for program enhancement, which mainly arose from their conversations with current students and alumni. In addition to addressing the areas for program enhancement, they encouraged creating better channels for communication and formal feedback among students, alumni, faculty and program leadership on curricular and teaching matters.

Like all other graduate programs, MBiotech uses the University-wide Online Course Evaluation system and trends resulting from these evaluations were provided in the self-study.

On October 18, 2019, MBIotech hosted their first retreat in direct response to the external reviewer's report and recommendations. They plan to make this an annual event for faculty and staff to improve communication and networking as well as capitalize on opportunities for collaboration within the Program. In addition, MBIotech has created an annual State of the Program Lunch (beginning Spring 2020) where the Program and host department's faculty and administration meet to provide updates and discuss academic relationships and opportunities.

In terms of curriculum enhancement, this was the focus of the first Annual MBIotech Retreat and resulted in very positive interactions among faculty and staff. Instructors were able to present and speak about their specific courses while faculty in management and the sciences learned more about the contributions of the complimentary field to the Program.

The reviewers found that more cutting-edge research could be incorporated into the program, and they proposed curricular and complement changes to support this. They identified challenges with research facilities and the need to secure additional research funding.

The Program is actively bringing research faculty back into teaching through a number of initiatives. They are rejuvenating mandatory science courses as well as offering new electives, including special topics courses, to bring in additional research faculty and encourage them to showcase their research in the classroom.

A number of intertwined challenges face the Program due to their status as the junior partner in split faculty appointments, since appointments in the Program can be no higher than 49% as IMI is an EDU-B. Overload or stipend instruction has been frequently required and faculty appointments must be negotiated with a host department. At the Program-level, the new State of the Program Lunches are designed specifically to address some of these faculty issues by increasing contact and improving communication with host departments. At the unit-level, a proposal to re-organize IMI as an EDU-A is currently in development by the IMI Director. As an EDU-A, IMI will be able to take the lead in resolving a number of these faculty and teaching concerns.

Lab space for teaching and graduate student research (not faculty research) is also of particular concern and the Program continues to negotiate their teaching space needs with specific departments (i.e. Chemical & Physical Sciences and Biology) and UTM as a whole. Connections through the State of the Program Lunches will help to some extent with this as well.

While the reviewers praised the DHT field, they were concerned about the lack of a clear teaching base or plan to deliver the materials, and they found the field would be enhanced by

clearer curriculum mapping, complement planning, and communication among faculty and administrators.

A more detailed curriculum map for DHT is in development pending completion of the first DHT cohort by May 2020 and updates will continue. As the review happened before DHT began, the reviewers would not have had the opportunity to speak to many DHT-specific instructors and faculty present for the review would not have been fully aware of the field and its specialized courses. A full review of the DHT field will take place at the next Annual MBIotech Retreat in the Fall of 2020, including the release of the detailed curriculum map.

The reviewers encouraged the program to further leverage its extensive, active alumni network to enhance the student experience, workplace preparation, and fundraising. They recommended the establishment of an Industry Advisory Board to support interactions, networking and advocacy.

MBiotech's new Industry Think-Tank Group (ITT) will launch in Spring 2020 to replace the current Advisory Board and will include a wider selection of alumni. The Program plans to take advantage of the new full-time IMI Alumni Engagement Officer to improve outreach. MBIotech alumni groups currently exist on LinkedIn and Facebook, and they plan to have the Alumni Officer assist in contacting all of their graduates about joining these groups. MBIotech's *FIFTEEN* event held in April 2019 to celebrate the Program's anniversary was attended by 125 alumni and they plan to leverage this event to do more fundraising and outreach. MBIotech is also launching a new International Ambassadors Program aimed at building opportunities for international exchange; they are currently exploring contacts in Paris and Vienna.

The reviewers noted a lack of recognition in the Self-Study of the issue of increasing the diversity of MBIotech admissions. They also recommended tracking gender balance.

Based on data supplied by the Program, the gender balance fluctuates on an annual basis but the aggregate male-female ratio over the last seven years is 0.93, which overall is fairly balanced. The Program's analysis of the two current cohorts indicates significant diversity in terms of cultural/ ethnic background and also in educational background, though admittedly skewed toward UofT.

The reviewers recommended identifying a private space in which staff and students can discuss sensitive information.

Currently faculty and staff offices, other than the Director's office, are all shared. MBIotech plans to bring this issue to the IMI Space Committee and request that suitable space be set

aside to be shared by IMI programs for this purpose. There are currently some rooms available for private meetings and IMI graduate programs have priority for some of this space.

The reviewers stated that one of their overarching concerns was the lack of clarity in the relationship between the MBiotech program and Institute for Management and Innovation (IMI). They recommended developing connections with other programs in IMI to support professional development opportunities and student networking. They noted that the “value of the Institute for Management and Innovation (IMI) overseeing MBiotech operations is unclear” in the areas of marketing, admissions, and internships.

IMI administrators are better suited to address this concern and we expect this will be raised in the IMI external review, scheduled to take place within the next few years. IMI administrators do meet once a term to discuss issues, concerns, and opportunities for collaboration. The IMI Graduate Student Council encourages cross-program networking, and space is held in common and allocated by the IMI Space Committee as noted above. MBiotech itself offers BTC1860H, their Generations of Advanced Medicine: Biologics in Therapy (GAMBiT) elective course, which is open to other IMI programs and students as well as other UofT students broadly. MBiotech is also proposing a staff restructuring through HR, related to discussions about IMI-wide vs. program-specific staffing structures.

Further to this, as stated above, a proposal to re-organize IMI as an EDU-A is currently in development by the IMI Director. In addition to the faculty resourcing concerns that can be alleviated by this status change, as an EDU-A, IMI will be able to better define its own relationship with the professional graduate programs as well as inter-program relationships. Under this proposed new structure, IMI can provide the necessary framework to unify the programs under a collective vision and plan.

The reviewers found that the basis for resource allocation within the program was unclear, and they encouraged the creation of a transparent annual operating budget to allow resources to be targeted to reflect priorities and improve impact.

UTM Business Services, with the support of the Associate Dean, Graduate, has held a review of all IMI graduate program budgetary processes over the past two years. This has resulted in improved understanding of how budgets should be administered at the program-level. In collaboration with the IMI Director, Operations & Finance, the Program has adopted a more rigorous budgetary planning approach in the 2019 fiscal cycle, supported by accurate quarterly forecasting. The MBiotech Program Director has oversight and control over all program budget matters. The thorough and complete use of Internal Orders has enabled precise expense tracking of all courses and major activities (recruiting, employer development, etc.).

Implementation Plan – MBiotech Program, UTM

The Program and the Office of the Dean, in consultation, will undertake the following approaches to enact positive changes:

Immediate Term (6 months)

- Host first Annual MBiotech Retreat (focus on overall curriculum enhancement) *(program)*
- Host first annual State of the Program Lunch with host department chairs *(program and host departments)*
- Rejuvenation of mandatory SCI courses to bring in more cutting-edge research *(program)*
- Creation of new electives, including special topics courses, to bring in additional research faculty and showcase current research on campus *(program and Dean's Office)*
- Launch new Industry Think Tank (ITT) Group to replace current Advisory Board *(program)*
- Discussion with IMI Space Committee to find private space for discussion of sensitive information *(program and IMI)*
- Revision of budgetary processes and planning *(program, Dean's Office, and UTM Business Services)*

Medium Term (1-2 years)

- Host second Annual MBiotech Retreat, focused on DHT field and curriculum map *(program)*
- Continue *State of the Program Lunches*, with special attention to teaching lab space needs *(program, host departments, with support from UTM Facilities and Planning)*
- Continue rejuvenation of mandatory courses and introduction of new electives to highlight research faculty *(program and Dean's Office)*
- Alumni outreach improvement *(program and IMI Alumni Engagement Officer)*
- Development of International Ambassadors Program *(program)*
- Increase connections with other IMI programs *(program and IMI)*

Long Term (3-5 years)

- Continue *State of the Program Lunches* *(program)*
- Continue rejuvenation of mandatory courses and introduction of new electives to highlight research faculty *(program and Dean's Office)*
- Increase connections with other IMI programs *(program and IMI)*

Please let me know if you have any questions about this response.

Sincerely,



Amrita Danieri
Vice-Principal, Academic & Dean



Heather M.-L. Miller
Vice-Dean, Teaching & Learning

AD/hm

Enc: Director's Response to the 2019 External Review of the MBiotech Program, UTM

CC: Leigh Revers, Director of MBiotech Program
Soo Min Toh, Director of Institute for Management & Innovation

3. Committee on Academic Policy & Programs (AP&P) Findings

The spokesperson for the Reading Group reported that the summary covered the full Review. The Group agreed that the Dean's administrative response fully addressed the issues identified. The Group had no specific additional questions or comments.

No follow-up report was requested.

4. Institutional Executive Summary

The reviewers praised the MBiotech program's innovative approach to professional education, stating that the University is "fortunate to have MBiotech as a 'gem' that offers remarkably positive recognition in Canada;" they found that the program prepares talented and highly qualified graduate students for diverse careers in biotechnology, and that alumni have an impressive rate of employment across multiple sectors; they also praised the new Digital Health Technologies (DHT) field, noting that it "is well conceived and has great potential for training students in an important emerging technology sector." The reviewers recommended that the following issues be addressed: conducting a more formal survey of teaching performance and curriculum effectiveness; creating better channels for communication and formal feedback on curricular and teaching matters; incorporating more cutting-edge research into the program; addressing challenges with research facilities and the need to secure additional research funding; addressing the DHT field's lack of a clear teaching base or plan to deliver the materials; further leveraging the program's alumni network; exploring the issue of increasing the diversity of MBiotech admissions; tracking gender balance in the program; identifying a private space in which staff and students can discuss sensitive information; addressing the lack of clarity in the relationship between the MBiotech program and Institute for Management and Innovation (IMI), and developing connections with other programs in IMI; addressing the lack of clarity around resource allocation within the program, and creating a transparent annual operating budget.

5. Monitoring and Date of Next Review

Progress checks and monitoring of the implementation plan will occur through Annual Activity Reports submitted to the Director of IMI, with the Director passing on progress in the Annual Activity Reports submitted to the Dean.

The Dean will provide an interim report to the Vice-Provost, Academic Programs no later than 2022-23 on the status of the implementation plans.

The next review will be commissioned in 2025-26 for a site visit to take place no later than eight years from March 2019.

6. Distribution

On October 26, 2020, the Final Assessment Report and Implementation Plan was posted to the Vice-Provost, Academic Programs website and the link provided by email to the Dean of the University of Toronto Mississauga, the Secretaries of AP&P, Academic Board and Governing Council, and the Ontario Universities Council on Quality Assurance. The Dean provided the link to the Chair of the Department.