



(2019)

1.0 Degree Title

Please specify the two degrees for concurrent degree programs

2.0 Administering Faculty or GPS

1.1 Major (Subject/Discipline) (30-char. max.)

Offering Faculty & Department

1.2 Concentration (Option) (30 char. max.)

3.0 Effective Term of Implementation

(Ex. Sept. 2019 or 201909)

Term

1.3 Complete Program Title (info from boxes 1.0+1.1+1.2+5.2)

4.0 Rationale and Admission Requirements for New Program/Concentration

Graduate students interested in the translation of research into clinical application need to understand how basic research is relevant to the wider clinical context as well as identify the gaps (knowledge/technological) that currently exist in the clinic and use it to inform further research. We combine coursework, and clinical mentorship in an effort to train the next generation of translational scientists.

Admission Requirement: must hold an undergraduate degree with a minimum CGPA of 3.0 out of 4.0 or a CGPA of 3.2 out of 4.0 for the last two years of full-time study in the last two years of academic studies.

5.0 Program Information

Indicate an "x" as appropriate

5.1 Program Type

Bachelor's Program
 Master's
 M.Sc.(Applied) Program
 Dual Degree/Concurrent Program
 Certificate
 Diploma
 Graduate Certificate
 Graduate Diploma
 Professional Development Cert
 Ph.D. Program
 Doctorate Program
 (Other than Ph.D.)
 Self-Funded/Private Program
 Off-Campus Program
 Distance Education Program
 Other (Please specify)

5.2 Category

Faculty Program (FP)
 Major
 Joint Major
 Major Concentration (CON)
 Minor
 Minor Concentration (CON)
 Honours (HON)
 Joint Honours Component (HC)
 Internship/Co-op
 Thesis (T)
 Non-Thesis (N)
 Other
 Please specify

5.3 Level

Undergraduate
 Dentistry/Law/Medicine
 Continuing Studies (Non-Credit)
 Collegial
 Masters & Grad Dips & Certs
 Doctorate
 Post-Graduate Medicine/Dentistry
 Graduate Qualifying

5.4 Requires Centrally-Funded
Resources

 Yes No
6.0 Total Credits or CEUs (if latter, indicate "CEUs" in box)

7.0 Consultation with

 Related Units Yes No

 Financial Consult Yes No

Attach list of consultations.

8.0 Program Description (Maximum 150 words)

The Graduate Certificate in Translational Research is an introduction to relevant clinical aspects of translating scientific discovery as a means of bridging the gap of knowledge and experience between clinicians and scientists, while promoting future collaboration. The program includes clinical mentorship.

9.0 List of proposed new Program/Concentration

If new concentration (option) of existing program, a program layout (list of all courses) of existing program **must** be attached.

Proposed program (list courses as follows: Subj Code/Crse Num, Title, Credit Weight under the headings of: Required Courses, Complementary Courses, Elective Courses)

Required Courses (12 credits)

FMED 525 Foundations of Translational Science (3 credits)
 PHAR 522D1/D2 Fundamentals of Disease Therapy (6 credits)
 PHAR 524 Clinical Mentorship (3 credits)

Complementary Courses (3 credits)

3 credits from the following:

BMDE 655 Biomedical Clinical Trials - Medical Devices (3 credits)
 EPIB 507 Biostats for Health Sciences (3 credits)
 EXMD 617 Workshop in Clinical Trials 1 (1 credit)
 EXMD 618 Workshop in Clinical Trials 2 (1 credit)
 EXMD 619 Workshop in Clinical Trials 3 (1 credit)
 EXMD 620 Clinical Trials and Research 1 (1 credit)
 EXMD 633 Clinical Aspects of Research in Respiratory Diseases (3 credits)
 EXMD 640 Experimental Medicine Topic 1 (3 credits)
 PHAR 508 Drug Discovery and Development 3 (3 credits)
 PPHS 529 Global Environmental Health and Burden of Disease (3 credits)

10.0 Approvals

Routing Sequence	Name	Signature	Meeting Date
Department	Gerhard Multhaup	<i>Gerhard Multhaup</i>	February 17 th , 2021
Curric/Acad Committee	Melissa Vollrath- FCC Chair	<i>M. Vollrath</i>	10th November 2021
Faculty 1	Aimee Ryan- FMHS Assoc. Dean	<i>A-Ryan</i>	17th November , 2021
Faculty 2			
Faculty 3			
CGPS			
SCTP			
APC			
Senate			

Submitted by

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Submission Date	

To be completed by ES:

CIP Code

REMINDERS:

*Box 5.4 – Must be completed; see section 6.5.4 within the New Program Guidelines at:

<https://www.mcgill.ca/sctp/guidelines>.

**All new program proposals must be accompanied by a 2-3 page support document.

Rationale for a Certificate in Translational Research

While biomedical research advances at an ever increasing pace, effectively translating these findings into tangible human health improvements remains a challenge. An overarching concern is **that we do not train science graduate students to be skilled at translating their research** nor provide the infrastructure required to facilitate interdisciplinary communication, particularly between clinicians and scientists. There is an educational gap¹ that we seek to fill. Historically, we have relied on MD/PhD programs to fill this gap. However, given how time-intensive and selective these programs are, in addition to the high resource-cost of this sort of combined training, this strategy alone will not meet this growing curricular and societal needs². Thus, **a radical re-thinking of how we train the next generation of translational scientists produced in biomedical science graduate programs is imperative** if we are to break down professional silos and facilitate the flow of innovation from bench to bedside. Our graduates will fill a need in the knowledge economy as well, as they will be better placed to help translate discoveries into inventions, intellectual property and new clinical interventions. The U.S. has addressed this need as early as 2005 by funding training programs at the top 13 institutions in the U.S. under the Howard Hughes Medical Institute (HHMI) that would expose graduate students to medicine, and give them access to the language, culture and network of the clinical world. However, **Canada is sorely lagging behind in creating such holistic programs**. Specifically at McGill, students interested in translational research can take individual courses or attend workshops, but such offerings are sparse, department- or faculty-specific (see for example <https://www.mcgill.ca/study/2021-2022/faculties/medicine/graduate/programs/graduate-certificate-gr-cert-translational-biomedical-engineering>), and not widely available to graduate student in biomedical science departments in the Faculty of Medicine and Health Sciences. Further, none offer structured clinical mentorship to our knowledge.

We propose a 1.5 year certificate program in translational research open to all STEM graduate students that can be completed before, concurrently (if allowed) or after their graduate degree programs. Modelled loosely after the HHMI-funded Leder Human Biology Program at Harvard University, it will combine medical-style coursework and clinical mentorship, and leverage network-building opportunities. In a preliminary survey conducted in April 2020 among 72 McGill students, **74% of participants were eager to enrol in the proposed program, while the other 26% would enrol pending details such as financing and integration with their degree programs**. The students we want to attract are those either immediately before or after their project-based graduate training. **It will be extremely interesting for students transitioning from graduate to medical training as well**. Ideally, as the program evolves, we hope to build it into a larger MSc or PhD program within the School of Biomedical Sciences.

Benchmarking of Existing Programs

To assess the unmet curricular need of our proposed program, we conducted an analysis of existing translational medicine programs from over 50 universities across the United States and Canada. As summarized in the table below, our findings illustrate three main categories of programs: either course-based, research-based, or a more holistic combination of course- and research-based (see **Appendix** for a curated list of relevant programs).

In Canada, the most common form of program was a Master's degree that offered 1-2 years of coursework in translational science and medicine, ranging from pathology and physiology to clinical trial design. Furthermore, many programs were geared towards medical doctors, early-career principal investigators and post-doctoral researchers. In contrast, **few universities provide certificate programs designed for graduate students that could be completed alongside their doctoral studies.** Our search revealed a fundamental need in Canada for holistic programs that combine standard coursework, hands-on experience in clinical settings and opportunities to establish a network of contacts in both academic and clinical communities. We believe that as one of the leading universities in Canada, McGill University is uniquely positioned to pioneer such a program.

Table 1 - Types of Translational Medicine Programs

Category	Example Institutions	Characteristics
Course-based	University of Alberta	Two years of coursework on various topics including preclinical research, clinical trials & drug discovery.
Research-based	University of California - Berkeley	Curriculum focuses on the completion of an independent capstone project related to themes of translational medicine.
Holistic approach	Harvard University	Mix of traditional coursework complemented by structured clinical mentorship and exposure to practical settings of clinical care.

Structure of Proposed Program

The Graduate Certificate Program in Translational Research we envision will span 1.5 years and enrich basic science training through a mix of medical-style coursework crafted for graduate students, an immersive clinical experience and engagement with the broader translational network at McGill. It will initially be run out of the Department of Pharmacology and Therapeutics. The coursework will start in the winter semester with an existing course at McGill: *Foundations of Translational Science* (FMED 525). In the following year, students enroll in a new year-long *Fundamentals of Disease Therapy* course, PHAR 522, in which clinicians are invited to teach 3 week modules covering one organ system - its normal function, associated diseases, and state-of-the-art treatment approaches. Concurrently, students will be paired with a clinical mentor in our other new course- PHAR 524 *Clinical Mentorship for Graduate Students*, ideally in their chosen area of focus and interface with patients who suffer from the diseases they are interested in. They will also take an additional complementary course (from a wide array of initial offerings after our consultations with the relevant course coordinators), take part in student-led discussion groups where they process their experiences with their peers. Moreover, we will organize recurring seminars and other networking events with

clinical mentors, industry partners and MD & MD-PhD students which are essential to not only the success of this program but also fostering a strong, long-lasting interdisciplinary community.

Incentives for Stakeholders

<p>Students</p> <ul style="list-style-type: none"> <input type="checkbox"/> Gain experiential clinical knowledge to better inform graduate and professional training and future research aspirations 	<p>Principal Investigators/Professors</p> <ul style="list-style-type: none"> <input type="checkbox"/> Foster collaboration with clinicians, create potential for new ideas, grants, and research projects
<ul style="list-style-type: none"> <input type="checkbox"/> Engage real individuals suffering from the relevant disease that will inspire/motivate research <input type="checkbox"/> Creation of a lifelong bench-to-bedside network for more effective innovation and knowledge transfer 	<ul style="list-style-type: none"> <input type="checkbox"/> Increase student mentorship and training for graduate students <input type="checkbox"/> Harness clinician input to conduct more clinically-oriented and impactful research
<p>Clinicians</p> <ul style="list-style-type: none"> <input type="checkbox"/> Keep up to date with cutting-edge research in their field to inform clinical practice <input type="checkbox"/> Affect the direction of current and future research to better address clinical need <input type="checkbox"/> Develop long-term collaborations with individual researchers 	<p>McGill University</p> <ul style="list-style-type: none"> <input type="checkbox"/> Become a world leader for the development of translational scientists <input type="checkbox"/> Foster student passion for translational work with institutional support <input type="checkbox"/> Build infrastructure to foster collaboration between McGill researchers/students and McGill clinicians

References

1. Heller, C. & De Melo-Martín, I. Clinical and translational science awards: Can they increase the efficiency and speed of clinical and translational research? *Acad. Med.* **84**, 424–432 (2009).
2. Smith, C. L., Jarrett, M. & Bierer, S. B. Integrating clinical medicine into biomedical graduate education to promote translational research: Strategies from two new phd programs. *Acad. Med.* **88**, 137–143 (2013).

Appendix: Relevant Programs from Benchmarking Review of Existing Programs

Institution	Program/Class Name	Program Type	Program Length	Website
American Universities				
Harvard University	Leder Human Biology & Translational Medicine	Graduate Certificate	1.5 years	https://lhbtm.squarespace.com/
Emory University	Georgia Clinical & Translational Science Alliance (Georgia CTSA) Certificate Program in Translational Research (CPTR) Affiliated with Emory University	Graduate Certificate	1 year, maximum complete in 2 yrs	http://georgiactsa.org/training/certificate-program-in-translational-research/index.html
University of Michigan - Ann Arbor	Translational Research Education Certificate (TREC)	Graduate Certificate	9 credits; length not mentioned	https://michr.umich.edu/dc/2015/9/17/translational-research-education-certificate
University of Minnesota - Twin Cities	TL1 Program	Career development training program for trainees	Up to 2 years	https://www.ctsi.umn.edu/career-development-programs/education-and-training/tl1-program
University of North Carolina - Chapel Hill	Graduate Training Program in Translational Medicine	Graduate Certificate	Concurrent with PhD	https://www.med.unc.edu/oge/stad/transmed/
University of Texas - Austin	Certificate in Translational Science	Graduate Certificate	1 year	https://iims.uthscsa.edu/education/certificate_in_ts.html
			2 years	https://www.med.upenn.edu

University of Pennsylvania	Graduate Training in Medical Science	Graduate Certificate		u/gtms/
Columbia University	1 year course (6 modules)	Certificate during PhD	1 year	https://www.gsas.cuimc.columbia.edu/med-grad-program
University of California - San Diego (UCSD)	Translational Science Certificate	Certificate	1 year	https://extension.ucsd.edu/courses-and-programs/translational-science
Yale University	Medical Research Scholars Program	Certificate during PhD	3 years	https://medicine.yale.edu/bbs/training/nihprograms/mrsp/
Canadian Universities				
Queen's University	Translational Medicine	MSc./PhD	2-year thesis-based program	https://www.queensu.ca/sgs/programs-degrees/translational-medicine https://deptmed.queensu.ca/academics/translational-medicine-graduate-programs
University of Alberta	Translational Research Training Program	Graduate Program	2 years	https://www.ualberta.ca/departments-of-medicine/education/graduate-studies/translational-medicine-program/index.html
University of Toronto	Translation Research Program	Masters of Health Science	2 years (5 terms)	https://trp.utoronto.ca/our-program/