

UTQAP Cyclical Review: Final Assessment Report and Implementation Plan

1 Review Summary

Program(s) Reviewed:	Graduate programs: <ul style="list-style-type: none">• Medical Biophysics, MSc, PhD
Unit Reviewed:	Department of Medical Biophysics
Commissioning Officer:	Dean, Temerty Faculty of Medicine
Reviewers (Name, Affiliation):	<ul style="list-style-type: none">• Prof. Alison Allan, Department of Anatomy & Cell Biology, Western University• Prof. Brian Pogue, Department of Medical Physics, University of Wisconsin School of Medicine and Public Health• Prof. Sheila Singh – Department of Surgery, McMaster University
Date of Review Visit:	February 23-24, 2022 (conducted remotely)
Date Reported to AP&P:	April 13, 2023

Previous UTQAP Review

Date: November 1-2, 2016

Summary of Findings and Recommendations

Significant Program Strengths

- Flourishing program provides superb research training and career development opportunities for a large number of graduate students
- Revitalized, modernized curriculum reflects the current state of the discipline
- Organized and active Graduate Student Society strengthens the sense of community
- Among the top few such departments in North America and internationally
- Unsurpassed training opportunities with state-of-the-art infrastructure and facilities
- Strong relationships with cognate departments and research institutes allow MBP to translate modest investments from the Faculty of Medicine and U of T into a world-class research enterprise with a flourishing graduate program

Opportunities for Program Enhancement

- Aligning courses and other program elements with well-defined learning outcomes and degree-level expectations to ensure that the training of each student does achieve the desired expectations; aligning MBP offerings with complementary graduate programs to take advantage of synergies
- Ensuring appropriate time-to-completion; addressing any gaps in graduate student supervision; and considering ways to better support students in these processes throughout their program
- Enhancing student outreach and recruitment beyond southern Ontario
- Improving mentoring and relationships across the department to ensure onboarding of faculty employed by the hospitals, increased participation in MBP activities, and strengthened collaborations across multiple physical sites
- Revisiting MBP's overall communications strategies both internally and beyond the program to support enhanced outreach and recruitment.

Current Review: Documentation and Consultation

Documentation Provided to Reviewers

Confirmation/agreement Letter; terms of reference; self-study report; faculty CVs; course descriptions; schedule; previous review report (2016-17), Dean's and Chair's responses, and FAR-IP; Dean's Report 2021; Temerty Faculty of Medicine's Strategic Plan (2018-2023); University of Toronto Towards 2030; University of Toronto Quality Assurance Process.

Consultation Process

The external reviewers met remotely with the following:

Temerty Faculty of Medicine

1. Acting Dean and Vice Dean, Medical Education
2. Vice Dean, Strategy & Operations
3. Director of Strategic Initiatives, Office of Advancement
4. Chair, Dept. of Laboratory Medicine & Pathobiology
5. Acting Chair, Dept. of Immunology
6. Interim Chair, Dept. of Biochemistry
7. Interim Chair, Dept. of Molecular Genetics

Dept. of Medical Biophysics

8. Chair
9. Vice Chairs
10. Program Coordinators
11. Faculty
12. Graduate Students
13. Administrative Staff

Research Institutes

14. Executive Vice President, Science & Research, University Health Network
15. Vice President, Research & Innovation, Sunnybrook Research Institute
16. Vice President, Research, Rotman Baycrest Research Institute
17. Interim Director of Research, Lunenfeld-Tanenbaum Research Institute, Sinai Health System
18. Research Director, Princess Margaret Cancer Centre
19. Associate Research Director, Princess Margaret Cancer Centre
20. Director, Biological Sciences Platform, Sunnybrook Research Institute

Current Review: Findings and Recommendations

1. Undergraduate Program(s) n/a

2. Graduate Program(s)

Unless otherwise noted, all bulleted comments apply to all programs reviewed.

The reviewers observed the following **strengths**:

- Overall quality
 - ▶ Overall, reviewers remarked on the exceptionally strong, interdisciplinary nature of the Medical Biophysics (MBP) graduate program, and congratulated the Department

- and its Chair for the effort that has gone into addressing recommendations from the previous external review
- ▶ “It is clearly a jewel in the crown of the research and graduate programs within Temerty and at the University of Toronto, and should be strongly supported in order to enable their continued success on the national and world stages.”
 - ▶ Reviewers noted that MBP has kept pace and evolved with the times of the discipline
 - ▶ MBP’s program identity is strong enough to unify a diverse group of participating faculty, and its interdisciplinarity provides “a tremendously rich learning and training environment for the next generation of biomedical leaders and serves as an aspirational role model for other graduate programs, both within and external to the University of Toronto.”
- Objectives
 - ▶ Educational efforts are appropriately focused on graduate education and training given the unit’s research-intensive nature
 - Admissions requirements
 - ▶ Admissions requirements are appropriate and in keeping with MBP’s international reputation, with high standards for admission and a very rigorous admissions process
 - ▶ The lab rotation component of the admissions process is viewed as a particular strength as it facilitates optimal matches between students and supervisors. “This has resulted in the successful recruitment of high-quality domestic and international students who are well-positioned to take advantage of the interdisciplinary, research-intensive training environment.”
 - Curriculum and program delivery
 - ▶ Reviewers found MBP graduate programs to be of very high-quality, with clear program requirements and learning outcomes that align with graduate-level expectations in the discipline
 - ▶ There are rich research experience opportunities available for all graduate students
 - ▶ Program structures, curriculum, length, mode(s) of delivery and expectations appear to be well-communicated and clearly understood by graduate students and their supervisors
 - ▶ Courses cover cutting-edge topics related to the relevant disciplines of biology and physics; content and learning outcomes tailored and appropriate for the MSc and PhD graduate level
 - ▶ Reviewers noted that the recently implemented modular course structure is innovative and appears to better cover the scope of interdisciplinary research, allows for greater cross-over learning experiences between students in different disciplines, and improves course flexibility
 - ▶ Overall quality of the educational experience deemed very high, supported by direct student survey feedback
 - Accessibility and diversity
 - ▶ Reviewers observed significant improvements in program outreach, promotion and communication since the previous external review

- ▶ “The creation of a departmental equity, diversity and inclusion (EDI) Committee led by numerous passionate MBP faculty, students and staff was a major accomplishment in this past 5-year period, and the initiatives and activity of this group is laudable.”
- Assessment of learning
 - ▶ Assessments are appropriate and effective at measuring student achievement and progression, including academic performance in courses, MSc to PhD reclassification exams, PhD qualifying/comprehensive exams, thesis advisory committees, and thesis exams
- Student engagement, experience and program support services
 - ▶ The department has a very active and well-organized graduate student council (MBPGSA) that appears to work in close partnership with faculty, staff, and departmental leadership in developing and organizing social events and other learning opportunities outside of the classroom
 - ▶ The MBPGSA also provides strong input into shaping the academic and organizational aspects of the graduate program, advocating for the needs of MBP graduate students as whole
 - ▶ Recently introduced ‘plan for completion’ form for students in the final year of their PhD program supports the development of “a clear plan and timeline to completion in consultation with the supervisor, student, and advisory committee.”
 - ▶ Student satisfaction is generally high regarding supervision/mentoring, and most graduate students appear to feel well-supported by their supervisors, lab group, and by the program overall
 - ▶ Fairly effective incident reporting mechanisms in place to share concerns about laboratory/learning environment and supervisory relationships
- Quality indicators – graduate students
 - ▶ Reviewers remarked that MBP has a very competitive and high-quality graduate program that ranks very highly against the Canadian U15 and international comparators with excellent applicants and admitted students
- Quality indicators – alumni
 - ▶ Postgraduation employability appears to be high, particular in the industry and academic sectors
- Quality indicators – faculty
 - ▶ Reviewers observed the quality and availability of faculty supervision and faculty commitment to mentorship to be excellent
- Student funding
 - ▶ The department has a very rigorous, committee-based process for reviewing scholarship applications and awarding scholarships based on merit
 - ▶ Well-developed graduate student funding strategy that has been very successful and is expected to be even further strengthened post-pandemic

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

- Curriculum and program delivery
 - ▶ Diverse range of opinions from students and faculty regarding the level of course work, and whether it was too much or not enough for both the MSc and PhD
 - ▶ There is a “lack of consistency in quality, delivery and assessment methods across courses, as well as some redundancy issues between courses.”
 - ▶ Students are allowed to take courses offered by programs outside of MBP, but find this difficult as they are not prioritized for enrollment in said programs
 - ▶ Many students like the modular, 6-week course structure but acknowledged that “not much could be learned in that short of a time frame.” Others expressed an interest in longer (i.e. 0.5 FCE) courses
 - ▶ Fairly consistent lack of satisfaction with the current versions of required research ethics and statistics courses
 - ▶ Faculty and students expressed the desire for more offerings/opportunities relating to computational programming knowledge
- Accessibility and diversity
 - ▶ Reviewers noted student comments regarding perceived sense of unequal treatment concerning access to student services in comparison to other University students. “They would like to ensure that they have inclusion in University of Toronto and Temerty lectures and programming in a number of areas including EDI.”
- Student engagement, experience and program support services
 - ▶ Graduate student survey data identified mental health as a concern amongst many students
 - ▶ Concerns voiced that staff are not trained to handle certain situations relating to conflict resolution and mental health
- Student funding
 - ▶ Stipend funding remains a concern given the high cost of living in Toronto; drawback to MBP not having an undergraduate program is that there are limited TA positions available

The reviewers made the following **recommendations**:

- Curriculum and program delivery
 - ▶ Continue to monitor times to completion on an ongoing basis, particularly: at the MSc level; in the case of extreme outlier situations; and in the context of the COVID-19 pandemic
 - ▶ Enhance computational curriculum and infrastructure with AI and machine learning components
 - ▶ Work with advancement colleagues to develop “a Dean’s Challenge Fund application to Temerty Medicine or a similar strategic initiative around development of an enhanced computational sciences/machine learning/AI curriculum and infrastructure for MBP.”
 - ▶ Carry out a high-level curricular review “to ensure continued relevance and consistency of learning outcomes and assessment methods, reduce content

- redundancy, and increase quality/value across all courses. In particular, the mandatory ethics and statistics courses should be carefully scrutinized and revised as needed.”
- Accessibility and diversity
 - ▶ Program outreach could be further enhanced by the collection of, or access to, demographic data of applicants to gain a better sense of what attracts students, and what drives their decision to accept/reject offers to the program
 - ▶ Reviewers encouraged making funding options available for waiving graduate program application fees in order to increase diversity
 - Student engagement, experience and program support services
 - ▶ Reviewers recommend incorporating more formal program activities aimed at supporting professional/career development in both academic and non-academic career paths; majority of current efforts appears to be student-driven
 - ▶ Explore opportunities for an increased number of TA positions and/or opportunities for postdoctoral scholars to contribute to the graduate education activities of the department as part of the larger curricular review
 - ▶ Monitor graduate student mental well-being and resiliency to optimize pandemic recovery

3. Faculty/Research

The reviewers observed the following **strengths**:

- Overall quality
 - ▶ Reviewers commented on MBP’s excellence as a highly productive research-intensive department with extraordinary depth, breadth and interdisciplinarity of science.
 - ▶ “The faculty have several luminary researchers within their ranks, and the expectations for the current faculty to progress are exceedingly high.”
- Research
 - ▶ Faculty appear to rank near the top of the University and the discipline when it comes to financial success in grants
 - ▶ The department has enormous pride in its successes
 - ▶ Faculty research activities percolate down to the level of graduate student accomplishments, which are also high
- Faculty
 - ▶ Annual performance reviews led by the research institutes and in collaboration with the Chair are felt to be very valuable
 - ▶ “Through close partnerships with the TAHSN [Toronto Academic Health Science Network] research institutes, the department appears to have a carefully planned, well-balanced and engaged faculty complement that is nicely distributed across the ranks of Assistant, Associate and Full Professor.”

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

- Faculty
 - ▶ “Depending on the specific research institute that a faculty member belongs to, there is quite a bit of variability in both the accessibility of faculty development resources and the involvement of the MBP Chair in performance reviews”
 - ▶ Though outside the control of department, COVID-19 has created significant challenges and risks for Although outside the control of the department or institutes, the COVID-19 pandemic has created significant challenges and risks for early-career researchers (ECR) working to establish their independent research programs
 - ▶ “While there is no doubt that faculty engagement has significantly improved over the past 5 years, there continues to be suggestions that it is mainly a core sub-group of the faculty that are consistently and highly engaged in the role of the department and its administration, and that this is a concern.”
 - ▶ Several EDI initiatives appear to require additional staffing support, “and there was a stated concern that MBP faculty seem like 2nd class citizens as compared to the attention given to those with primary appointments in the Faculty of Medicine (versus the TAHSN research institutes).”

The reviewers made the following **recommendations**:

- Faculty
 - ▶ Reviewers encourage efforts to make faculty development resources and performance reviews more uniform across the various institutes
 - ▶ Reviewers recommend that the department and Chair take extra care in continuing to support and mentor ECR faculty over the next 5 years “to ensure their success and that of their graduate students”
 - ▶ Maintain and enhance current faculty engagement in departmental activities for all faculty and explore tracking faculty engagement such as through gathering data on hours of service, which could be included as part of their annual review
 - ▶ Develop an EDI subcommittee for TAHSN to address their concerns and suggestions. “It was felt very strongly that higher level organization across the entire system around this topic was urgently needed to have a stronger impact.”

4. Administration

Note: Issues that are addressed through specific University processes and therefore considered out of scope for UTQAP reviews (e.g., individual Human Resources issues, specific health and safety concerns) are routed to proper University offices to be addressed, and are therefore not included in the Review Summary component of the Final Assessment Report and Implementation Plan.

The reviewers observed the following **strengths**:

- Relationships
 - ▶ “MBP participates in several city-wide collaborative programs designed to further develop and integrate graduate training in various multidisciplinary fields, including Biomedical Engineering, Cardiovascular Sciences, Genome Biology & Bioinformatics, Human Development, and Neuroscience.”
 - ▶ Faculty, staff and student morale and inclusiveness appear to be in an exceptionally good state; strong culture of belonging
 - ▶ Strong alliances with research institute directors across TAHSN as well as with cognate departments within the Temerty Faculty of Medicine
 - ▶ Current Chair is highly respected and uniformly valued and liked by MBP students, faculty and staff, as well as by other Chairs and research institute leaders
 - ▶ The Chair “serves as a strong mentor and advocate for students and faculty who have encountered challenges, as well as advocating for issues of importance to the department as a whole.”
 - ▶ “The involvement in academic and professional organizations appears to be very high, although largely at the individual faculty level.”
- Organizational and financial structure
 - ▶ The organizational and financial structure of the department “minimizes the financial ties to the University and provides a nimble structure that is very research-focused”
 - ▶ Research space allocation and research infrastructure is almost exclusively managed by the TAHSN research institutes and appears to be excellent and sufficient for the needs of the program
 - ▶ Very successful in attracting and utilizing philanthropic dollars, particularly in partnership with the TAHSN research institutes and in relation to graduate student funding support
- Long-range planning and overall assessment
 - ▶ Strategic priorities in the department’s self-study appear consistent with the University and Temerty Faculty of Medicine’s academic plan
 - ▶ Complement planning and infrastructure considerations appear to be robust and sustainable
 - ▶ The Chair has demonstrated himself to be a highly dedicated and productive academic leader, launching efforts to establish a better and more comprehensive database for the department to track and manage the enormous scope and complexity of faculty, graduate training and research activities, and initiating work to better promote and establish international research collaborations
- International comparators
 - ▶ “The scope and quality of MBP as a whole is exceptionally high; top-ranked at both the national and international level and perhaps the pinnacle of success at the university. This provides a phenomenal interdisciplinary and cutting-edge research environment for the training of graduate students, where the cross-talk between biology, physics and computational approaches is unparalleled.”

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

- Relationships
 - ▶ Postdoctoral scholars are critical to the research success of the department but their supports appear to vary between the various TAHSN research institutes
- Organizational and financial structure
 - ▶ The operating budget “is almost entirely dependent upon the residual funding from student tuition funds that are collected by the University, and partially filtered down to the department. The need to expand funding for administrative support has causes problems with this financial model”
 - ▶ “It is critical that the leadership in Temerty and the University of Toronto recognize that MBP’s significant accomplishments are a result of an enormous amount of work by the Chair to successfully maintain and enhance this very large and complex department, and that the sustainability of this over time is questionable with the department’s current budgetary resources”

The reviewers made the following **recommendations**:

- Relationships
 - ▶ Take a more inclusive approach to incorporating postdocs into the MBP culture through departmental communications and opportunities for engagement in department activities, in close collaboration with TASHN institutes
- Organizational and financial structure
 - ▶ Permanent inclusion of funding for Vice-Chairs and Associate Chair administrative stipends in the department’s core budget with the intent of establishing a model of distributed leadership to delegate many of the Chair’s responsibilities
 - ▶ Develop formal MOUs between MBP/Temerty Faculty of Medicine, the Vice-Chairs/Associate Chair and their respective TAHSN research institutes to allow these administrative roles to be accommodated
 - ▶ Inclusion of funds for an efficient and modern database management system to provide essential data relating to tracking student recruitment and progression through the system, tracking student accomplishments, tracking faculty engagement, enabling generation of funding letters for students to reduce administrative workload
 - ▶ Reviewers recommend a travel budget for the development of international collaborations to support faculty and to also allow enhancement of graduate student recruitment and outreach efforts at international universities



2 Administrative Response & Implementation Plan

TEMERTY FACULTY OF MEDICINE
UNIVERSITY OF TORONTO

Temerty
Medicine

L. Trevor Young, MD PhD FRCPC
Dean

Vice Provost, Relations with Health Care Institutions

March 16, 2023

Professor Susan McCahan, Vice-Provost, Academic Programs
Division of the Vice-President & Provost
University of Toronto

Dear Susan,

[DEPARTMENT OF MEDICAL BIOPHYSICS](#)
[Dean's Cover Letter | Temerty Faculty of Medicine](#)

On behalf of the Temerty Faculty of Medicine at the University of Toronto, I would first like to thank the reviewers—Dr. Alison Allan, Dr. Brian Pogue, Dr. Sheila Singh—for their very comprehensive review of the Department of Medical Biophysics (MBP) on February 23-24, 2022. I would also like to thank Dr. Thomas Kislinger, Chair of MBP, the administrative staff, and all those who contributed to the preparation of the outstanding self-study report. I also wish to thank the many staff, trainees, and faculty members who met with the external reviewers and provided thoughtful feedback. The reviewers noted that MBP is *“a jewel in the crown of the research and graduate programs within Temerty and at the University of Toronto”* and that *“the scope and quality of MBP as a whole is exceptionally high; top-ranked at the national and international level and perhaps the pinnacle of success at the university. This provides a phenomenal interdisciplinary and cutting-edge research environment for the training of graduate students, where the cross-talk between biology, physics and computational approaches is unparalleled.”*

The thorough report provided by the reviewers is an invaluable guide for program enrichments and future strategic directions of MBP. The reviewers identified areas for enhancement including the curriculum by way of a review, monitoring and support of student well-being and times to completion, mentoring of early career researchers, and engagement of faculty and postdoctoral fellows. The reviewers encouraged further work with advancement and recommended the establishment of academic administrative stipends, a database management system, and a budget for international collaborations. Each of the recommendations has been addressed in the Programs' Responses column in the accompanying table and in the Chair's cover letter. I am in full agreement with the responses of Dr. Kislinger and have provided additional comments addressing each of the recommendations in the Dean's Response column of the table.

Overall, MBP has made excellent progress under the leadership of Dr. Kislinger and as noted by the reviewers, *“[MBP] and their Chair are to be congratulated on the significant care and effort that has gone into addressing the recommendations from the previous external review in order to further enhance what continues to be an exceptionally strong, internationally recognized research enterprise and a top-tier interdisciplinary graduate program.”* I congratulate Dr. Kislinger on his outstanding leadership. I look forward to working with the incoming Chair and members of MBP to ensure the continued success and growth of the Department to attain its strategic and operational aspirations.

The next review of MBP is scheduled in 2027-28. In 2025, I will follow up with the new Chair on the implementation of the external reviewers' recommendations and, later that year, provide you with an interim report on the status of the implementation plan.

Sincerely,

Trevor Young, MD, PhD, FRCPC
Dean, Temerty Faculty of Medicine
Vice Provost, Relations with Health Care Institutions

2021-22 UTQAP Review of the MED Department of Medical Biophysics - Review Recommendations

Request Prompt <i>verbatim from the request</i>	Rec. #	Recommendations from Review Report <i>verbatim from the review report</i>	Programs' Responses	Dean's Response
<p>The reviewers recommended conducting a high-level curricular review of Medical Biophysics, with an eye towards ensuring the continued relevance of learning outcomes and assessment methods, reducing any content redundancy and increasing quality and value across all courses.</p>	1	<p>"Now that the new modular graduate course structure has been in place for a few years, we recommend that the department (in close consultation with students and faculty) carry out high level curricular review in order to ensure continued relevance and consistency of learning outcomes and assessment methods, reduce content redundancy, and increase quality/value across all courses. In particular, the mandatory ethics and statistics courses should be carefully scrutinized and revised as needed."</p>	<p>We are committed to continuously improving the graduate curriculum. This is already done on a continuous basis. See points listed below:</p> <ul style="list-style-type: none"> ▪ At the end of each module students can provide feedback, in an anonymous manner, that is evaluated by the course coordinator. This feedback is used to continuously modify our modules and achieve better learning objective. A specific example is our mandatory Statistics Module that has been continuously modified over the last 5 years. ▪ A new Artificial Intelligence module was introduced in 2021. ▪ Implementation of a curriculum for our newly offered Medical Physicists specialty program was introduced in 2022. The program is currently under CAMPEP review and required extensive development of new modules. <p>Implementation Plan: While our curriculum is continuously evaluated, we will focus our efforts on improving assessment methods and reducing redundancy across modules.</p>	<p>MBP is continuously improving their curricular offerings for students, and they afford opportunities for students to provide anonymous feedback to help with improvement. The graduate program also has a plan to improve assessment methods to reduce redundancy across modules, which will help increase the quality and value across all courses.</p>
<p>The reviewers recommended continuing to monitor and manage student time to completion; particularly at the MSc Level, in the case of outlier situations, and in the context of the COVID-19 pandemic.</p>	2	<p>"While student times to completion (TTC) have been significantly improved and are no longer considered a major concern, TTCs should continue to be monitored and actively managed on an ongoing basis, particularly (1) at the MSc level; (2) in the case of extreme outlier situations (which now appear to be fairly rare); and (3) in the context of the COVID-19 pandemic."</p>	<p>Time-to-completion (TTC) is a contentious and highly complex topic. It is often driven by outlier cases, which have individual and complex reasons, that are difficult to manage. Following multiple measures implemented by MBP, TTC for PhD students has dropped to an average of 6 years. For MSc students TTC is approximately 2.7 years. This is driven by our rotations program that adds approximately 4 months to each students' TTC and the ever-increasing complexity of biomedical research projects.</p>	<p>MBP has created a comprehensive plan to help address times to completion (TTC) issues for students, which is a challenging area to manage in various graduate departments throughout Temerty Medicine. MBP's plan includes the use of a newly developed database system as well as monitoring at the level of student committee meeting schedules, requiring students to submit a TTC plan after year four of study, and monitoring the timelines for students ready to defend their thesis to ensure they complete this within the specified 6-month period.</p>

			<p>We will rigorously monitor progression through the program for all our graduate students using our newly developed database system. Specific measures to manage this complex topic, while keeping the highest academic standings, are listed below:</p> <ul style="list-style-type: none"> ▪ Vice-Chair Cunningham monitors committee meeting schedules for all MBP students and sends regular reminder emails. ▪ PhD students submit a TTC plan once they complete their fourth year of study. This plan will then be monitored during all consecutive advisory committee meetings. ▪ We have recently noticed that over 50% of our PhD students fail to defend their thesis within the specified 6-month period. MBP has committed to further monitoring this timeline, since it would have a significant impact on TTC. We will also implement this for MSc students. <p>Implementation Plan: The mandatory TTC plan and more structured departmental follow-up during the thesis-writing period, previously applied to PhD students, will be implemented for MSc students as well.</p>	
<p>The reviewers made several observations and possible suggestions related to student experience and supports:</p> <ul style="list-style-type: none"> ▪ The reviewers noted that many MBP students reported a perceived lack of access to student supports and services compared to other U of T students, and urged the careful monitoring and support of student mental health and resiliency, particularly in the pandemic recovery context. 	3	<p>“In terms of access to student services, we heard that students in MBP felt that they were not treated the same as other university students in terms of access to resources, and they would like to ensure that they have inclusion in University of Toronto and Temerty lectures and programming in a number of areas including EDI. These resources appear to be available, but it was unclear whether capacity limits or other issues may be a barrier for MBP student access.”</p>	<p>MBP students have access to all of the same resources as campus-based students. Nevertheless, MBP is committed to facilitating, for our students, the best possible access to these resources. Since most of our faculty members and administrative staff are unqualified to provide appropriate mental health support, we strongly rely on resources provided by UofT. The Department will work closely with the MBPGSA to provide awareness of all available University-wide resources. We have already implemented this as a link on our new MBP webpage and it seems that better communication between Department and student leadership could solve this issue.</p>	<p>MBP has an active Equity, Diversity and Inclusion Committee made up of students, administrative staff and faculty representatives (https://medbio.utoronto.ca/EDI). As mentioned in the Department’s response, communication and coordination between MBP leadership and students is a thoughtful approach to ensuring students are clear about access to resources, including those related to EDI. In addition, Temerty Medicine’s Office of Inclusion & Diversity provides information and opportunities for collaboration to EDI leads within each department (MBP has a designated lead on their leadership team), and can assist MBP with connecting students to university-wide resources and supports.</p>

<ul style="list-style-type: none"> The reviewers observed that the majority of efforts related to professional and career development (especially with respect to non-academic careers) are led by MBP's student association rather than unit, and recommended considering enhanced formal student supports in these areas. 			<p>Implementation Plan: We will focus on communication between Department leadership and MBP students to call attention to available University-wide resources.</p>	
	4	<p>"... graduate student mental well-being and resiliency should be carefully monitored and supported in order to optimize pandemic recovery."</p>	<p>Vice-Chair Cunningham is our faculty representative on the MBP mental health committee. This will provide appropriate feedback between students and MBP leadership. We are committed to working with the University to further improve available resources and communications.</p> <p>Implementation Plan: MBP will continue to work with MBPGSA leadership to monitor student mental well-being and provide access to resources at UofT.</p>	<p>In addition to MBP's plan to work with student leadership, Temerty Medicine is committed to providing regular communications to all graduate students regarding health and wellness resources within the Faculty and the wider university both proactively as a part of optimizing pandemic recovery, as well as in response to specific needs that arise for students.</p>
	5	<p>"The majority of efforts related to professional development and career development (particularly related to non-academic careers) appear to be student-driven through the MBPGSA rather than by the departmental graduate program itself... it is therefore recommended that more focus/value be placed on incorporating formal program activities aimed at supporting professional/career development inclusive of both academic and non-academic career paths."</p>	<p>Five years ago, MBP implemented an Alumni Day specifically focused on career development. The Department has access to an extensive alumni database and closely collaborates with the MBPGSA to organize (and fund) this initiative. The purpose of this initiative is to enable current MBP graduate students to network with former students and obtain information regarding nonacademic careers. We are committed to continuing to fund the MBP Alumni Day.</p> <p>Implementation Plan: MBP will continue to host an annual Alumni Day with the goal of supporting both academic and nonacademic career paths.</p>	<p>MBP's Alumni Day is a formal, department-led initiative to address the support of professional/career development for students. Additional opportunities for professional and career development may be available to students through research training centres at the TAHSN-affiliated research institutes.</p>
<p>The reviewers noted that students reported some difficulty with accessing courses outside of Medical Biophysics.</p>	6	<p>"Students are allowed to take courses offered by programs outside of MBP, but these are often difficult to get into because MBP students are not prioritized for enrollment in other programs."</p>	<p>While the number of students taking courses outside of MBP is relatively small (but growing—especially in courses related to computational biology), the Department is aware that not all students gain access to the courses they wish to take. This is often related to late registration or limited spots for students external to the departments offering these courses. MBP is happy to work with individual departments to limit these access issues. This is, however, a challenging task not fully within MBP's control since this is not restricted to one specific course.</p>	<p>MBP is exploring solutions to help resolve the issue of students finding it difficult to take courses in programs outside of MBP. Temerty Medicine will work collaboratively with MBP to address any systemic barriers for students to access courses.</p>

			<p>Implementation Plan: We will engage with other departments to evaluate potential solutions. In fact, the Dept. of Immunology has allotted eight spaces for MBP students to enroll in their Immunotherapy course.</p>	
<p>The reviewers made a number of observations and suggestions related to supporting and potentially increasing broad faculty engagement in departmental activities. They also noted widespread pandemic-related challenges for early-career researchers, and recommended that the department closely monitor junior faculty in the coming years and provide enhanced support where appropriate, to ensure their success and that of their graduate students.</p>	7	<p>“It is imperative to recognize that the COVID-19 pandemic has created significant challenges and risks for early-career researchers (ECRs) who are working to establish their independent research programs. Therefore, we recommend that the department and the Chair take extra care in continuing to support and mentor this ECR faculty group over the next 5 years to ensure their success and that of their graduate students – they are the future of MBP.”</p>	<p>MBP is committed to supporting ECRs. While most of our affiliated research hospitals offer specific mentorship programs for ECRs (i.e., PMH and SickKids) there are several possibilities to further enhance this support. One possible initiative could be a Coffee With The Chair/Vice-Chairs, which has been highly successful for enhanced communication between the MBP administration and graduate students (held monthly). As a note, MBP has historically supported ECRs through MBP Excellence Awards to partially support graduate student stipends.</p> <p>Implementation Plan: A regularly scheduled meeting with the Chair/Vice-Chairs will be developed specifically to increase communication with ECRs.</p>	<p>MBP has created a thoughtful plan to help support and mentor early career researchers (ECRs). Temerty Medicine’s Offices of Clinical & Faculty Affairs and Research & Health Science Education are helpful resources available for guidance and support on department specific initiatives for faculty members.</p>
	8	<p>“... it [is] recommended that there be ongoing active efforts to maintain and enhance faculty engagement consistently for all faculty, not just the subset of currently active faculty. For example, for the committee on student awards, additional criteria could be added to prioritize the funding of students who have actively involved PIs for special funding opportunities ... we recommend gathering data on hours of service (i.e. # of seminars attended and performed, # of exams chaired, etc.) and generating an automated annual ‘engagement report card’ showing the relative scoring of each faculty member and their comparison to medians across a variety of measured performance metrics. This could be provided for each faculty at their annual review with their</p>	<p>We agree that in a department as large and diverse as MBP it can be challenging to continuously engage faculty members that are effectively employees of the research hospitals. We are strongly committed to continuously monitoring and improving faculty engagement. We also note that faculty engagement has significantly improved over the last 5 years, possibly through transparent departmental communication, a modified curriculum (i.e., more diverse modules) and a newly-implemented workload recommendation that every new faculty member is required to sign. Implementation of a database management system will enable MBP to quantify engagement and more equitably distribute workload.</p> <p>Implementation Plan: Our proposed database will improve quantification and tracking of faculty engagement and will enable targeted encouragement where needed.</p>	<p>MBP’s plan to enhance faculty engagement involves the creation of a database and targeted initiatives when necessary to encourage participation. Temerty Medicine is also continuously working with hospital partners to encourage more collaboration with the University.</p>

		respective research institutes and used to set expectations.”		
The reviewers recommended exploring options for potential strategic funding initiatives to support curricular and infrastructure enhancements, in collaboration with University Advancement as appropriate. They flagged computational sciences, machine learning, and Artificial Intelligence as possible areas in which to prioritize expansion.	9	“... the external review panel would like to identify a great opportunity for advancement to work with MBP to develop a Dean’s Challenge Fund application to Temerty Medicine or a similar strategic initiative around development of an enhanced computational sciences/machine learning/AI curriculum and infrastructure for MBP...”	MBP is highly motivated to explore opportunities to enhance computational sciences/machine learning/AI curriculum and infrastructure for MBP through a Dean’s Challenge Fund application. With only approximately 15% of faculty and students currently involved in this type of research such improvements must be done thoughtfully. In addition, infrastructure for PIs in these types of research areas is usually provided by the research hospitals and students within these labs will have full access to these resources. We will explore these opportunities as they present themselves and discuss internally if applications are warranted. Implementation Plan: Computing infrastructure is typically provided by the research institutes. We are happy to explore augmenting this with a Dean’s Challenge Fund application, if available.	Temerty Medicine supports opportunities for MBP to collaborate with T-CAIREM, the Temerty Centre for Artificial Intelligence Research and Education in Medicine, an interdisciplinary EDU-C with a mandate to find opportunities to work collaboratively with departments across the Temerty Faculty of Medicine. Additional opportunities, such as the Dean’s Challenge Fund, can also be explored.
	10	“The permanent inclusion of funding for administrative stipends for the Vice-Chairs and Associate Chair in the department’s core budget. We recommend \$40K/year for Vice-Chairs and \$20K/year for the Associate Chairs. With this remuneration, more formal policies should be established to clearly define the roles and accountabilities of each Vice-Chair/Associate Chair with the intent of establishing a formally designated model of “Distributed Leadership” to delegate many of the Chair responsibilities in a logical, site-specific manner (i.e. Uptown/Downtown). Formal MOUs should be developed and signed between MBP/Temerty, the Vice-Chairs/Associate Chair and their respective TAHSN	We agree with this recommendation. It would also ease pressure on our core budget and effectively enable MBP to fund new initiatives/improvements. MBP leadership will work on implementing formal responsibilities for the Vice-Chairs and develop an MOU for all parties. For practical reasons this should be implemented by the new MBP Chair, since they will appoint the executive team and Vice Chairs. Implementation Plan: If funds are made available as part of an improved core budget, then we would be happy to develop a detailed policy to formalize Vice-Chairs’ responsibilities, which will be part of a MOU between Temerty, MBP and the research institutes.	Once the new MBP Chair is appointed, they will be in a position to implement MBP’s plan to better support the permanent inclusion of funding for administrative stipends for Vice-Chairs and Associate Chairs. Temerty Medicine supports the development of an inclusive and equitable policy to formalize Vice-Chair responsibilities in collaboration with MBP and the research institutes.

		research institutes to allow for these roles to be accommodated and this should be part of the implemented policy.”		
	11	“Inclusion of a travel budget for development of international collaborations in the core budget: This will assist in developing international scientific collaborations for faculty and also allow for enhancement of graduate student recruitment and research campaigns and outreach efforts to promote MBP at international universities. \$25-50K/year recommended.”	<p>We agree with this recommendation. Expanding international collaboration was an ambitious goal over the last 5 years and an initial trip to India established potentially interesting connections. Unfortunately, the global Covid-19 pandemic hampered these initiatives. We are keen to reinitiate these efforts. Our previous travel budget of \$10K/year was a good start, but it is currently allocated to support domestic recruitment efforts.</p> <p>Implementation Plan: With a restored travel budget, MBP will reinitiate efforts to enhance international collaborations that were stopped due to Covid-19.</p>	Temerty Medicine is committed to ongoing international collaboration and fully supports MBP’s efforts to continue this work. Enhanced virtual opportunities to build international collaborations can also be explored as part of Temerty Medicine’s commitment to planetary health and reducing climate change.
The reviewers recommended exploring funding options to enhance program accessibility and diversity.	12	“An important suggestion around increasing the program’s accessibility and diversity was to make funding options available for waiving graduate program application fees in order to increase diversity (e.g., as has been done in Department of Chemistry at the University of Toronto).”	<p>This is an excellent recommendation. MBP is highly motivated to waive application fees for in-need applicants; the MBP EDI committee previously explored this possibility. Since MBP receives over 400 applications per year (~\$60,000 in admission fees) this would require additional funds to implement. It would also require a way to objectively evaluate which students would qualify for a waiver of their application fee.</p> <p>Implementation Plan: The MBP EDI committee has previously been interested in exploring ways to waive application fees for students in need. The practical challenge is to 1) identify these students and 2) have sufficient funds to pay for this extra expense. Since MBP would effectively be paying the University, it seems that an application fee waiver would be better implemented at the SGS level.</p>	<p>MBP’s EDI Committee and other stakeholders have begun exploring opportunities to waive application fees for students in need. Temerty Medicine acknowledges the barriers that many students face to access graduate education opportunities. Based on these barriers, Temerty will substantially increase its graduate student stipends beginning in the 2023-2024 academic year, making them the highest in Canada. As a result, students in Master of Science programs will receive \$37,000 per year. PhD candidates will be offered \$40,000 annually.</p> <p>In addition to opportunities to increase diversity via fee waivers, Temerty Medicine’s newly created Office of Access & Outreach works collaboratively with departments across the Faculty to increase representation of historically and currently underrepresented and underserved groups in health professions and health sciences education.</p>
The reviewers observed while postdoctoral scholars are employed by the TAHSN research institutes,	13	“... it is recommended that MBP to take a more purposeful approach to incorporating postdocs into the MBP	We appreciate this recommendation, but implementation is not easily feasible. Postdoctoral fellows of MBP faculty are effectively employees of the	Temerty Medicine is committed to exploring opportunities for collaborations among MBP, the University of Toronto and the research institutes to

<p>they are clearly critical to the research success of MBP. They encouraged the department to explore ways to more purposefully incorporate postdocs into MBP culture.</p>		<p>culture through departmental communications, as well as offering them increased opportunities for engagement in department activities (i.e. seminars, retreats, career development activities, teaching opportunities) where feasible. This should be done in close collaboration with the TASHN institutes' Offices of Research Trainees, Temerty, and the postdocs themselves in order to ensure relevance and avoid redundancy of efforts."</p>	<p>various research institutes and hence are not under direct administration of UofT. While there has been considerable discussion about establishing a Toronto-wide "post-doc academy" to better serve these very important early career researchers, this has not yet been implemented. Career development, scientific workshops and seminar series could be included. MBP is highly supportive of these initiatives.</p> <p>Incorporation of PDFs from MBP faculty into departmental activities (i.e., annual research day, MBP retreat, Christmas party, Alumni Day, etc.) is currently neither logistically nor financially possible. There are several hundred PDFs in the various labs of MBP faculty members. Inviting them to any of our departmental activities would effectively double our participation and would require a significant increase to our core budget (approximately \$100,000 for the four activities mentioned above). This is currently not possible. In the future, we will continue to work with Dr. Justin Nodwell, Temerty Medicine's Vice Dean of Research & Health Science Education and the various research institutes to support a Toronto-wide "post-doc academy" to standardize engagement and support of PDFs Faculty-wide.</p> <p>Implementation Plan: MBP will explore collaborative opportunities with UofT and the research institutes to better integrate PDFs and will explore a Toronto-wide initiative towards a formal PDF academy.</p>	<p>better incorporate postdoctoral fellows into MBP culture. MBP has identified several complexities and challenges with addressing this issue, and Temerty's Vice Dean of Research & Health Sciences Education, Dr. Justin Nodwell is in the best position to help lead this initiative across departments.</p>
<p>The reviewers recommended exploring the implementation of modern systems to aid with efficiently tracking student recruitment and progression, and monitoring faculty engagement.</p>	<p>14</p>	<p>"An IT consultation could be obtained to design such a database (~\$50-100K one-time cost) and database maintenance and updates should be built into the subsequent annual core budget (~\$10K/year). This database will provide essential data for the department to make decisions on multiple fronts including:</p>	<p>We agree with the external reviewers that a modern database management system will be essential to efficiently manage a department the size and complexity of MBP. We have already started to explore feasible alternatives and believe that a new system could be implemented by the fall of 2023. Our database will provide our administrative staff with an effective means to monitor student progress/time-to-completion,</p>	<p>MBP has already begun the process of implementing a modern data base system to help track student recruitment and progression as well as to monitor faculty engagement. Temerty Medicine's IT unit, Discovery Commons, will be a helpful resource for MBP to finalize the creation of this new system.</p>

	<ul style="list-style-type: none"> ▪ Tracking student recruitment and progression through the system ▪ Tracking student accomplishments ▪ Tracking faculty engagement as described in the faculty recommendations above ▪ Enabling easy generation of funding letters for students: to reduce workload for administrative staff” 	<p>schedule committee meetings and calculate student stipends.</p> <p>The only way to objectively evaluate and manage time-to-completion is to collect data and to intervene in a timely manner. Currently this is done on an inefficient case-by-case basis, which is not feasible in the long term. The database will also enable us to track engagements of all MBP faculty and compare individual contributions to the departmental average. This will enable departmental leadership to assign administrative tasks in a more equitable manner.</p> <p>Implementation Plan: We have already initiated the first steps towards the development of a new database system for MBP. A first prototype should be available in the fall of 2023.</p>	
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3 Committee on Academic Policy & Programs (AP&P) Findings

The spokesperson for the reading group reported that the review summary had accurately reflected the full review and that the administrative response fully addressed the issues identified. In the group's view the summary told the full story of the review. It felt that under the leadership of the Dean, actions had been taken in response to the previous review to address issues such as times to completion and that updates to the curriculum had further strengthened the Medical Biophysics program. Their view was that recommendations made in the current review had been relatively minor (such as early career faculty support, development of a database system and implementation of a travel budget for international collaborations) and had been adequately addressed in the unit's response. The group had no specific additional questions or comments.

No follow-up report was requested.

4 Institutional Executive Summary

The reviewers praised the competitive, high-quality and very highly ranked graduate program, noting that the department's interdisciplinarity provides a tremendously rich learning and training environment, and that the program's identity is sufficiently strong to unify a very diverse and distant group of participating faculty. They highlighted the program's innovative modular course structure, and noted the lab rotation component of the admissions process as a particular strength. They commended the program for evolving along with the discipline, and noted a number of significant improvements to program promotion and student communications since the last review. They praised the active, well-organized student council and noted that student satisfaction is very high, as is postgraduate employability. They also highlighted the effective incident reporting mechanisms in place to address student concerns, the close partnerships with TAHSN research institutes, and that research space allocation and infrastructure appears to be excellent and sufficient for the program.

The reviewers recommended that the following issues be addressed: conducting a high-level curricular review of Medical Biophysics; continuing to monitor and manage student time to completion; careful monitoring and support of student mental health and resiliency; considering enhanced formal student supports related to professional and career development; monitoring junior faculty in the coming years and providing enhanced support where appropriate; exploring options for potential strategic funding initiatives to support curricular and infrastructure enhancements; exploring the implementation of modern systems to aid with efficiently tracking student recruitment and progression, and monitoring faculty engagement.

The Dean's Administrative Response describes the division and unit's responses to the reviewers' recommendations, including an implementation plan for any changes necessary as a result.

5 Monitoring and Date of Next Review

In 2025 the Dean will follow up with the Chair of the Dept. of Medical Biophysics on the implementation of the external reviewers' recommendations and will provide an interim report to the Vice-Provost, Academic Programs no later than December 2025 on the status of the implementation plans.

The next UTQAP review of the Dept. of Medical Biophysics will be commissioned in 2027-28.

6 Distribution

On June 30th, 2023, 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 Temerty Faculty of Medicine, the Secretaries of AP&P, Academic Board and Governing Council, and the Ontario Universities Council on Quality Assurance. The Dean provided the link to unit/program leadership.