Faculty of Medicine (Graduate)

Programs, Courses and University Regulations

2019-2020

This publication provides guidance to prospects, applicants, students, faculty and staff.

1 . McGill University reserves the right to mak

Publication Information

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Canada

McGill University reserves the right to make changes to the information contained in this publication - including correcting errors, altering fees, schedules of admission and credit requirements, and revising or cancelling particular courses or programs - without prior notification.

Not all courses are offered every year and changes can be made after publication. Always check the Minerva Class Schedule link at https://horizon.mcgill.ca/pban1/bwckschd.p_disp_dyn_sched for the most up-to-date information on whether a course is offered.

1 Dean's Welcome

To Graduate Students and Postdoctoral Fellows:

Welcome to Graduate and Postdoctoral Studies (GPS) at McGill. You are joining a community of world-class researchers and more than 10,000 graduate students in over 400 programs. *GPS* is here to support you from admissions through to graduation and beyond. We take a holistic approach to graduate student success; we support not only your academic development, but also your career-planning and professional development, and your well-being and student life. I invite you to consult the website *Resources for Your Success*, which is a one-stop-shop for the many resources and support systems in place for you across the University.

I would like to wish you all the best in your studies at McGill. We are here to make sure that you have the best possible experience.

Josephine Nalbantoglu, Ph.D.
Dean, Graduate and Postdoctoral Studies

2 Graduate and Postdoctoral Studies

2.1 Administrative Officers

Administrative Officers	
Josephine Nalbantoglu; B.Sc., Ph.D.(McG.)	**Dean (Graduate and Postdoctoral Studies)**
Robin Beech; B.Sc.(Nott.), Ph.D.(Edin.)	**Associate Dean (Graduate and Postdoctoral Studies)**
France Bouthillier; B.Ed., C.Admin.(UQAM), M.B.S.I.(Montr.), Ph.D.(Tor.)	**Associate Dean (Graduate and Postdoctoral Studies)**
Lorraine Chalifour; B.Sc., Ph.D.(Manit.)	**Associate Dean (Graduate and Postdoctoral Studies)**
Elisa Pylkkanen; B.A., M.A.(McG.)	**Director (Graduate and Postdoctoral Studies)**

2.2 Location

James Administration Building, Room 400
845 Sherbrooke Street West
Montreal QC H3A 0G4
Website: *www.mcgill.ca/gps*

Note: For inquiries regarding specific graduate programs, please contact the appropriate department.

2.3 Graduate and Postdoctoral Studies' Mission

The mission of Graduate and Postdoctoral Studies (GPS) is to promote university-wide academic excellence for graduate and postdoctoral education at McGill. GPS provides leadership and strategic direction across the university in close collaboration with the academic and administrative units, and the graduate and postdoctoral community.

3 Important Dates

For all dates relating to the academic year, consult *www.mcgill.ca/importantdates*.

4 Graduate Studies at a Glance

Please refer to *University Regulations & Resources* > *Graduate* > *: Graduate Studies at a Glance* for a list of all graduate departments and degrees currently being offered.

5 Program Requirements

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8.2 Guidelines and Policy for Academic Units on Postdoctoral Education

The general guidelines listed below are meant to encourage units to examine their policies and procedures to support postdoctoral education. Every unit hosting Postdocs should have explicitly stated policies and procedures for the provision of postdoctoral education as well as established means for informing Postdocs of policies, procedures, and privileges (e.g., orientation sessions, handbooks, etc.), as well as mechanisms for addressing complaints. Academic units should ensure that their policies, procedures and privileges are consistent with these guidelines and the Charter of Students' Rights. For their part, Postdocs are responsible for informing themselves of policies, procedures, and privileges.

1. **Definition and Status**

   i. Postdoctoral status will be recognized by the University in accordance with Quebec provincial regulations. Persons may only be registered with postdoctoral status for a period of up to five years from the date they were awarded a Ph.D. or equivalent degree. Time allocated to parental or health leave is added to this period of time. Leaves for other reasons, including vacation leave, do not extend the term. Postdocs must do research under the supervision of a McGill professor, including Adjunct Professors, who is a member of McGill's academic staff qualified in the discipline in which training is being provided and with the abilities to fulfil responsibilities as a supervisor of the research and as a mentor for career development. They are expected to be engaged primarily in research with minimal teaching or other responsibilities.

2. **Registration**

   i. Postdocs must be registered annually with the University through Enrolment Services. Initial registration will require an original or notarized copy of the Ph.D. diploma. Registration will be limited to persons who fulfil the definition above and for whom there is an assurance of appropriate funding and where the unit can provide assurance of the necessary resources to permit postdoctoral education.

   ii. Upon registration, the Postdoc will be eligible for a University identity card issued by Enrolment Services.

3. **Appointment, Pay, Agreement of Conditions**

   i. Appointments may not exceed your registration eligibility status.

   ii. In order to be registered as a Postdoc, you must be assured of financial support other than from personal means during your stay at McGill University, equivalent to the minimal stipend requirement set by the University in accordance with guidelines issued by federal and provincial research granting agencies. There are no provisions for paid parental leave unless this is stipulated in the regulations of a funding agency outside the University.

   iii. At the outset of a postdoctoral appointment, a written Letter of Agreement for Postdoctoral Education should be drawn up and signed by the Postdoc, the supervisor, and the department head or delegate (see template Letter of Agreement and supporting document—*Commitments of Postdoctor*

x. Access to student services and athletic services are available to the Postdoc on an opt-in basis. Fees are applicable.

5. Responsibilities

i. Postdocs are subject to the responsibilities outlined at *www.mcgill.ca/students/srr* and must abide by the policies listed at *www.mcgill.ca/secretariat/policies-and-regulations*.

ii. Each academic unit hosting Postdocs should clearly identify Postdocs' needs and the means by which they will be met by the unit.

iii. Each academic unit should assess the availability of research supervision facilities, office space, and research funding before recruiting Postdocs.

iv. Some examples of responsibilities of the department are:

- to verify the Postdoc's eligibility period for registration;
- to provide Postdocs with departmental policy and procedures that pertain to them;
- to oversee the registration and appointment of Postdocs;
- to assign departmental personnel (e.g., Postdoc coordinator and Graduate Program Director) the responsibility for Postdocs;
- to oversee and sign off on the Letter of Agreement for Postdoctoral Education;
- to ensure that each Postdoc has a supervisor, lab and/or office space, access to research operating costs and necessary equipment;
- to include Postdocs in departmental career and placement opportunities;
- to refer Postdocs to the appropriate University policies and personnel for the resolution of conflict that may arise between a Postdoc and a supervisor.

v. Some examples of responsibilities of the supervisor are:

- to uphold and transmit to their Postdocs the highest professional standards of research and/or scholarship;
- to provide research guidance;
- to meet regularly with their Postdocs;
- to provide feedback on research submitted by the Postdocs;
- to clarify expectations regarding intellectual property rights in accordance with the Univ

department shall forw

10 Graduate Student Services and Information

Graduate students are encouraged to refer to *: Student Services and Information* for information on the following topics:

- Service Point
- Student Rights & Responsibilities
- Student Services – Downtown & Macdonald Campuses
- Residential Facilities
- Athletics and Recreation
- Ombudsperson for Students
- Extra-Curricular and Co-Curricular Activities
- Bookstore
- Computer Store
- Day Care

11 Information on Research Policies and Guidelines, Patents, Postdocs, Associates, Trainees

Refer to *University Regulations & Resources* > *Graduate* > *: Research Policy and Guidelines* for information on the following:

- Regulations on Research Policy
- Regulations Concerning the Investigation of Research Misconduct
- Requirements for Research Involving Human Participants
- Policy on the Study and Care of Animals
- Policy on Intellectual Property
- Regulations Governing Conflicts of Interest
- Safety in Field Work
- Office of Sponsored Research
- Postdocs
- Research Associates

12 Browse Academic Units & Programs

The programs and courses in the following sections have been approved for the 2019–2020 session as listed. The Faculty/School reserves the right to introduce changes as may be deemed necessary or desirable at any time throughout the year.

12.1 Anatomy and Cell Biology

12.1.1 Location

Department of Anatomy and Cell Biology
Strathcona Anatomy and Dentistry Building
3640 University Street, Room M/28
Montreal QC H3A 0C7
Canada
Telephone: 514-398-6350

Website: *www.mcgill.ca/anatomy*

12.1.2 About Anatomy and Cell Biology

The Department offers graduate programs leading to **M.Sc.** and **Ph.D.** degrees. Research in the Department investigates the dynamics and organization of molecules, organelles, cells, and tissues in several major systems of the body. The work makes fundamental contributions to a number of established and emerging multidisciplinary fields such as:

- cell and molecular biology;
- cellular immunology and hematology;
- reproductive biology;
- calcified tissue biology;
- tumour cell biology;
- developmental biology;
- neurobiology;
- aging.

The Department offers contemporary facilities for the wide range of techniques currently employed in research. Modern methods of cell and molecular biology, immunology, and biochemistry are used in conjunction with specialized microscopy in a variety of experimental systems.

The Department has one of the largest and best-equipped electron microscope facilities in the world. Currently in use are four modern electron microscopes which include a Tecnai F20 and a Titan Krios. Combined with some of these microscopes are computer-aided analytical equipment capable of elemental microanalysis, histomorphometry, reconstruction, and quantitation. The high-voltage microscope is particularly useful for certain analytical electron optical procedures such as electron diffraction, lattice imaging, and three-dimensional electron microscopy.

Funding

M.Sc. and Ph.D. students receive a minimum yearly stipend of $18,000 and $20,000 respectively. All students are financially supported either by their supervisor or through fellowships or scholarships. Prospective students are urged to make every effort to secure their own funding. Applications may be made for a variety of fellowships administered by the University or by various federal, provincial, or private agencies. For more information on fellowships and awards, see the *Graduate and Postdoctoral Studies website*.

Departmental Seminars

Nationally and internationally recognized scientists present their research findings to the Department at a regular *seminar series* throughout the academic year. On a regular basis, graduate students also present their own research progress and results to other students, postdoctoral fellows, and researchers in the Department through the Research in Progress Seminar Series.

section 12.1.5: Master of Science (M.Sc.) Cell Biology (Thesis) (45 credits)

Graduate research activities leading to the presentation of the M.Sc. Thesis involve original experimental work in one of the areas being actively investigated by the Department's research supervisors. Our graduate program offers training in a personal, unique, and multidisciplinary environment in a top Canadian university with worldwide recognition. The thesis-based Master's training is intended for students with a B.Sc. or B.A. degree in life sciences from a university of recognized reputation. Candidates with an M.D., D.D.S., or D.V.M. degree are also welcome. Students are trained in how to address biological problems with an integrative understanding of cell biology by conducting hypothesis-driven projects. The training provides all the tools required for successful careers in academic settings as well as in industry or other fields.

section 12.1.6: Doctor of Philosophy (Ph.D.) Cell Biology

Graduate research activities leading to the presentation of the Ph.D. thesis involve original experimental work in one of the areas being actively investigated by the Department's research supervisors. Our graduate program offers training in a personal, unique, and multidisciplinary environment in a top Canadian university with worldwide recognition. The thesis-based Ph.D. training is intended for students with a B.Sc., B.A., or M.Sc. degree in life sciences from a university of recognized reputation. Candidates with an M.D., D.D.S., or D.V.M. degree are also welcome. Students are trained in how to address biological problems with an integrative understanding of cell biology by conducting hypothesis-driven projects. The training provides all the tools required for successful careers in academic settings as well as in industry or other fields.

12.1.3 Anatomy and Cell Biology Admission Requirements and Application Procedures

12.1.3.1 Admission Requirements

Admission is based on the candidate’s academic record and letters of recommendation. A minimum cumulative grade point average (CGPA) of 3.0 out of 4.0 is required. Once a student has submitted all the required documents, the applicant’s file will be reviewed by the Graduate Admission Committee. Files that do not meet the minimum requirement will not be considered. Applicants must also be accepted by a research supervisor who is and biochemistr98 1 2i290.322 Tm

Master's Program (Cell Biology)

1. A B.Sc. degree in life sciences or any of M.D., D.D.S., or D.V.M. degrees from a university of recognized reputation
2. Evidence of a high academic achievement with a minimum cumulative grade point average (CGPA) of 3.0 out of 4.0 as indicated in the general guidelines set up by GPS

Ph.D. Program (Cell Biology)

1. An M.Sc. degree in life sciences or any of M.D., D.D.S., or D.V.M. degrees from a university of recognized reputation
2. Evidence of a high academic achievement with a minimum cumulative grade point average (CGPA) of 3.0 out of 4.0 as indicated in the general guidelines set up by GPS

International Applicants

Graduate studies applicants whose mother tongue is not English and who have not completed an undergraduate or graduate degree from a recognized foreign institution where English is the language of instruction, or from a recognized Canadian institution (anglophone or francophone), must submit the following:

TOEFL: Minimum score of 86 on the Internet-based test (iBT; 567 on the paper-based test (PBT)) with each component score 20 or higher.

or

IELTS: Minimum overall band score of 6.5.

12.1.3.2 Application Procedures

McGill's online application form for graduate program candidates is available at *www.mcgill.ca/gradapplicants/apply*.

See *University Regulations & Resources* > *Graduate* > *Graduate Admissions and Application Procedures* > *: Application Procedures* for detailed application procedures. Further details from the department can be found under the "Applying" tab at *www.mcgill.ca/anatomy/graduate-mscphd*.

All applicants are advised to contact potential research supervisors before the application process since supervisor acceptance is required. Information about the research interests of faculty members can be found in our *Departmental Directory*.

Program guidelines are listed under the "Master's" and "Doctorate" tabs at *www.mcgill.ca/anatomy/graduate*.

12.1.3.2.1 Additional Requirements

The items and clarifications below are additional requirements set by this department:

- Agreement of a faculty member to act as Thesis Supervisor and to provide adequate financial support

12.1.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Department of Anatomy and Cell Biology and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill departmental website; please consult the list at *www.mcgill.ca/gps/contact/graduate-program*.

	Application Opening Dates	Application Deadlines		
	All Applicants	**Non-Canadian citizens (incl. Special, Visiting & Exchange)**	**Canadian citizens/Perm. residents of Canada (incl. Special, Visiting & Exchange)**	**Current McGill Students (any citizenship)**
Fall Term:	Sept. 15	April 21	June 21	June 21
Winter Term:	Feb. 15	Sept. 1	Nov. 10	Nov. 10
Summer Term:	N/A	N/A	N/A	N/A

Admission to graduate studies is competitive; accordingly, late and/or incomplete applications are considered only as time and space permit.

12.1.4 Anatomy and Cell Biology Faculty

Chair

Craig Mandato

Emeritus Professors

Gary C. Bennett; B.A., B.Sc.(Sir G. Wms.), M.Sc., Ph.D.(McG.)

John J.M. Bergeron; B.Sc.(McG.), D.Phil.(Oxf.)

Emeritus Professors

James R. Brawer; B.Sc.(Tufts), Ph.D.(Harv.)

Louis Hermo; B.A.(Loyola), M.Sc., Ph.D.(McG.)

Sandra C. Miller; B.Sc.(Sir G. Wms.), M.Sc., Ph.D.(McG.)

Dennis G. Osmond; C.M., B.Sc., M.B., Ch.B., D.Sc.(Brist.), M.R.C.S., L.R.C.P., F.R.S.C.

Hershey Warshawsky; B.Sc.(Sir G. Wms.), M.Sc., Ph.D.(McG.)

Professors

Chantal Autexier; B.Sc.(C'dia), Ph.D.(McG.)

Samuel David; Ph.D.(Manit.) (*joint appt. with Neurology and Neurosurgery*)

Elaine Davis; B.Sc., M.Sc.(W. Ont.), Ph.D.(McG.)

Timothy Kennedy; B.Sc.(McM.), M.Phil., Ph.D.(Col.) (*joint appt. with Neurology and Neurosurgery*)

Nathalie Lamarche-Vane; B.Sc., Ph.D.(Montr.)

Marc D. McKee; B.Sc., M.Sc., Ph.D.(McG.) (*joint appt. with Dentistry*)

Peter McPherson; B.Sc.(Manit.), Ph.D.(Iow

Emeritus Pr

Associate Members

Claudio Cuello (*Pharmacology and Therapeutics*)

Giovanni DiBattista (*Medicine*)

Allen Ehrlicher (*Bioengineering*)

Alyson Fournier (*Neurology and Neurosurgery*)

Lisbet Haglund (*Surgery*)

Janet Henderson (*Medicine*)

Loydie A. Jerome-Majewska (*Pediatrics and Human Genetics*)

Mari T. Kaartinen (*Dentistry*)

Svetlana Komarova (*Dentistry*)

Stephane Laporte (*Medicine*)

Andréa Leblanc (*Neurology and Neurosurgery*)

Stéphanie Lehoux (*Medicine*)

Heidi McBride (*Montreal Neurological Institute*)

Peter Metrakos (*Surgery*)

Makato Nagano (*Obstetrics and Gynecology*)

Christian Rocheleau (*Endocrinology and Metabolism*)

Edward S. Ruthazer (*Neurology and Neurosurgery*)

Peter Siegel (*Medicine and Biochemistry*)

Charles E. Smith; D.D.S., Ph.D.(McG.)

Thomas Stroh (*Neurology and Neurosurgery*)

Jason Tanny (*Pharmacology and Therapeutics*)

Adjunct Professors

Gregor Andelfinger; M.D.(Ulm)

Philippe Campeau; M.D.(Lav

12.1.5 Master of Science (M.Sc.) Cell Biology (Thesis) (45 credits)

Thesis Course (24 credits)

ANAT 698	(24)	M.Sc. Thesis Research 1

Required Course (12 credits)

ANAT 601	(3)	MSc Seminar Examination
ANAT 695	(3)	Seminars in Cell Biology 1
ANAT 696	(3)	Seminars in Cell Biology 2
ANAT 697	(3)	Seminars in Cell Biology 3

Complementary Courses (9 credits)

6 credits from one of two streams: Cell De

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

Required Courses

ANAT 690D1	(3)	Cell and Developmental Biology
ANAT 690D2	(3)	Cell and Developmental Biology
ANAT 695	(3)	Seminars in Cell Biology 1
ANAT 696	(3)	Seminars in Cell Biology 2
ANAT 697	(3)	Seminars in Cell Biology 3
ANAT 701	(0)	Ph.D. Comprehensive Examination

12.2 Biochemistry

12.2.1 Location

Department of Biochemistry
McIntyre Medical Sciences Building
3655 Promenade Sir-William-Osler
Montreal QC H3G 1Y6
Canada
Christine Laberge: Student Affairs Officer/Graduate Program Coordinator
Telephone: 514-398-2423
Fax: 514-398-7384
Email: *christine.laberge@mcgill.ca*
Website: *www.mcgill.ca/biochemistry*

12.2.2 About Biochemistry

The Department of Biochemistry offers M.Sc. and Ph.D. programs, which emphasize laboratory research. Our research interests include:

- molecular and cell biology;
- the regulation of gene and protein expression;
- signal transduction;
- protein structure and function;
- membrane biology;
- cell death and differentiation;
- embryonic development;
- neurobiology;
- bioinformatics;
- cancer.

Specialized graduate training programs in Chemical Biology, Human Systems Biology (Bioinformatics), *Cancer Research/Oncology*, and *Structural Biology* are available. Laboratories are located in the new Bellini Life Sciences Building and Goodman Cancer Research Centre, and the renovated McIntyre Medical Sciences Building, together comprising one of the best-equipped research facilities in Canada. The outstanding quality of our research has been recognized by recent awards including a Gairdner Award, two Killam Prizes, and eight Canada Research Chairs.

Funding

Master's students receive a minimum stipend of $20,000 annually; doctoral students receive $22,000. The Department is committed to helping graduate students secure adequate funding for their research. All students are financially supported either by their supervisor or through fellowships or scholarships. Prospective students are urged to make every effort to secure their own funding. Applications may be made for a variety of fellowships administered by the University or by various federal, provincial, or private agencies. For more information on fellowships and awards, see the *Graduate and Postdoctoral Studies website*.

Departmental Seminars

Visiting scientists and senior doctoral students present their research findings to the Department at a regular seminar series throughout the academic year. All graduate students are required to attend the regular seminars and additional special lectures, and are encouraged to attend scientific conferences and symposia.

section 12.2.5: Master of Science (M.Sc.) Biochemistry (Thesis) (45 credits)

The M.Sc. in Biochemistry introduces students to laboratory-based research at an advanced level. The M.Sc. program offers core courses in advanced biochemistry topics, b

the chemical biology of NO; quantification of bioenergetic mark

All applicants are advised to contact potential research supervisors during or before the application process since supervisor acceptance is required. Information about the research interests of faculty members can be found at *www.mcgill.ca/biochemistry/research* and *www.mcgill.ca/biochemistry/about-us/department/faculty-members*.

12.2.3.2.1 Additional Requirements

The items and clarifications below are additional requirements set by this department:

- Curriculum Vitae
- Personal Statement
- Agreement of a faculty member to act as Thesis Supervisor and to provide adequate financial support
- Acceptance by a Bioinformatics or Chemical Biology research director

12.2.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Department of Biochemistry and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill departmental website; please consult the list at *www*

Professors

Philippe Gros; B.Sc., M.Sc.(Montr.), Ph.D.(McG.), F.R.S.C. (*James McGill Professor*)

Alba Guarné; B.Sc., M.Sc., Ph.D.(Barcelona)

Roderick R. McInnes; B.Sc., M.D.(Dal.), Ph.D.(McG.)

William Muller; B.Sc., Ph.D.(McG.) (*Canada Research Chair in Molecular Oncology*)

Alain Nepveu; B.Sc., M.Sc.(Montr.), Ph.D.(Sher.) (*James McGill Professor*) (*joint appt. with Oncology and Medicine*)

Morag Park; B.Sc., Ph.D.(Glas.), F.R.S.C. (*Diane and Sal Guerrera Chair in Cancer Genetics*) (*James McGill Professor*) (*joint appt. with Oncology and Medicine*)

Arnim Pause; B.Sc., M.Sc.(Konstanz), Ph.D.(McG.)

Jerry Pelletier; B.Sc., Ph.D.(McG.) (*James McGill Professor*)

Nahum Sonenberg; M.Sc., Ph.D.(Weizmann Inst.), F.R.S.C., F.R.S. (*James McGill Professor*) (*Gilman Cheney Chair in Biochemistry*)

David Y. Thomas; B.Sc.(Brist.), M.Sc., Ph.D.(Univ. College, Lond.), F.R.S.C. (*Canada Research Chair in Molecular Genetics*)

Michel L. Tremblay; B.Sc., M.Sc.(Sher.), Ph.D.(McM.), F.R.S.C. (*Jeanne and Jean-Louis Levesque Chair in Cancer Research*)

Associate Professors

Josée Dostie; B.Sc.(Sher.), Ph.D.(McG.) (*CIHR New Investigators Award; Chercheure-boursière du FRSQ*)

Thomas Duchaine; B.Sc., Ph.D.(Montr.) (*Chercheur-boursier du FRSQ*)

Bhushan Nagar; B.Sc., Ph.D.(Tor.)

Martin Schmeing; B.Sc.(McG.), Ph.D.(Yale) (*Canada Research Chair in Macromolecular Machines*)

Jose G. Teodoro; B.Sc.(W. Ont.), Ph.D.(McG.) (*CIHR New Investigators Award; Chercheur-boursier du FRSQ*)

Jason C. Young; B.Sc.(Tor.), Ph.D.(McM.)

Assistant Professors

Uri David Akavia; B.Sc., M.Sc., Ph.D.(Tel Aviv)

Maxime Denis; B.Sc., Ph.D.(Montr.)

Sidong Huang; B.A.(Boston), Ph.D.(Calif.) (*Canada Research Chair in Functional Genomics*)

Lawrence Kazak; Ph.D.(Camb.)

William Pastor; Ph.D.(Harv.)

Ian Watson; B.Sc., Ph.D.(Tor.) (*Canada Research Chair in Functional Genomics of Melanoma*)

Associate Members

Gary Brouhard (*Dept. of Biology*)

Robert S. Kiss (*Dept. of Medicine*)

Gergely Lukacs (*Dept. of Physiology*)

Janusz Rak (*Dept. of Medicine*)

Stéphane Richard (*Depts. of Medicine and Oncology*)

Selena M. Sagan (*Dept. of Microbiology & Immunology*)

Reza Salavati (*Inst. of Parasitology*)

Maya Saleh (*Dept. of Medicine*)

Erwin Schurr (*Ctr. for Host Resistance, MGH*)

Peter Siegel (*Goodman Cancer Ctr., Dept. of Medicine*)

Ivan Topisirovic (*Dept. of Oncology*)

Youla S. Tsantrizos (*Dept. of Chemistry*)

Bernard Turcotte (*Dept. of Medicine*)

Josie Ursini-Siegel (*Dept. of Oncology*)

Associate Members

Simon Wing (*Dept. of Medicine*)

Xiang-Jiao Yang (*Goodman Cancer Ctr., Dept. of Medicine*)

Adjunct Professors

Jacques Drouin (*IRCM*)

Michael Hallett (*C'dia, Dept. of Biology*)

Enrico Purisima (*NRC/BRI*)

Julie St-Pierre (*Ott.*)

12.2.5 Master of Science (M.Sc.) Biochemistry (Thesis) (45 credits)

Thesis Courses (36 credits)

BIOC 697	(9)	Thesis Research 1
BIOC 698	(12)	Thesis Research 2
BIOC 699	(15)	Thesis Research 3

Required Course (3 credits)

BIOC 696	(3)	Seminars in Biochemistry

Complementary Courses* (6 credits)

At least 3 credits must be chosen from the following:

BIOC 600	(3)	Advanced Strategies in Genetics and Genomics
BIOC 603	(3)	Genomics and Gene Expression
BIOC 604	(3)	Macromolecular Structure
BIOC 605	(3)	Protein Biology and Proteomics
BIOC 670	(3)	Biochemistry of Lipoproteins
EXMD 615	(3)	Essentials of Glycobiology
EXMD 635D1	(3)	Experimental/Clinical Oncology
EXMD 635D2	(3)	Experimental/Clinical Oncology

Plus additional credits, to a minimum of 6 total complementary course credits, of 500- or higher-level courses in biomedical and allied sciences.

* Complementary courses are chosen in consultation with the Research Director.

The Graduate Advisory Committee may stipulate additional coursework depending on the background of the candidate. BIOC 450 (Protein Structure and Function) and BIOC 454 (Nucleic Acids) are additional requirements for those who have not previously completed equivalent courses in their prior training.

12.2.6 Master of Science (M.Sc.) Biochemistry (Thesis): Bioinformatics (45 credits)

Thesis Courses (30 credits)

BIOC 694	(3)	Thesis Research 4
BIOC 698	(12)	Thesis Research 2
BIOC 699	(15)	Thesis Research 3

BIOC 690	(1)	Seminars in Chemical Biology 4

At least 3 credits from the following:

CHEM 502	(3)	Advanced Bio-Organic Chemistry
CHEM 503	(3)	Drug Discovery
PHAR 503	(3)	Drug Discovery and Development 1

and at least 3 credits from the following:

BIOC 600	(3)	Advanced Strategies in Genetics and Genomics
BIOC 603	(3)	Genomics and Gene Expression
BIOC 604	(3)	Macromolecular Structure
BIOC 605	(3)	Protein Biology and Proteomics
BIOC 670	(3)	Biochemistry of Lipoproteins
EXMD 615	(3)	Essentials of Glycobiology
EXMD 635D1	(3)	Experimental/Clinical Oncology
EXMD 635D2	(3)	Experimental/Clinical Oncology

Plus additional credits, to a total of at least 11 complementary course credits from the following list:

CHEM 504	(3)	Drug Design
CHEM 522	(3)	Stereochemistry
CHEM 582	(3)	Supramolecular Chemistry
CHEM 591	(3)	Bioinorganic Chemistry
CHEM 621	(5)	Reaction Mechanisms in Organic Chemistry
CHEM 629	(5)	Organic Synthesis
CHEM 655	(4)	Advanced NMR Spectroscopy
EXMD 510	(3)	Bioanalytical Separation Methods
EXMD 602	(3)	Techniques in Molecular Genetics
PHAR 504	(3)	Drug Discovery and Development 2
PHAR 562	(3)	Neuropharmacology
PHAR 563	(3)	Endocrine Pharmacology
PHAR 707	(3)	Topics in Pharmacology 6

* Complementary courses are chosen in consultation with the Research Director.

The Graduate Advisory Committee may stipulate additional coursework depending on the background of the candidate. BIOC 450 (Protein Structure and Function) and BIOC 454 (Nucleic Acids) are additional requirements for those who have not previously completed equivalent courses in their prior training.

12.2.8 Doctor of Philosophy (Ph.D.) Biochemistry

Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

Required Courses (3 credits)

BIOC 696*	(3)	Seminars in Biochemistry
BIOC 701**	(0)	Research Seminar 1
BIOC 702**	(0)	Ph.D. Thesis Proposal
BIOC 703**	(0)	Ph.D. Seminar

*Students promoted directly from the M.Sc. to the Ph.D. program, and who registered for and passed BIOC 696 at the M.Sc. level, do not register for BIOC 696 at the Ph.D. level.

** NOTE: Students DO NOT register for these courses until notified by the Student Affairs Officer.

Students must complete BIOC 701 in the third term after admission to the program, BIOC 702 in the fifth or sixth term, and BIOC 703 approximately six months prior to submission of the Ph.D. thesis.

Complementary Courses*** (6 credits)

At least 3 credits selected from:

BIOC 600	(3)	Advanced Strategies in Genetics and Genomics
BIOC 603	(3)	Genomics and Gene Expression
BIOC 604	(3)	Macromolecular Structure
BIOC 605	(3)	Protein Biology and Proteomics
BIOC 670	(3)	Biochemistry of Lipoproteins
EXMD 615	(3)	Essentials of Glycobiology
EXMD 635D1	(3)	Experimental/Clinical Oncology
EXMD 635D2	(3)	Experimental/Clinical Oncology

Plus additional credits to a minimum of 6 total complementary course credits of 500- or higher-level courses in the biomedical and allied sciences.

*** Complementary courses are chosen in consultation with the Research Director.

The Graduate Advisory Committee may stipulate additional course work depending on the background of the candidate. BIOC 450 (Protein Structure and Function) and BIOC 454 (Nucleic Acids) are additional requirements for those who have not previously completed equivalent courses in their prior training.

12.2.9 Doctor of Philosophy (Ph.D.) Biochemistry: Bioinformatics

Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

Required Courses (6 credits)

	(3)	Seminars in Biochemistry

* Students promoted directly from the M.Sc. to the Ph.D. program, and who registered for and passed BIOC 696 at the M.Sc. level, do not register for BIOC 696 at the Ph.D. level.

** NOTE: Students DO NOT register for these courses until notified by the Student Affairs Officer.

Students must complete BIOC 701 in the third term after admission to the program, BIOC 702 in the fifth or sixth term, and BIOC 703 approximately six months prior to submission of the Ph.D. thesis.

Complementary Courses*** (9 credits)

3 credits from the following:

BIOC 600	(3)	Advanced Strategies in Genetics and Genomics
BIOC 603	(3)	Genomics and Gene Expression
BIOC 604	(3)	Macromolecular Structure
BIOC 605	(3)	Protein Biology and Proteomics
BIOC 670	(3)	Biochemistry of Lipoproteins
EXMD 615	(3)	Essentials of Glycobiology
EXMD 635D1	(3)	Experimental/Clinical Oncology
EXMD 635D2	(3)	Experimental/Clinical Oncology

Plus 6 credits from the following:

BINF 621	(3)	Bioinformatics: Molecular Biology
BMDE 652	(3)	Bioinformatics: Proteomics
BTEC 555	(3)	Structural Bioinformatics
COMP 618	(3)	Bioinformatics: Functional Genomics
PHGY 603	(3)	Systems Biology and Biophysics

*** Complementary courses are chosen in consultation with the Research Director.

The Graduate Advisory Committee may stipulate additional coursework depending on the background of the candidate. BIOC 450 (Protein Structure and Function) and BIOC 454 (Nucleic Acids) are additional requirements for those who have not previously completed equivalent courses in their prior training.

12.2.10 Doctor of Philosophy (Ph.D.) Biochemistry: Chemical Biology

Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contrib

* Students promoted directly from the M.Sc. to the Ph.D. program, and who registered for and passed BIOC 696 at the M.Sc. level, do not register for BIOC 696 at the Ph.D. level.

** NOTE: Students DO NOT register for these courses until notified by the Student Affairs Officer.

Students must complete BIOC 701 in the third term after admission to the program, BIOC 702 in the fifth or sixth term, and BIOC 703 approximately six months prior to submission of the Ph.D. thesis.

Complementary Courses* (9 credits)**

At least 3 credits from the following:

CHEM 502	(3)	Advanced Bio-Organic Chemistry
CHEM 503	(3)	Drug Discovery
PHAR 503	(3)	Drug Discovery and Development 1

At least 3 credits from the following:

BIOC 600	(3)	Advanced Strategies in Genetics and Genomics
BIOC 603	(3)	Genomics and Gene Expression
BIOC 604	(3)	Macromolecular Structure
BIOC 605	(3)	Protein Biology and Proteomics
BIOC 670	(3)	Biochemistry of Lipoproteins
EXMD 615	(3)	Essentials of Glycobiology
EXMD 635D1	(3)	Experimental/Clinical Oncology
EXMD 635D2	(3)	Experimental/Clinical Oncology

Plus additional credits to a total of at least 9 complementary course credits from the following list:

CHEM 504	(3)	Drug Design
CHEM 522	(3)	Stereochemistry
CHEM 582	(3)	Supramolecular Chemistry
CHEM 591	(3)	Bioinorganic Chemistry
CHEM 621	(5)	Reaction Mechanisms in Organic Chemistry
CHEM 629	(5)	Organic Synthesis
CHEM 655	(4)	Advanced NMR Spectroscopy
EXMD 510	(3)	Bioanalytical Separation Methods
EXMD 602	(3)	Techniques in Molecular Genetics
PHAR 504	(3)	Drug Discovery and Development 2
PHAR 562	(3)	Neuropharmacology
PHAR 563	(3)	Endocrine Pharmacology
PHAR 707	(3)	Topics in Pharmacology 6

*** Complementary courses are chosen in consultation with the Research Director.

The Graduate Advisory Committee may stipulate additional coursework depending on the background of the candidate. BIOC 450 (Protein Structure and Function) and BIOC 454 (Nucleic Acids) are additional requirements for those who have not previously completed equivalent courses in their prior training.

12.3 Bioethics

12.3.1 Location

Biomedical Ethics Unit
3647 Peel Street
Montreal QC H3A 1X1
Canada
Telephone: 514-398-6668
Website: *www.mcgill.ca/biomedicalethicsunit/teaching/masters*

For information, contact the Graduate Program Director:

Jennifer Fishman – *jennifer.fishman@mcgill.ca*

12.3.2 About Bioethics

The Biomedical Ethics Unit was established in 1996 with the aim of supporting scholarly research, clinical services, teaching, and public outreach. Members of the unit have backgrounds in law, sociology, molecular genetics, history, medicine, and philosophy. We offer a master's degree specialization in biomedical ethics for selected master's students in the Division of Experimental Medicine, the Department of Family Medicine, Department of Human Genetics, Department of Philosophy, School of Religious Studies, and Faculty of Law.

Master's Specialization in Bioethics

The Master's Specialization in Bioethics is sponsored by the:

- Faculty of Medicine, Division of Experimental Medicine, Department of Human Genetics, Department of Family Medicine;
- Faculty of Law; and
- Faculty of Arts, Department of Philosophy, School of Religious Studies.

Students receive an **M.A.**, **LL.M.**, or **M.Sc.** degree in the discipline chosen with a specialization in Bioethics.

Some applicants are mid-career professionals currently working as physicians, nurses, social workers, other health care providers, or lawyers. Other applicants have recently completed their undergraduate degrees in science, philosophy, law, religious studies, or other disciplines, and wish to pursue specialized master's level training in bioethics before enrolling in doctoral level studies or entering the workplace.

Students pursuing the master's degree specialization normally take two semesters of courses before beginning their master's thesis. Courses offered include Bioethics Theory, Public Health Ethics and Policy, Research Ethics, and a Practicum that includes placement in a clinical or research setting. Research and writing the thesis normally takes one year. Students must also comply with the course and thesis requirements of their home disciplines.

12.3.3 Bioethics Admission Requirements and Application Procedures

12.3.3.1 Admission Requirements

M.D., professional training in a health science, or bachelor's degree in the sciences, social sciences, law, philosophy, or religious studies. Other students may be considered on an individual basis.

Enrolment is limited to 12 students.

12.3.3.2 Application Procedures

McGill's online application form for graduate program candidates is available at *www.mcgill.ca/gradapplicants/apply*.

See *University Regulations and Resources* > *Graduate* > *Graduate Admissions and Application Procedures* > *: Application Procedures* for detailed application procedures.

Applications for the Master's Specialization in Bioethics are made initially through the Faculties of Law, Medicine (Division of Experimental Medicine, Department of Human Genetics, Department of Family Medicine), and Arts (Department of Philosophy, School of Religious Studies).

Applicants must satisfy the admission criteria for their chosen discipline and those of the Bioethics Unit, which administers the program and teaches the core courses; see *www.mcgill.ca/biomedicalethicsunit/teaching/masters/apply*.

Applicants must be accepted by the appropriate Faculty, the Bioethics Graduate Studies Advisory Committee, and Graduate and Postdoctoral Studies.

12.3.3.3 Application Dates and Deadlines

Deadlines coincide with those of the chosen base discipline. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill departmental website; please consult the list at *www.mcgill.ca/gps/contact/graduate-program*.

Note:

Our faculty members are particularly active in research related to the development of quantitative analysis tools and instruments for biological and biomedical research. The ultimate goal is the pursuit of answers to biological and medical questions. Ongoing biological and biomedical engineering research at McGill includes:

- signal analysis, including brain (EEG), muscles (EMG), eyes (EOG), respiration, and mass spectrometry;
- systems analysis, including neuromuscular control, and oculomotor and vestibular control;
- experimental and computational biomechanics, including orthopedic and auditory mechanics;
- biomaterials, including artificial cells;
- medical imaging and image processing;
- micro and nanotechnology and biosensors;
- nanoparticles and cell imaging;
- bioinformatics and computational biology;
- computers in medical education, including interactive 3D models and haptics;
- biological materials and mechanics;
- biomolecular and cellular engineering, and regenerative medicine;
-

12.4.3.2 Application Procedures

McGill's online application form for graduate program candidates is available at *www.mcgill.ca/gradapplicants/apply*.

See *University Regulations & Resources* > *Graduate* > *Graduate Admissions and Application Procedures* > *: Application Procedures* for detailed application procedures.

Please address enquiries directly to *info.bbme@mcgill.ca*.

12.4.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Biological and Biomedical Engineering Graduate Program and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill departmental website; please consult the list at *www.mcgill.ca/gps/contact/graduate-program*. For additional information, please consult *www.mcgill.ca/bbme/prospective-students/how-apply*.

Application Opening Dates	Application Deadlines
	Current McGill Students (any

BBME 600N1	(1.5)	Seminars in Biological and Biomedical Engineering
BBME 600N2	(1.5)	Seminars in Biological and Biomedical Engineering

Complementary Courses (18 credits)

3 credits from the following quantitative courses:

BIEN 510	(3)	Engineered Nanomaterials for Biomedical Applications
BIEN 520	(3)	High Throughput Bioanalytical Devices
BIEN 530	(3)	Imaging and Bioanalytical Instrumentation
BIEN 550	(3)	Biomolecular Devices
BIEN 560	(3)	Biosensors
BIEN 570	(3)	Active Mechanics in Biology
BIEN 590	(3)	Cell Culture Engineering
BMDE 502	(3)	BME Modelling and Identification
BMDE 503	(3)	Biomedical Instrumentation
BMDE 512	(3)	Finite-Element Modelling in Biomedical Engineering
BMDE 519	(3)	Biomedical Signals and Systems
BMDE 610	(3)	Functional Neuroimaging Fusion
BMDE 660	(3)	Advanced MR Imaging and Spectroscopy of the Brain

6 credits from the following:

BIEN 510	(3)	Engineered Nanomaterials for Biomedical Applications
BIEN 520	(3)	High Throughput Bioanalytical Devices
BIEN 530	(3)	Imaging and Bioanalytical Instrumentation
BIEN 540	(3)	Information Storage and Processing in Biological Systems
BIEN 550	(3)	Biomolecular Devices
BIEN 560	(3)	Biosensors
BIEN 570	(3)	Active Mechanics in Biology
BIEN 590	(3)	Cell Culture Engineering
BIEN 680	(4)	Bioprocessing of Vaccines
BMDE 501	(3)	Selected Topics in Biomedical Engineering
BMDE 502	(3)	BME Modelling and Identification
BMDE 503	(3)	Biomedical Instrumentation
BMDE 504	(3)	Biomaterials and Bioperformance
BMDE 505	(3)	Cell and Tissue Engineering
BMDE 508	(3)	Introduction to Micro and Nano-Bioengineering
BMDE 512	(3)	Finite-Element Modelling in Biomedical Engineering
BMDE 519	(3)	Biomedical Signals and Systems
BMDE 525D1	(3)	Design of Assistive Technologies: Principles and Praxis
BMDE 525D2	(3)	Design of Assistive Technologies: Principles and Praxis
BMDE 610	(3)	Functional Neuroimaging Fusion
BMDE 650	(3)	Advanced Medical Imaging
BMDE 653	(3)	Patents in Biomedical Engineering

BMDE 654	(3)	Biomedical Regulatory Affairs - Medical Devices
BMDE 655	(3)	Biomedical Clinical Trials - Medical Devices
BMDE 660	(3)	Advanced MR Imaging and Spectroscopy of the Brain
MDPH 607	(3)	Medical Imaging

9 credits at the 500-level or higher chosen from a list on the program web site https://www.mcgill.ca/bbme/students/courses or from other courses, at the 500 level or higher, at least 3 credits of which have both life sciences content and content from the physical sciences, engineering, or computer science, with the prior written approval of the Thesis Supervisor and the Graduate Program Director.

12.4.6 Doctor of Philosophy (Ph.D.) Biological and Biomedical Engineering

The goal of the Biological and Biomedical Engineering Ph.D. program is for students to gain advanced training in the interdisciplinary application of methods, paradigms, technologies, and devices from engineering and the natural sciences to problems in biology, medicine, and the life sciences. The program will focus in an area of choice while integrating quantitative concepts and engineering tools for the study of life sciences and/or for patient care. As part of the Ph.D. requirement, the student will integrate the scientific method, develop critical and deep thinking, and acquire advanced writing and presentation skills that will form the foundation for his/her career. Under the guidance of his/her supervisor, the student will tackle a research challenge and make original contributions to the adv

- neuromuscular and postural control;
- muscle mechanics;
- the vestibular system;
- oculomotor control;
- the auditory system;
- joint prosthetics;
- biomaterials;
- artificial cells and organs;
- cell and tissue engineering;
- drug delivery;
- microencapsulation;
- microbiome and probiotics;
- functional food and neutraceuticals;
- medical imaging;
- microfluidics;
- nanomedicine and nanotechnology;
- bioinformatics in genomics and proteomics.

Staff members are also active in more applied research related to the development of quantitative analysis tools and instruments for biomedical research. Areas of activity here include: signal analysis, system identification, modelling, simulation and parameter estimation, image processing, pattern recognition, ultrasound, and biorobotics.

section 12.5.5: Graduate Certificate (Gr. Cert.) Translational Biomedical Engineering (15 credits)

This program will enable students to translate advances in biomedical engineering research to clinical and commercial solutions. Students will learn the complementary skills needed to take early-stage research results from the bench to the bedside and bridge the gap between invention and product innovation.

The graduate certificate responds to the demand from students for such training and addresses the needs of the biomedical industry for such highly qualified personnel.

For additional information, see the *Biomedical Engineering website*.

12.5.3 Biomedical Engineering Admission Requirements and Application Procedures

12.5.3.1 Admission Requirements

See *University Regulations & Resources* > *Graduate* > *Graduate Admissions and Application Procedures* > *: Admission Requirements (Minimum Requirements to be Considered for Admission)*. In addition, please see the Department's website: *www.mcgill.ca/bme/prospective-students/certificate*.

12.5.3.2 Application Procedures

McGill's online application form for graduate program candidates is available at *www.mcgill.ca/gradapplicants/apply*.

See *University Regulations & Resources* > *Graduate* > *Graduate Admissions and Application Procedures* > *: Application Procedures* for detailed application procedures.

Please address enquiries directly to the Department.

12.5.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Department of Biomedical Engineering and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill departmental website; please consult the list at *www.mcgill.ca/gps/contact/graduate-program*.

Application Opening Dates	Application Deadlines	
	Canadian citizens/Perm. residents of	Current McGill Students (any citizenship)

	Application Opening Dates		Application Deadlines	
Summer Term:	N/A	N/A	N/A	N/A

Admission to graduate studies is competitive; accordingly, late and/or incomplete applications are considered only as time and space permit.

Note: Applications for Summer term admission will not be considered.

12.5.4 Biomedical Engineering Faculty

Chair

D. Juncker

Emeritus Professor

T.M.S. Chang; B.Sc., M.D.,C.M., Ph.D.(McG.), F.R.C.P.(C), F.R.S.(C) (*joint appt. with Physiology*)

Professors

D.L. Collins; B.Sc., M.Eng., Ph.D.(McG.) (*joint appt. with Neurology and Neurosurgery*)

H.L. Galiana; B.Eng., M.Eng., Ph.D.(McG.)

D. Juncker; Dipl., Ph.D.(Neuch-Switzerland)

R.E. Kearney; B.Eng., M.Eng., Ph.D.(McG.)

S. Prakash; B.Sc.(Hon.), M.Sc., M.Tech.(BHU), Ph.D.(McG.)

M. Tabrizian; B.Sc.(Iran), M.Sc., Ph.D.(PMC-France), M.B.A.(HEC) (*joint appt. with Dentistry*)

Associate Professor

W.R.J. Funnell; B.Eng., M.Eng., Ph.D.(McG.) (*joint appt. with Otolaryngology*)

Assistant Professors

A. Haidar; B.Sc.(Kuwait), M.Sc. A.(École Poly., Montr.), Ph.D.(McG.)

D.A. Rudko; B.Sc.(Br. Col.), M.Sc.(Vic., BC), Ph.D.(W. Ont.)

C.L. Tardif; B.Eng.(McG.), M.Sc.(Lond.), Ph.D.(McG.)

Associate Members

S. Baillet (*Neurology and Neurosurgery*)

C. Baker (*Ophthalmology*)

F. Barthelat (*Mechanical Engineering*)

S. Blain-Moraes (*Physical and Occupational Therapy*)

M. Chacron (*Physiology*)

M. Chakravarty (*Psychiatry*)

M. Driscoll (*Mechanical Engineering*)

A. Ehrlicher (*Bioengineering*)

S. Enger (*Oncology*)

A.C. Evans; B.Sc.(Liv.), M.Sc.(Sur.), Ph.D.(Leeds) (*Neurology and Neurosurgery*)

J. Gotman (*Neurology and Neurosurgery*

Associate Members

Y. Iturria-Medina (*Neurology and Neurosurgery*)

A. Kamen (*Bioengineering*)

A. Katsarkas (*Otolaryngology*)

J. Kildea (*Medical Physics*)

J. Kinsella (*Bioengineering*)

S. Komarova (*Dentistry*)

A.M. Lauzon (*Medicine*)

R. Leask (*Chemical Engineering*)

I. Levesque (*Medical Physics and Oncology*)

J. Li (*Mechanical Engineering*)

N. Li-Jessen (*Communications and Science*)

B. Misic (*Neurology and Neurosurgery*)

G. Mitsis (*Bioengineering*)

L. Mongeau (*Mechanical Engineering*)

R. Mongrain (*Mechanical Engineering*)

C. Moraes (*Chemical Engineering*)

J. Near (*Psychiatry*)

D. Nicolau (*Bioengineering*)

C. Pack (*Neurology and Neurosurgery*)

D. Pasini (*Mechanical Engineering*)

W. Reisner (*Physics*)

A. Shmuel (*Neurology and Neurosurgery*)

B. Willie (*Pediatric Surgery*)

Y.B. Xia (*Bioengineering*)

Adjunct Professors

P.G. Charette (Sher.)

K. Cullen (*Physiology*)

I. El Naqa (Mich.)

C. Grova (C'dia)

J.-M. Lina (ETS)

M. Mekhail (Shriners)

J.L. Nadeau (Calif. Tech.)

G.B. Pike (Calg.)

A. Reader (King's, Lond.)

T. Veres (NRC)

12.5.5 Graduate Certificate (Gr. Cert.) Translational Biomedical Engineering (15 credits)

NEW PROGRAM

This program comprises mandatory courses dealing with topics that are unique to the translational process in the biomedical engineering environment. Topics covered will include: managing intellectual property; patents and the patenting process; regulatory affairs; medical standards; quality management systems; and clinical trials. Complementary courses will provide students with advanced training in a specialized area of biomedical engineering selected from the areas where Departmental staff have significant expertise.

In cases where students have taken one or more of the core courses as part of another program, these core courses will be replaced with the equivalent number of credits, at the 500 level or higher, by other appropriate courses selected in consultation with the program director.

Required Courses (9 credits)

Three courses dealing with issues related specifically to the translation of biomedical engineering advances to clinical and commercial environments:

BMDE 653	(3)	Patents in Biomedical Engineering
BMDE 654	(3)	Biomedical Regulatory Affairs - Medical Devices
BMDE 655	(3)	Biomedical Clinical Trials - Medical Devices

Complementary Courses (6 credits)

Students must complete 6 credits of biomedical engineering course work selected from one or more of the following domains or other appropriate courses at the 500 level or higher approved by the Program Director:

General Biomedical Engineering

BMDE 501	(3)	Selected Topics in Biomedical Engineering

Biomedical Signals and Systems

BMDE 502	(3)	BME Modelling and Identification
BMDE 503	(3)	Biomedical Instrumentation
BMDE 512	(3)	Finite-Element Modelling in Biomedical Engineering
BMDE 519	(3)	Biomedical Signals and Systems

Medical Imaging

BIEN 530	(3)	Imaging and Bioanalytical Instrumentation
BMDE 610	(3)	Functional Neuroimaging Fusion
BMDE 650	(3)	Advanced Medical Imaging
MDPH 607	(3)	Medical Imaging

Biomaterials and Tissue Engineering

BIEN 510	(3)	Engineered Nanomaterials for Biomedical Applications
BMDE 504	(3)	Biomaterials and Bioperformance
BMDE 505	(3)	Cell and Tissue Engineering

Biosensors and Devices

BIEN 520	(3)	High Throughput Bioanalytical Devices
BIEN 550	(3)	Biomolecular Devices
BIEN 560	(3)	Biosensors
BMDE 503	(3)	Biomedical Instrumentation
BMDE 508	(3)	Introduction to Micro and Nano-Bioengineering

Montreal League for the Hard of Hearing Award – Candidates must be enrolled at the graduate level in the School and working in the area of hearing impairment. Awarded by the School. Value: two $750 awards.

section 12.6.6: Master of Science,

An applicant must hold an undergraduate degree with a minimum B average (3.0 on a 4.0 point scale) or better in areas relevant to the selected field of specialization. Specific requirements are 3 credits in statistics, a total of 18 credits across the disciplines of psychology and linguistics (with a minimum of 6 credits in each discipline). Please refer to *www.mcgill.ca/scsd/programs/slp/how-apply/prerequisite-courses* for important details on the nature of these prerequisites.

M.Sc. in Communication Sciences and Disorders

The M.Sc. provides research training for:

1. students who are also taking courses for professional qualification;
2. students who have a non-thesis professional degree in Communication Sciences and Disorders; and
3. students with de

Application Opening Dates	Application Deadlines	
		Curr

Faculty Lecturers (Part-Time)

Liliane Brunetti; B.Sc.(C'dia), M.Cl.Sc.(W. Ont.)

Jesse Burns; B.A.(C'dia), M.Sc.(McG.)

Dahlia Forrester; B.A.(UWI)

Ariana Fraid; B.A., M.Sc.A.(McG.)

Alexandre Herbay; B.Sc.(Montr.)

Suzanne Lalonde; B.A.(Montr.), M.Sc.A.(McG.)

Lisa Massaro; B.A.(York), M.Sc.A.(McG.)

Maia Masuda; B.Mus., M.Sc.A.(McG.)

Gina Mills; B.Sc.(Acad.), M.Sc.(Dal.)

Yondu Mori; B.Sc.(Alta.)

Amanda Ovadia; B.Sc., M.Sc.A.(McG.)

Francois Prevost; B.Sc.(Montr.), M.Sc.(Ott.), Ph.D.(Montr.)

Eve Julie Rioux; B.A.(Montr.), M.Sc.A.(McG.)

Part-Time Professor, Post-Retirement

Vincent Gracco; B.A., M.A.(San Diego), Ph.D.(Wisc.-Madison)

Adjunct Professors

Krista Byers-Heinlein (*C'dia*)

David McFarland (*Montr.*)

Lucie Menard (*UQAM*)

Doug Shiller (*McG.*)

Associate Member

Eva Kehayia (*Physical and Occupational Therapy*)

Luc Mongeau (*Mechanical Engineering*)

Debra Titone (*Psychology*)

12.6.5 Master of Science (M.Sc.) Communication Sciences and Disorders (Thesis) (45 credits)

Thesis Courses (24 credits)

SCSD 671	(12)	M.Sc. Thesis 1
SCSD 672	(12)	M.Sc. Thesis 2

Complementary Courses (21 credits)

6-21 credits chosen from:

SCSD 675	(12)	Special Topics 1
SCSD 676	(9)	Special Topics 2
SCSD 677	(6)	Special Topics 3
SCSD 678	(3)	Special Topics 4

0-15 credits chosen from:

SCSD 673	(12)	M.Sc. Thesis 3

SCSD 674	(3)	M.Sc. Thesis 4

or courses in other departments, as arranged with the student's thesis supervisor.

12.6.6 Master of Science, Applied (M.Sc.A.) Communication Sciences & Disorders (Non-Thesis): Speech-Language Pathology (82 credits)

The professional degree program involves two academic years of full-time study and related practical work, followed by a Summer internship.

Required Courses (79 credits)

IPEA 500	(0)	Roles in Interprofessional Teams
IPEA 501	(0)	Communication in Interprofessional Teams
IPEA 502	(0)	Patient-Centred Care in Action
SCSD 609	(3)	Neuromotor Disorders
SCSD 616	(3)	Audiology
SCSD 617	(3)	Anatomy and Physiology: Speech and Hearing
SCSD 618	(3)	Research and Measurement Methodologies 1
SCSD 619	(3)	Phonological Development
SCSD 624	(3)	Language Processes
SCSD 631	(3)	Speech Science
SCSD 632	(3)	Phonological Disorders: Children
SCSD 633	(3)	Language Development
SCSD 636	(3)	Fluency Disorders
SCSD 637	(3)	Developmental Language Disorders 1
SCSD 638	(3)	Neurolinguistics
SCSD 639	(3)	Voice Disorders
SCSD 642	(3)	Aural Rehabilitation
SCSD 643	(3)	Developmental Language Disorders 2
SCSD 644	(3)	Applied Neurolinguistics
SCSD 646	(4)	Introductory Clinical Practicum
SCSD 664	(3)	Augmentative and Alternative Communication
SCSD 669	(3)	ASD and Neurodevelopmental Disorders
SCSD 679	(12)	Advanced Clinical Practicum
SCSD 680	(3)	Deglutition and Dysphagia
SCSD 681	(1)	Practicum and Seminar 1
SCSD 682	(1)	Practicum and Seminar 2
SCSD 683	(1)	Practicum and Seminar 3
SCSD 684	(1)	Practicum and Seminar 4
SCSD 688	(1)	Genetics in Speech-Language Pathology Practice
SCSD 689	(1)	Management Cranio-Facial Disorders

Complementary Courses (3 credits)

3 credits from the following:

SCSD 666	(3)	Communication Sciences and Disorders 3
SCSD 667	(3)	Communication Sciences and Disorders 4

SCSD 670	(3)	Communication Sciences and Disorders 2
SCSD 678	(3)	Special Topics 4

12.6.7 Doctor of Philosophy (Ph.D.) Communication Sciences and Disorders

The Ph.D. program provides a foundation for creative research and scientific problem-solving in communication sciences (speech, language, hearing, voice) in typical and atypical populations. The program structure is flexible to encourage students to customize their program through the selection of coursework, seminars, comprehensive topics, research experiences, and thesis topic. The School's doctoral program follows a mentor model and students work closely with faculty supervisors who have international reputations in their respective areas.

Students who have completed a Master's degree with research thesis in Communication Sciences and Disorders or a related area are admitted at level PhD 2. High-caliber students who have not completed a research thesis at the Master's level can enter the Qualifying Year Program (admitted at level PhD 1), which includes extra requirements (coursework and a research project) at the onset of the program.

Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

Required Courses (6 credits)

For both PhD 1 and PhD 2:

SCSD 652	(3)	Advanced Research Seminar 1
SCSD 653	(3)	Advanced Research Seminar 2
SCSD 701	(0)	Doctoral Comprehensive

Complementary Courses (6 or 21 credits)

For both PhD 1 and PhD 2: 6 credits of statistics courses at the 500 level or higher, pre-approved by the supervisor and the graduate program director.

In addition to the above, students entering at PhD 1 must take the following 15 credits:

SCSD 654	(3)	Advanced Research Seminar 3
SCSD 685	(3)	Research Project 1
SCSD 686	(3)	Research Project 2

Plus 6 credits, of graduate-level courses, pre-approved by the supervisor and the graduate program director.

12.6.8 Doctor of Philosophy (Ph.D.) Communication Sciences and Disorders: Language Acquisition

This unique interdisciplinary program focuses on the scientific exploration of language acquisition by different kinds of learners in diverse contexts. Students in the Language Acquisition Program are introduced to theoretical and methodological issues on language acquisition from the perspectives of cognitive neuroscience, theoretical linguistics, psycholinguistics, education, communication sciences and disorders, and neuropsychology.

For details go to: www.psych.mcgill.ca/lap.html.

Students who have completed a Master's degree with research thesis in Communication Sciences and Disorders or a related area are admitted at level PhD 2. High-caliber students who have not completed a research thesis at the Master's level can enter the Qualifying Year Program (admitted at level PhD 1), which includes extra requirements (coursework and a research project) at the onset of the program.

Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

Required Courses (12 credits)

For both PhD 1 and PhD 2:

LING 710	(2)	Language Acquisition Issues 2

PSYC 709	(2)	Language Acquisition Issues 1
SCSD 652	(3)	Advanced Research Seminar 1
SCSD 653	(3)	Advanced Research Seminar 2
SCSD 701	(0)	Doctoral Comprehensive
SCSD 712	(2)	Language Acquisition Issues 4

Complementary Courses (9 or 26 credits)

For both PhD 1 and PhD 2:

6 credits of statistics courses at the 500 level or higher, pre-approved by the supervisor and the graduate program director.

At least 3 credits at the 500 level or higher in language acquisition courses that have been approved by the Director of the Language Acquisition Program. For a pre-approved list go to: https://www.mcgill.ca/scsd/programs/rt/phd/language-acquisition-courses.

For PhD 1 students, 0-2 credits from the following:

EDSL 711	(2)	Language Acquisition Issues 3

In addition to the above, students entering at PhD 1 must take the following 15 credits:

SCSD 654	(3)	Advanced Research Seminar 3
SCSD 685	(3)	Research Project 1
SCSD 686	(3)	Research Project 2

Plus 6 credits, of graduate-level courses pre-appro

- epidemiologic methods;
- chronic diseases;
- reproductive and perinatal epidemiology;
- genetic epidemiology;
- global health;
- causal inference;
- and many cross-disciplinary activities.

Faculty members may have funding available for students through their research grants. We provide rich research environments at five university-affiliated hospitals, public health agencies, and university research centres. Graduates pursue careers in academia, clinical settings, government agencies, NGOs, and industry.

12.7.3 Epidemiology, Biostatistics and Occupational Health Faculty

Chair

G. Paradis

Emeritus Professors

M.R. Becklake; M.B.B.Ch., M.D.(Witw.), F.R.C.P. (*In memoriam*)

J.F. Boivin; M.D.(Laval), S.M., Sc.D.(Harv.)

J. McCusker; M.D.,C.M.(McG.), M.P.H., Ph.D.(Col.)

O.S. Miettinen; M.D.(Helsinki), M.P.H., M.S., Ph.D.(Minn.)

I.B. Pless; B.A., M.D.(W. Ont.)

S.H. Shapiro; B.S.(Bucknell), M.S., Ph.D.(Stan.)

G. Thériault; M.D.(Laval), M.I.H., Dr.P.H.(Harv.)

S. Wood-Dauphinee; B.Sc.(Phys.Ther.), Dip.Ed., M.Sc.(A.), Ph.D.(McG.)

Professors Post-Retirement

A. Ciampi; M.Sc., Ph.D.(Qu.), Ph.D.(Rome)

J. McCusker; M.D.,C.M.(McG.), M.P.H., Ph.D.(Col.)

I.B. Pless; B.A., M.D.(W. Ont.)

G. Thériault; M.D.(Laval), M.I.H., Dr.P.H.(Harv.)

Associate Professors Post-Retirement

B. Case; B.Sc., M.D.,C.M., M.Sc.(McG.), Dip.Occ.Hyg., F.R.C.P.(C)

Professors

M. Abrahamowicz; Ph.D.(Cracow) (*James McGill Professor*)

J. Brophy; B.Eng.(McG.), M.Eng., M.D.(McM.), Ph.D.(McG.) (*joint appt. with Medicine*)

D. Buckeridge; M.D.(Qu.), M.Sc.(Tor.), Ph.D.(Stan.) (*CIHR Applied Public Health Chair*)

E.L.F. Franco; M.P.H., Dr.P.H.(Chapel Hill) (*joint appt. with Oncology*) (*James McGill Professor*

Professors

R. Menzies; M.D.,C.M., M.Sc.(McG.) (*joint appt. with Medicine*)

M. Pai; M.B.B.S.(Stanley Med. Coll.), M.D.(Christian Medical Coll.), Ph.D.(Calif., Berk.) (*Canada Research Chair*)

G. P

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Assistant Professors

S. Weichenthal; B.Sc., M.Sc., Ph.D.(McG.) (*joint appt. with Oncology*) (*Cancer Research Society/FRQ-S*)

S. Yang; B.A.(Ajou), M.Sc.(McG.), Ph.D.(Mich.)

Associate Members

Biomedical Ethics Unit: J. Kimmelman, N. King

Dentistry: P. Allison, J. Feine

Family Medicine: A. Andermann, E. Robinson

Geography: N. Ross

Human Genetics: S. Gravel

Human Nutrition: N. Basu

Internal Medicine, MUHC: N. Dayan, M. Young

Medicine: J. Afilalo, F. Ahmad Kahn, D. Assayag, A. Barkun, M. Behr, S. Bernatsky, J. Bourbeau, P. Brassard, K. Dasgupta, M. Eisenberg, P. Ernst, N. Ezer, I. Fortier, M. Goldberg, A.V. Gonzalez, C. Greenaway, S. Kahn, M. Kaminska, M. Klein, T.C. Lee, A. Marelli, N. Mayo, S. Morin, S. Pamidi, N. Pant Pai, J. Pickering, L. Pilote, E. Rahme, B. Richards, R. Sapir-Pichhadze, K. Schwartzman, G. Sebastiani, M. Sewitch, J. Shahin, I. Shrier, B. M. Smith, V. Tagalakis, G. Thanassoulis, E. Vinet

*Neurology and Neurosurgery*ery

Adjunct Professors

Shire Inc.: A. Koutsavlis

Univ. of Bern: A. Chiolero

Univ. of Calgary: A Clarke

Univ. Hospital Basel: J.R. Young

Univ. de Montréal: C. Quach-Thanh, A. Motulsky, M.E. Schnitzer, J. Siemiatycki

Univ. de Sherbrooke: C. Rochefort

12.7.4 Epidemiology

The Department offers master's and doctoral degrees in Epidemiology. The methods learned in these fields are used not only in the study of diseases, but also in clinical research, health services research, public health, program planning and evaluation, and policy development. Our faculty members are at the forefront of their research domains and include epidemiologists, biostatisticians, clinician scientists, medical informatics specialists, public health specialists, health economists, medical sociologists, and health geographers. Research in the Department spans a broad range of areas, including:

- clinical and public health informatics;
- environmental and occupational health;
- health care delivery and organization;
- infectious diseases;
- pharmacoepidemiology;
- population and public health;
- social epidemiology;
- epidemiologic methods;
- chronic diseases;
- reproductive and perinatal epidemiology;
-

section 12.7.4.5: Master of Science (M.Sc.) Epidemiology (Non-Thesis): Pharmacoepidemiology (48 credits)

Applicants to the Pharmacoepidemiology Option of the M.Sc. (Non-Thesis) program should hold a bachelor's degree in the natural or quantitative sciences (e.g., chemistry, microbiology, computer science, statistics, economics) or hold a degree in one of the health professional sciences (e.g., medicine, pharmacy). Applicants must have an interest in the epidemiology of medications, along with strong conceptual, analytic, and quantitative skills (e.g., differential and integral calculus, statistics) at the undergraduate level. The Pharmacoepidemiology Option is designed to provide training in both theory and practice of pharmacoepidemiology. Students will study the foundations and principles of epidemiology and applied biostatistics in order to design, conduct, and analyze pharmacoepidemiological research. Courses require intellectual and academic rigour, and the program provides students with an opportunity to obtain specialized training in pharmacoepidemiology, including pharmacoepidemiologic methods, pharmacology for pharmacoepidemiologists, and practical experience in the form of a research project. Graduates of the program often go on to do doctoral work or become research associates in public, private, and academic settings. McGill has a world-renowned reputation for excellence in pharmacoepidemiology, and McGill-trained pharmacoepidemiologists are known for methodological and quantitative rigour, and quantitative analytic independence.

section 12.7.4.9: Doctor of Philosophy (Ph.D.) Epidemiology

This program may be of interest to students from the natural or quantitative sciences (e.g., microbiology, computer science, statistics, economics, geography), quantitative social sciences (e.g., sociology, psychology), or the health professions (e.g., medicine, nursing, social work, nutrition). Applicants must have an interest in health research, along with strong conceptual, analytic, and quantitative skills (e.g., differential and integral calculus, statistics) at the undergraduate and master's levels.

The Ph.D. program prepares students with the advanced epidemiological research skills needed to undertake original contributions to new knowledge related to the determinants of health and disease, prevention, prognosis, treatment, and outcomes. The program is generally completed in four to five years. Graduates will be prepared to engage in scientific collaboration, and communicate results to other scientists and div

section 12.7.4.12: Doctor of Philosophy (Ph.D.) Epidemiology: Population Dynamics

With interdisciplinary research being increasingly important to understanding complex social and biological processes, CPD student trainees benefit from both a strong disciplinary foundation from their departmental affiliations, as well as from the sharing of knowledge across disciplinary boundaries through CPD activities.

12.7.4.1 Public Health

The Department offers a Master of Science in Public Health. Students apply the methods they learn to the study of diseases, clinical research, health services research, public health, program planning and evaluation, and policy development. Our faculty members are at the forefront of research in epidemiology, biostatistics, clinical medicine, biomedical informatics, public health, health economics, medical sociology, and health geography.

Faculty members in the Department draw on extensive contacts in the public health community locally, nationally, and internationally to facilitate practicum placements in many areas, including:

- urban public health practice;
- clinical and public health informatics;
- environmental and occupational health;
- health care delivery and organization;
- infectious diseases;
- maternal and child health;
- aboriginal health;
- global health.

Graduates are highly sought after for careers in government agencies, NGOs, clinical settings, research, and industry.

section 12.7.4.6: Master of Science (M.Sc.) Public Health (Non-Thesis) (60 credits)

The mission of the Master of Science in Public Health is to train outstanding public health professionals and future leaders by offering a rigorous academic program in methods, research, and practice. This program may be of interest for students from the natural or quantitative sciences (e.g., microbiology, computer science, statistics, economics, geography), social sciences (e.g., sociology, psychology, anthropology), or the health professions (e.g., medicine, nursing, social work, physical and occupational therapy, nutrition). Through a core series of courses, a wide range of electi2 Tm(computerlic in man)Tj1 0 0 1 128.15ra

12.7.4.2 Epidemiology & Public Health Admission Requirements and Application Procedures

12.7.4.2.1 Admission Requirements

The graduate programs in Epidemiology (M.Sc. and Ph.D.) and Public Health (M.Sc.) require substantial quantitative skills. The Admission Committees for these programs will look for proof of quantitative proficiency such as good grades in undergraduate-level courses in differential or integral calculus or in statistics (for M.Sc. applicants) and in master's-level courses (for Ph.D. applicants).

The *GRE* is required of candidates who are health professional graduates from universities outside North America.

Master's in Epidemiology

Applicants to the M.Sc. in Epidemiology programs must hold a bachelor's degree in a related area.

Master's of Public Health

Applicants to the Master's of Public Health programs must hold a bachelor's degree. Experience in this field is an asset.

Ph.D.

Applicants to Ph.D. programs must hold a master's degree in Epidemiology or its equivalent. In addition to the Ph.D. requirements, applicants admitted to the Ph.D. degree program without the equivalent of an M.Sc. in Epidemiology at McGill will, in their first year, have to complete required coursework equiv

Required Courses (21 credits)

Students exempted from any of the courses listed below must replace them with additional complementary course credits.

EPIB 601	(4)	Fundamentals of Epidemiology
EPIB 603	(4)	Intermediate Epidemiology
EPIB 605	(1)	Critical Appraisal in Epidemiology
EPIB 607	(4)	Inferential Statistics
EPIB 613	(1)	Introduction to Statistical Software
EPIB 621	(4)	Data Analysis in Health Sciences
PPHS 602	(3)	Foundations of Population Health

Complementary Course (3 credits)

3 credits of coursework, at the 500 level or higher, chosen in consultation with the student's academic adviser or supervisor.

12.7.4.4 Master of Science (M.Sc.) Epidemiology (Non-Thesis): Environmental & Occupational Health (48 credits)

This program provides in-depth training for graduate students in methods used in Environmental and Occupational Health (EOH) and the application of these methods to study the effects of environmental and occupational exposures on human health. Students will be provided with tools to critically evaluate studies in EOH, as well as to be able to participate in these studies, learn how to apply specific methods to environmental and occupational problems, and understand how to apply research results to public health or policy. Career opportunities exist in academia, industry, and the public health sectors. Each student will be assigned a supervisor to provide guidance for their project. Research topics must be related to environmental and occupational health and approved by the program coordinating committee.

Research (12 credits)

EPIB 691	(12)	Research Project in Epidemiology

Required Courses (30 credits)

Students exempted from any of the courses listed below must replace them with additional complementary course credits.

EPIB 601	(4)	Fundamentals of Epidemiology
EPIB 603	(4)	Intermediate Epidemiology
EPIB 605	(1)	Critical Appraisal in Epidemiology
EPIB 607	(4)	Inferential Statistics
EPIB 613	(1)	Introduction to Statistical Software
EPIB 621	(4)	Data Analysis in Health Sciences
EPIB 684	(3)	Principles of Environmental Health Sciences 1
EPIB 685	(3)	Principles of Environmental Health Sciences 2
EPIB 686	(3)	Environmental Health Seminar
PPHS 602	(3)	Foundations of Population Health

Complementary Courses (6 credits)

6 credits of coursework, at the 500 level or higher, chosen in consultation with the student's academic adviser or supervisor. Complementary courses are meant to further the student's general knowledge in environment, environmental health, methodologies, and related aspects to a student's project.

12.7.4.5 Master of Science (M.Sc.) Epidemiology (Non-Thesis): Pharmacoepidemiology (48 credits)

This program provides in-depth training for graduate students on pharmacoepidemiologic methods and the application of these methods to study the population effects (benefits and harm) of pharmaceutical products. Students will develop knowledge and capacity to critically evaluate pharmacoepidemiologic studies, learn how to apply specific methods and understand how to apply research results for knowledge translation or policy purpose. Career opportunities for graduates are multiple and include work in industry, government, or academia. Students will be required to participate in the Pharmacoepidemiology Journal Club. Research topics must be related to pharmacoepidemiology and approved by the program coordinating committee.

Research (12 credits)

EPIB 691	(12)	Research Project in Epidemiology

Required Courses (25 credits)

Students exempted from any of the courses listed below must replace them with additional complementary course credits at the 500 level or higher.

EPIB 601	(4)	Fundamentals of Epidemiology
EPIB 603	(4)	Intermediate Epidemiology
EPIB 605	(1)	Critical Appraisal in Epidemiology
EPIB 607	(4)	Inferential Statistics
EPIB 613	(1)	Introduction to Statistical Software
EPIB 621	(4)	Data Analysis in Health Sciences
EPIB 634	(3)	Fundamentals of Pharmacoepidemiology
EPIB 662	(1)	Pharmacological Basis of Pharmacoepidemiology
PPHS 602	(3)	Foundations of Population Health

Complementary Courses (11 credits)

11 credits of coursework, at the 500 level or higher, chosen in consultation with the student's academic adviser or supervisor. Courses must be approved by the program's academic adviser.

12.7.4.6 Master of Science (M.Sc.) Public Health (Non-Thesis) (60 credits)

Students will study the foundations and principles of epidemiology and biostatistics as applied to public health research and practice in order to design, conduct, and analyze clinical, population-based, environmental, policy, and methodological public health-related research. The program will include a three-month practicum after the first year.

Practicum/Project (9 credits)

PPHS 630	(9)	MScPH Practicum/Project

Required Courses (30 credits)

Students exempted from any of the courses listed below must replace them with additional complementary course credits.

EPIB 601	(4)	Fundamentals of Epidemiology
EPIB 603	(4)	Intermediate Epidemiology
EPIB 605	(1)	Critical Appraisal in Epidemiology
EPIB 607	(4)	Inferential Statistics
EPIB 613	(1)	Introduction to Statistical Software
EPIB 621	(4)	Data Analysis in Health Sciences
PPHS 602	(3)	Foundations of Population Health
PPHS 612	(3)	Principles of Public Health Practice
PPHS 629D1	(1)	MScPH Forum 1
PPHS 629D2	(1)	MScPH Forum 1
PPHS 631*	(4)	MScPH Forum 2
PPHS 631D1	(2)	MScPH Forum 2
PPHS 631D2	(2)	MScPH Forum 2

* with departmental permission only.

Note: Students take either PPHS 631 or PPHS 631D1/D2

Complementary Courses (12 credits)

12 credits of coursework at the 500 level or higher, with a minimum of 3 credits chosen from each of the following fields:

Environmental Health Sciences

GEOG 503	(3)	Advanced Topics in Health Geography
OCCH 602	(3)	Occupational Health Practice
PPHS 529	(3)	Global Environmental Health and Burden of Disease

Or other courses, at the 500 level or higher, selected with the Program's Academic Adviser.

Health Services Research Policy and Management

PPHS 525	(3)	Health Care Systems in Comparative Perspective
PPHS 527	(3)	Economics for Health Services Research and Policy
PPHS 528	(3)	Economic Evaluation of Health Programs

Or other courses, at the 500 level or higher, selected with the Program's Academic Adviser.

Population and Public Health Interventions (social and behavioural science)

PPHS 525	(3)	Health Care Systems in Comparative Perspective
PPHS 624	(3)	Public Health Ethics and Policy
SOCI 515	(3)	Medicine and Society
SOCI 588	(3)	Biosociology/Biodemography

Or other courses, at the 500 level or higher, selected with the Program's Academic Adviser.

Field Epidemiology or Epidemiology in Practice

OCCH 604	(3)	Monitoring Occupational Environment
PPHS 615	(3)	Introduction to Infectious Disease Epidemiology
PPHS 616	(3)	Principles and Practice of Public Health Surveillance

Or other courses, at the 500 level or higher, selected with the Program's Academic Adviser.

Electives (9 credits)

9 credits of coursework, at the 500 level or higher.

Students may choose to focus on more advanced methods in epidemiology, biostatistics, geography, etc. or substantive areas such as environmental or occupational health, or to select a variety of courses that will deepen their general knowledge of the disciplines that influence population and public health.

Courses will be selected with and approved by the Program's Academic Adviser.

12.7.4.7 Master of Science (M.Sc.) Public Health (Non-Thesis): Global Health (60 credits)

This option will provide enhanced training in global health to graduate students registered in the M.Sc. Public Health degree program at McGill. Students will become familiar with topics of global health relevance and incorporate this into their core coursework and practicum or project research. The practicum or research project must be relevant to global health, conducted in a global health setting, and approved by the Global Health Coordinating Committee. Contextualizing the core training students receive in public health and in their respective substantive disciplines within the global health research domain will enhance their academic experience. Graduates of this option will be prepared to pursue further training in global health or to undertake a variety of career opportunities in global health in Canada or internationally.

Practicum/Project (9 credits)

PPHS 630	(9)	MScPH Practicum/Project

Required Courses (33 credits)

Students exempted from any of the courses listed below must replace them with additional complementary course credits.

EPIB 601	(4)	Fundamentals of Epidemiology

PPHS 525	(3)	Health Care Systems in Comparative Perspective
SOCI 513	(3)	Social Aspects HIV/AIDS in Africa
SOCI 519	(3)	Gender and Globalization
SOCI 545	(3)	Sociology of Population

12.7.4.8 Master of Science (M.Sc.) Public Health (Non-Thesis): Population Dynamics (60 credits)

The Population Dynamics Option (PDO) is open to students in the M.Sc. in Public Health; Non-Thesis program in the Department of Epidemiology, Biostatistics, and Occupational Health specializing in Population Dynamics. The purpose of this program is to provide graduate training in demographic methods (including life table analyses) and enhance students' knowledge of critical population issues. Students will be required to take a course on demographic methods and an overview substanti

PPHS 527	(3)	Economics for Health Services Research and Policy
PPHS 528	(3)	Economic Evaluation of Health Programs

Or other courses, at the 500 level or higher, to be selected with the program's academic adviser.

Population and Public Health Interventions (social and behavioural science)

PPHS 525	(3)	Health Care Systems in Comparative Perspective
PPHS 624	(3)	Public Health Ethics and Policy
SOCI 515	(3)	Medicine and Society
SOCI 588	(3)	Biosociology/Biodemography

Or other courses, at the 500 level or higher, to be selected with the program's academic adviser.

Field Epidemiology or Epidemiology in Practice

OCCH 604	(3)	Monitoring Occupational Environment
PPHS 615	(3)	Introduction to Infectious Disease Epidemiology
PPHS 616	(3)	Principles and Practice of Public Health Surveillance

Or other courses, at the 500 level or higher, to be selected with the program's academic adviser.

3 credits of coursework, at the 500 level or higher, from the list of courses approved for the Population Dynamics Option that have not been taken to satisfy other program requirements:

ECON 622	(3)	Public Finance
ECON 634	(3)	Economic Development 3
ECON 641	(3)	Labour Economics
ECON 734	(3)	Economic Development 4
ECON 741	(3)	Advanced Labour Economics
ECON 742	(3)	Empirical Microeconomics
ECON 744	(3)	Health Economics
EPIB 648	(3)	Methods in Social Epidemiology
EPIB 681	(3)	Global Health: Epidemiological Research
PPHS 525	(3)	Health Care Systems in Comparative Perspective
PPHS 527	(3)	Economics for Health Services Research and Policy
PPHS 528	(3)	Economic Evaluation of Health Programs
PPHS 529	(3)	Global Environmental Health and Burden of Disease
PPHS 615	(3)	Introduction to Infectious Disease Epidemiology
SOCI 502	(3)	Sociology of Fertility
SOCI 512	(3)	Ethnicity & Public Policy
SOCI 513	(3)	Social Aspects HIV/AIDS in Africa
SOCI 520	(3)	Migration and Immigrant Groups
SOCI 525	(3)	Health Care Systems in Comparative Perspective
SOCI 535	(3)	Sociology of the Family
SOCI 588	(3)	Biosociology/Biodemography

12.7.4.9 Doctor of Philosophy (Ph.D.) Epidemiology

Epidemiology is the study and analysis of the patterns and causes of disease in human populations. It forms the core discipline of public health by identifying excess illness and by gaining the etiologic understanding to intervene toward the improvement of population health. The PhD program in epidemiology at McGill trains scientists and health professionals to design and conduct studies, analyze health data and effectively communicate scientific results, and to gain novel insights into the causes and prevention of diseases at the population level. Epidemiologic work at the doctoral level involves a thorough integration of biological knowledge of pathogenesis, statistical knowledge of quantitative analysis and causal inference, and sociological knowledge to place these insights in the context of dynamic and interconnected human populations. Major areas of strength at McGill include epidemiologic methods, clinical epidemiology, infectious diseases, social epidemiology, pharmacoepidemiology, public and population health, global health, environmental epidemiology, chronic diseases and aging, and perinatal epidemiology.

Students admitted to the Ph.D. degree program with the equivalent of the M.Sc. in Epidemiology at McGill will be required to take a minimum of 25 credits of Ph.D. courses.

Required Courses (22 credits)

EPIB 623	(3)	Research Design in Health Sciences
EPIB 681	(3)	Global Health: Epidemiological Research
EPIB 701	(0)	Ph.D. Comprehensive Examination
EPIB 702	(0)	Ph.D. Proposal
EPIB 703	(2)	Principles of Study Design
EPIB 704	(4)	Doctoral Level Epidemiologic Methods 1
EPIB 705	(4)	Doctoral Level Epidemiologic Methods 2
EPIB 706	(3)	Doctoral Seminar in Epidemiology
EPIB 707	(3)	Research Design in Health Sciences
PPHS 511	(3)	Fundamentals of Global Health

Complementary Courses (9 credits)

6 credits of coursework at the 500 level or higher, with a minimum of 3 credits in biostatistics, and 3 credits in epidemiology. Courses must be chosen in consultation with the student's supervisor and/or the degree program's director or adviser.

3 credits of coursework at the 500 level or higher from this list, or any other course approved by the Global Health Option Committee that have not been taken to satisfy other program requirements.

GEOG 503	(3)	Advanced Topics in Health Geography
NUTR 501	(3)	Nutrition in Developing Countries
PPHS 525	(3)	Health Care Systems in Comparative Perspective
PPHS 527	(3)	Economics for Health Services Research and Policy
PPHS 529	(3)	Global Environmental Health and Burden of Disease
SOCI 513	(3)	Social Aspects HIV/AIDS in Africa
SOCI 519	(3)	Gender and Globalization
SOCI 545	(3)	Sociology of Population

12.7.4.11 Doctor of Philosophy (Ph.D.) Epidemiology: Pharmacoepidemiology

This program provides in-depth training for graduate students on pharmacoepidemiologic methods and the application of these methods to study the population effects (benefits and harm) of pharmaceutical products. Students will acquire the skills to become independent investigators and conduct original research in pharmacoepidemiology. Career opportunities for graduates are multiple and include work in industry, government, or academia. Students will be required to participate in the Pharmacoepidemiology Journal Club. Research topics must be related to pharmacoepidemiology and approved by the program coordinating committee.

Students admitted to the Ph.D. in Epidemiology; Pharmacoepidemiology degree program with the equivalent of the M.Sc. in Epidemiology at McGill will be required to take a minimum of 28 credits of Ph.D. courses.

In addition to the Ph.D. requirements, students admitted to the Ph.D. degree program without the equivalent of an M.Sc. in Epidemiology at McGill will, in their first year, have to complete required coursework equivalent to the Master's Epidemiology program, excluding thesis course(s), as determined by the Department.

Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

Required Courses (25 credits)

EPIB 623	(3)	Research Design in Health Sciences

ECON 741	(3)	Advanced Labour Economics
ECON 742	(3)	Empirical Microeconomics
ECON 744	(3)	Health Economics
EPIB 648	(3)	Methods in Social Epidemiology
EPIB 681	(3)	Global Health: Epidemiological Research
PPHS 525	(3)	Health Care Systems in Comparative Perspective
PPHS 528	(3)	Economic Evaluation of Health Programs
PPHS 529	(3)	Global Environmental Health and Burden of Disease
PPHS 615	(3)	Introduction to Infectious Disease Epidemiology
SOCI 502	(3)	Sociology of Fertility
SOCI 512	(3)	Ethnicity & Public Policy
SOCI 513	(3)	Social Aspects HIV/AIDS in Africa
SOCI 520	(3)	Migration and Immigrant Groups
SOCI 525	(3)	Health Care Systems in Comparative Perspective
SOCI 535	(3)	Sociology of the Family
SOCI 588	(3)	Biosociology/Biodemography

Courses must be chosen in consultation with the student's supervisor and/or the degree program's director or adviser.

12.7.5 Biostatistics

Biostatistics involves the development and application of statistical methods to scientific research in areas such as medicine, epidemiology, public health, occupational and environmental health, genetics, and ecology. Biostatisticians play key roles in designing studies—from helping to formulate the questions that can be answered by data collection to the decisions on how best to collect the data—and in analyzing the resulting data. Our biostatistics faculty work in close collaboration with epidemiologists, clinicians, public health specialists, basic scientists, and other health researchers. They also develop new statistical methods for such data. Students will take courses, and may do research, on topics such as:

- generalized linear models;
- longitudinal data;
- mathematical statistics;
- causal inference;
- statistical methods for epidemiology;
- survival analysis.

The Department of Epidemiology, Biostatistics, and Occupational Health has one of the largest concentrations of Ph.D.-level statisticians in health sciences in any Canadian university. F

BIOS 602	(4)	Epidemiology: Regression Models
MATH 523	(4)	Generalized Linear Models
MATH 533	(4)	Honours Regression and Analysis of Variance
MATH 556	(4)	Mathematical Statistics 1
MATH 557	(4)	Mathematical Statistics 2

12.7.5.3 Master of Science (M.Sc.) Biostatistics (Non-Thesis) (48 credits)

Training in statistical theory and methods, applied data analysis, scientific collaboration, communication, and report writing by coursework and project.

Research Project (6 credits)

BIOS 630	(6)	Research Project/Practicum in Biostatistics

Required Courses (24 credits)

Students exempted from any of the courses listed below must replace them with additional complementary course credits.

BIOS 601	(4)	Epidemiology: Introduction and Statistical Models
BIOS 602	(4)	Epidemiology: Regression Models
MATH 523	(4)	Generalized Linear Models
MATH 533	(4)	Honours Regression and Analysis of Variance
MATH 556	(4)	Mathematical Statistics 1
MATH 557	(4)	Mathematical Statistics 2

Complementary Courses (18 credits)

18 credits of coursework, at the 500 level or higher, chosen in consultation with the student's academic adviser or supervisor.

12.7.5.4 Doctor of Philosophy (Ph.D.) Biostatistics

Students will study theoretical and applied statistics and related fields; the program will train them to become independent scientists able to develop and apply statistical methods in medicine and biology and make original contributions to the theoretical and scientific foundations of statistics in these disciplines. Graduates will be prepared to develop new statistical methods as needed and apply new and existing methods in a range 0 0 1/laboratr e projects. Graduates will be able to communicate methods and results to co/laborators and other audiences, and teach biostatistics to biostatistics students, students in related fields, and professionals in academic and other settings.

Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show f vious work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

Required Courses

BIOS 700	(0)	Ph.D. Comprehensive Examination Part A
BIOS 701	(0)	Ph.D. Comprehensive Examination Part B
BIOS 702	(0)	Ph.D. Proposal

Complementary Courses (46 credits)

0-28 credits from the fo/lowing list: (if a student has not already successfully completed them or their equivalent)

BIOS 601	(4)	Epidemiology: Introduction and Statistical Models
BIOS 602	(4)	Epidemiology: Regression Models
BIOS 624	(4)	Data Analysis & Report Writing

MATH 523	(4)	Generalized Linear Models
MATH 533	(4)	Honours Regression and Analysis of Variance
MATH 556	(4)	Mathematical Statistics 1
MATH 557	(4)	Mathematical Statistics 2

12 credits (chosen and approved in consultation with the student's academic adviser), at the 500 level or higher, in statistics/biostatistics.

6 credits (chosen and approved in consultation with the student's academic adviser), at the 500 level or higherdits tatistics.

Faculty members have a wide variety of research interests, which embrace:

- cancer genetics;
- cytogenetics;
- reproductive biology;
- neurogenetics;
- genomic and genetic basis of human diseases.

Detailed information regarding faculty research interests can be found on the *Department website*.

The Graduate Training Committee requires that students who have been accepted into the M.Sc. or Ph.D. in Human Genetics research graduate program have a guaranteed minimum stipend of $15,000, plus the full amount of tuition and fees. Detailed information regarding financial matters can be found on the *Student Funding webpage*.

Tuition Assistance Packages

A certain number of tuition assistance packages will be offered to incoming out-of-province/international students for the M.Sc. or Ph.D. in Human Genetics thesis program who have demonstrated outstanding academic achievement. Students who have a **CGPA of 3.5 out of 4.0 or above** (as converted by the McGill GPS guidelines) and who submit online application and documents by **March 31 (Fall), or Sept. 10 (Winter)** will automatically be considered eligible for assistance. Once applications have been received by the deadline, the Graduate Training Committee will review all eligible applications and award tuition assistance to certain top eligible candidates at the time of admission into the program.

section 12.10.5: Master of Science (M.Sc.) Human Genetics (Thesis) (45 credits)

The Department of Human Genetics provides a unified curriculum of study in genetics. Areas of specialization include:

- biochemical genetics
- genetics of development
- animal models of human diseases
- cancer genetics
- molecular pathology
- gene therapy
- genetic dissection of complex traits
- genetics of infectious and inflammatory14.44 Tm(x traits)Tj1 0 0.g3dmission into the program.

section 12.10.8: Master of Science (M.Sc.) Genetic Counselling (Non-Thesis) (48 credits)

The M.Sc. in Genetic Counselling program provides the academic foundation and clinical training required for the contemporary practice of genetic counselling. Genetic counsellors are health professionals who provide information and support to families who have members with birth defects or genetic disorders and to families who may be at risk for a variety of inherited conditions. Genetic counsellors investigate the problem present in the family, analyze inheritance patterns and risks of recurrence, and review available options with the family. Some counsellors also work in administrative and academic capacities, and many engage in research activities.

The curriculum includes a variety of required courses in human genetics and other departments, and 40 weeks of supervised clinical training spread over four semesters. Graduates will be eligible to sit for both the Canadian Association of Genetic Counsellors and the American Board of Genetic Counselling certification examinations. Upon completion of the M.Sc. in Genetic Counselling program, students will demonstrate competence in, or satisfactory knowledge of: principles of human genetics, including cytogenetics, biochemical, molecular, and population genetics; methods of interviewing and counselling, and the dynamics of human behaviour in relation to genetic disease; and social, legal, and ethical issues in genetics. Enrolment will be limited to four students.

section 12.10.9: Doctor of Philosophy (Ph.D.) Human Genetics

The Department of Human Genetics provides a unified curriculum of study in genetics. Areas of specialization include: biochemical genetics, genetics of development, animal models of human diseases, cancer genetics, molecular pathology, gene therapy, genetic dissection of complex traits, genetics of infectious and inflammatory diseases, non-mendelian genetics, bioinformatics, behavioural genetics, neurogenetics, bioethics, and genomics. Many of our faculty hold cross-appointments in various departments (including: biochemistry, biology, cardiology, medicine, microbiology, immunology, neurology, pathology, pediatrics, pharmacology, psychiatry) within the Faculties of Science and Medicine. This enables numerous opportunities for interdisciplinary research and collaboration. The Department conducts research on all sites of the McGill University Health Centre (MUHC), the Montreal Neurological Institute and Hospital, the McGill Life Sciences Complex, the *McGill University & Genome Quebec Innovation Centre*, the Biomedical Ethics Unit, and the *Centre for Genomics and Policy*.

section 12.10.10: Doctor of Philosophy (Ph.D.) Human Genetics: Bioinformatics

This program is currently not offered.

Students successfully completing the Bioinformatics option at the Ph.D. level will be fluent in the concepts, language, approaches, and limitations of the field and have the capability of developing an independent Bioinformatics research program. Bioinformatics research lies at the intersection of biological/medical sciences and mathematics/computer science/engineering. The intention of the Bioinformatics option is to train students to become researchers in this interdisciplinary field. This includes the development of strategies for experimental design, the construction of tools to analyze datasets, the application of modelling techniques, the creation of tools for manipulating bioinformatics data, the integration of biological databases, and the use of algorithms and statistics.

Enrolment in the Bioinformatics option can only be approved after a student has been admitted into the Department. There is an agreement for the option that must be signed by the student, supervisor, and Department, and enrolment in the option is subject to space availability and other constraints that the Department cannot assess at the time of admission. For more information, please contact the Graduate Program Coordinator.

12.10.3 Human Genetics Admission Requirements and Application Procedures

12.10.3.1 Admission Requirements

M.Sc. in Genetic Counselling

Prerequisites:

- Bachelor's or medical degree – minimum cumulative grade point average (CGPA) of 3.0 out of 4.0, or 3.2 out of 4.0 in the last two full-time academic years;
- Recent (within the past five years) university-level courses in molecular/cell biology, biochemistry, advanced genetics (preferably human), statistics, and a minimum of two courses in psychology;
- Some experience (either paid or volunteer) working with adults in a counselling or advisory capacity, ideally in a crisis setting.

For detailed information, visit the *Genetic Counselling Program website*.

M.Sc. and Ph.D. in Human Genetics

Prerequisites:

- B.Sc. – minimum CGPA of 3.2 out of 4.0;
- A minimum of 6 credits in cellular and molecular biology or biochemistry, 3 credits in mathematics or statistics, and 3 credits in genetics.

Admission is based on acceptance by a *research supervisor*, confirmed *funding* for the duration of the academic program, and an online application form evaluated by the Graduate Training Committee.

Prospective graduate students should complete the online application form and indicate the name of the secured research supervisor.

For detailed information, visit the *Human Genetics program website*.

Language Requirements

Applicants to graduate studies whose mother tongue is not English, and who have not completed an undergraduate or graduate degree from a recognized foreign institution where English is the language of instruction or from a recognized Canadian institution (anglophone or francophone), must submit a *TOEFL* or *IETLS* test score to McGill University. Minimum scores of 600 on the TOEFL paper-based test, 250 on the computer-based test or 100 on the Internet-based test are required. Each component or subsection score requires a minimum score of 20. On the IELTS the minimum standard for consideration is 7.

Note: TOEFL scores must be sent electronically by the testing agency to McGill University using our institution code of 0935. Scanned copies of results or hard copies sent in the mail will not be entered as received in your application. IELTS scores also must be submitted electronically by the test centre to McGill University.

12.10.3.2 Application Procedures

McGill's online application form for graduate program candidates is available at *www.mcgill.ca/gradapplicants/apply*.

See *University Regulations & Resources* > *Graduate* > *Graduate Admissions and Application Procedures* > *: Application Procedures* for detailed application procedures.

12.10.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Department of Human Genetics and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill departmental website; please consult the list at *www.mcgill.ca/gps/contact/graduate-program*.

M.Sc. Genetic Counselling program* (Non-Thesis)

	Application Opening Dates	Application Deadlines		
	All Applicants	**Non-Canadian citizens (incl. Special, Visiting & Exchange)**	**Canadian citizens/Perm. residents of Canada (incl. Special, Visiting & Exchange)**	**Current McGill Students (any citizenship)**
Fall Term:	Sept. 15	Jan. 01	Jan. 01	Jan. 01
Winter Term:	N/A	N/A	N/A	N/A
Summer Term:	N/A	N/A	N/A	N/A

M.Sc. (Thesis) and Ph.D. Human Genetics programs

	Application Opening Dates	Application Deadlines		
	All Applicants	**Non-Canadian citizens (incl. Special, Visiting & Exchange)**	**Canadian citizens/Perm. residents of Canada (incl. Special, Visiting & Exchange)**	**Current McGill Students (any citizenship)**
Fall Term:	Sept. 15	March 31	March 31	March 31
Winter Term:	Feb. 15	Sept. 10	Sept. 10	Sept. 10
Summer Term:	May 15	Jan. 15	Apr. 1	Apr. 1

Applications for thesis programs submitted after these deadlines may be considered, if a suitable supervisor can be secured. However, these applications will not be considered for departmental funding or entrance awards.

* The **M.Sc. Genetic Counselling program** accepts applications for the Fall term only. **No late applications or applications for Summer or Winter terms for the Genetic Counselling program will be considered under any circumstances.**

12.10.4 Human Genetics Faculty

Chair

E.A. Shoubridge

Program Directors

J. Fitzpatrick – *M.Sc. in Genetic Counselling*

A. Naumova – *M.Sc. and Ph.D. in Human Genetics*

Emeritus Professors

F. Kaplan; B.A.(Col.), Ph.D.(McG.)

K. Morgan; Ph.D.(Mich.)

L. Pinsky; M.D.(McG.)

C. Scriver; B.A., M.D.,C.M.(McG.)

Professors

E. Andermann; M.Sc., Ph.D., M.D.,C.M.(McG.) (*Neurology and Neurosurgery*)

B. Brais; M.D.,C.M., Ph.D.(McG.) (*Neurology and Neurosurgery*)

W. Foulkes; B.Sc., MB.BS., Ph.D.(Lond.) (*Medicine*)

B. Knoppers; Ph.D.(Paris IV), Ad.E., O.C. (*Director, Centre of Genomics and Policy*)

M. Lathrop; B.Sc., M.Sc.(Alta.), Ph.D.(Wash.) (*Director, McGill University-Genome Quebec Innovation Centre*)

D. Malo; D.U.M., M.Sc.(Montr.), Ph.D.(McG.) (*William Dawson Scholar*) (*Medicine*)

R. McInnes; C.M.,M.D., Ph.D., F.R.S.C.(McG.) (*Alva Chair in Human Genetics*) (*Director, Lady Davis Research Institute*)

R. Palmour; B.A.(Texas W.), Ph.D.(Texas) (*Psychiatry and Biology*)

D. Radzioch; M.Sc., Ph.D.(Jagiellonian, Krakow) (*Medicine*)

D.S. Rosenblatt; M.D.,C.M.(McG.) (*Medicine, Pediatrics, and Biology*)

R. Rozen; B.Sc., Ph.D.(McG.) (*Pediatrics and Biology*)

E. Schurr; M.Sc., Ph.D.(Albert-Ludwigs, Freiburg) (*Medicine*)

E.A. Shoubridge; B.Sc., M.Sc.(McG.), Ph.D.(Br. Col.) (*Neurogenetics*)

R. St-Arnaud; B.Sc.(Montr.), Ph.D.(Laval) (*Surgery*)

P. Tonin; B.Sc., M.Sc., Ph.D.(Tor.) (*Medicine*)

J. Trasler; M.D.,C.M., Ph.D.(McG.) (*William Dawson Scholar*) (*Pathology and Pediatrics*)

S. Vidal; Ph.D.(Genève) (*Medicine*)

Associate Professors

A. Ao; Ph.D.(UCL)

G. Bourque; B.Sc.(Montr.), M.A., Ph.D.(USC) (*Genome Quebec*)

N. Braverman; B.Sc.(Cornell), M.Sc.(Sarah Lawrence), M.D.(Tulane) (*Pediatrics*)

K. Dewar; Ph.D.(Laval) (*Genome Quebec*)

R. Hernandez; Ph.D. (Cornell University) (Genome Innovation Centre)

Y. Joly; Ph.D.(McG.) (*Centre of Genomics and Policy*)

J. Majewski; B.Sc., M.Sc.(Stan.), Ph.D.(Wesl.)

P. Moffatt; Ph.D.(Montr.) (*Pharmacology*)

R. Nadon; B.A., M.A., Ph.D.(C’dia)

I. Ragoussis; Ph.D.(Tübingen)

L. Russell; B.A., M.D.(Ind.) (*Pediatrics*)

A. Ryan; Ph.D.(Qu.)

R. Sladek; B.A.Sc., M.D.(Tor.)

R. Slim; M.Sc.(Lebanese), M.Sc., Ph.D.(Paris VII)

Y. Yamanaka; Ph.D.(Osaka) (*Goodman Cancer Research Centre*)

Assistant Professors

D. Buhas; M.D.(Craiova) (*Montreal Children's Hospital*)

L. Cartier; B.Sc., M.Sc.(McG.)

Assistant Professors

G. Chong; Ph.D.(Kansas State)

C. Crist; B.Sc.(Br. Col.), M.Sc., Ph.D.(Tokyo)

M-D. D'Agostino; M.D., M.Sc., F.R.C.P.C.

I. De Bie; M.D.(Laval), Ph.D.(McG.) (*Montreal Children's Hospital*)

J. Fitzpatrick; M.S.(Mich.) (*Pediatrics and Medicine*)

S. Gravel; Ph.D.(Physics)(Cornell) (*Numerical methods*)

C. Kleinman; Ph.D.(Montr.) (*Bioinformatics*)

D. Langlais; Ph.D.(Montr.)

B. Mucha-Le Ny; M.D.(Freiburg)

H. Najafabadi; Ph.D.(Montr.) (*Genome Innovation Centre*)

LBLa.Ca

Adjunct Professors

B. Gottleib (*Medicine*)

E-L. Grundberg (*The Children's Mercy Hospital*)

V.A. Hastings (*Children's Hospital of Eastern Ontario*)

C. Honeywell (*Children's Hospital of Eastern Ontario*)

T-M. Pastinen (*The Children's Mercy Hospital*)

J. Rutberg (*Childr*

HGEN 670	(3)	Advances in Human Genetics 1
HGEN 671	(3)	Advances in Human Genetics 2
HGEN 690	(3)	Inherited Cancer Syndromes
HGEN 691	(3)	Host Responses to Pathogens
HGEN 693	(3)	Using Bioinformatics Resources
HGEN 695	(3)	Psychiatric Genetics
HGEN 696	(3)	Advanced Readings in Genetics 1
HGEN 697	(3)	Advanced Readings in Genetics 2
HGEN 698	(3)	Advanced Readings in Genetics 3
HGEN 699	(3)	Advanced Readings in Genetics 4

Note: The Graduate Advisory Committee may stipulate additional coursework at the 500, 600, or 700 level depending on the background of the candidate.

12.10.6 Master of Science (M.Sc.) Human Genetics (Thesis): Bioinformatics (45 credits)

** This program is currently not offered. **

Thesis Courses (33 credits)

HGEN 680	(9)	M.Sc. Thesis Research 1
HGEN 681	(12)	M.Sc. Thesis Research 2
HGEN 682	(12)	M.Sc. Thesis Research 3

Required Courses (6 credits)

COMP 616D1	(1.5)	Bioinformatics Seminar
COMP 616D2	(1.5)	Bioinformatics Seminar
HGEN 692	(3)	Human Genetics

Complementary Courses (6 credits)

6 credits from the following courses:

BINF 621	(3)	Bioinformatics: Molecular Biology
BMDE 652	(3)	Bioinformatics: Proteomics
BTEC 555	(3)	Structural Bioinformatics
COMP 618	(3)	Bioinformatics: Functional Genomics
PHGY 603	(3)	Systems Biology and Biophysics

Note: The Graduate Advisory Committee may stipulate additional coursework at the 500, 600, or 700 level depending on the background of the candidate.

12.10.7 Master of Science (M.Sc.) Human Genetics (Thesis): Bioethics (45 credits)

Thesis Courses (30 credits)

30 credits selected as follows:

HGEN 681	(12)	M.Sc. Thesis Research 2
HGEN 682	(12)	M.Sc. Thesis Research 3
HGEN 683	(6)	M.Sc. Thesis Research 4

Required Courses (12 credits)

12 credits from:

BIOE 680	(3)	Bioethical Theory
BIOE 681	(3)	Bioethics Practicum
HGEN 662	(3)	Laboratory Research Techniques
HGEN 692	(3)	Human Genetics

Complementary Courses (3 credits)

3 credits from the following:

BIOE 682	(3)	Medical Basis of Bioethics
CMPL 642	(3)	Law and Health Care
PHIL 643	(3)	Seminar: Medical Ethics
RELG 571	(3)	Ethics, Medicine and Religion

12.10.8 Master of Science (M.Sc.) Genetic Counselling (Non-Thesis) (48 credits)

Required Courses (48 credits)

HGEN 600D1	(3)	Genetic Counselling Practicum
HGEN 600D2	(3)	Genetic Counselling Practicum
HGEN 601	(3)	Genetic Counselling Principles
HGEN 610D1	(3)	Genetic Counselling: Independent Studies
HGEN 610D2	(3)	Genetic Counselling: Independent Studies
HGEN 617	(3)	Principles of Medical Genetics
HGEN 620	(3)	Introductory Field Work Rotations 1
HGEN 621	(6)	Intro Field Work Rotations 2
HGEN 630D1	(6)	Advanced Field Work Rotations
HGEN 630D2	(6)	Advanced Field Work Rotations
HGEN 640	(3)	Second Year Practicum 1
HGEN 641	(3)	Second Year Practicum 2
PATH 653	(3)	Reading and Conference

12.10.9 Doctor of Philosophy (Ph.D.) Human Genetics

Candidates entering Ph.D. 1 must complete at least three years of full-time resident study (six terms). The normal and expected duration of the Ph.D. program is four to five years. A student who has obtained a master's degree at McGill in a related field, or at an approved institution elsewhere, and is proceeding in the same subject toward a Ph.D. degree may, upon the recommendation of the Graduate Training Committee, enter at the Ph.D. 2 level.

Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

Required Courses (3 credits)

HGEN 692	(3)	Human Genetics
HGEN 701	(0)	Ph.D. Comprehensive Examination

Complementary Courses (15 credits)

(15 credits or 6 credits depending on admission status as described above.)

Courses are to be chosen from the list below and/or from among 500-, 600-, or 700-level courses offered in the Faculties of Medicine and Science.

HGEN 660	(3)	Genetics and Bioethics
HGEN 661	(3)	Population Genetics
HGEN 663	(3)	Beyond the Human Genome
HGEN 690	(3)	Inherited Cancer Syndromes
HGEN 691	(3)	Host Responses to Pathogens
HGEN 693	(3)	Using Bioinformatics Resources
HGEN 695	(3)	Psychiatric Genetics
HGEN 696	(3)	Advanced Readings in Genetics 1
HGEN 697	(3)	Advanced Readings in Genetics 2
HGEN 698	(3)	Advanced Readings in Genetics 3
HGEN 699	(3)	Advanced Readings in Genetics 4

Students are restricted to taking the following courses:

HGEN 670	(3)	Advances in Human Genetics 1
HGEN 671	(3)	Advances in Human Genetics 2

Note: The Graduate Advisory Committee may stipulate additional coursework depending on the background of the candidate.

12.10.10 Doctor of Philosophy (Ph.D.) Human Genetics: Bioinformatics

** This program is currently not offered. **

Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

Required Courses (6 credits)

COMP 616D1	(1.5)	Bioinformatics Seminar
COMP 616D2	(1.5)	Bioinformatics Seminar
HGEN 692	(3)	Human Genetics
HGEN 701	(0)	Ph.D. Comprehensive Examination

Complementary Courses (6 credits)

* Two courses from the following:

BINF 621	(3)	Bioinformatics: Molecular Biology
BMDE 652	(3)	Bioinformatics: Proteomics
BTEC 555	(3)	Structural Bioinformatics
COMP 618	(3)	Bioinformatics: Functional Genomics
PHGY 603	(3)	Systems Biology and Biophysics

* Note: Students who enter in Ph.D. 1 will need to take an additional 6 credits of complementary courses chosen from the departmental offerings listed for the Ph.D. in Human Genetics and/or from among 500-, 600-, or 700-level courses in the Faculties of Medicine or Science.

12.11 Medical Physics

12.11.1 Location

Medical Physics Unit, DS1-7129
McGill University Health Centre – Glen Site
Cedars Cancer Centre
1001 Décarie Boulevard
Montreal QC H4A 3J1
Telephone: 514-934-1934 ext. 44158
Fax: 514-934-8229
Email: *margery.knewstubb@mcgill.ca*
Website: *www.mcgill.ca/medphys*

12.11.2 About Medical Physics

The Medical Physics Unit is a teaching and research unit focusing on the role that physics and its related sciences plays in medicine and cancer research, especially (but not exclusively) in radiation medicine; i.e., radiation oncology, medical imaging, and nuclear medicine. The Unit offers a graduate diploma and an M.Sc. in Medical Radiation Physics. Facilities are available for students to undertake a Ph.D. in Physics administered through the Department of Physics, or a Ph.D. in Biological and Biomedical Engineering administered through the Departments of Biomedical Engineering and Bioengineering, each with a research emphasis on medical physics. These graduate programs are supervised, funded, and hosted by Medical Physics Unit PI's (principal investigators).

The research interests of Unit members include various topics related to the application of physics methods to medicine:

- 3D and 4D imaging, the development of new imaging modalities, and applications of imaging in radiation therapy;
- radiation physics and computational & experimental dosimetry;
- AI and machine learning applications to medical imaging, radiation therapy, and health informatics;
- applications of nano-sciences to medical imaging and therapy;
- numerical modelling of fundamental interactions of radiation with living cells;
- metabolic and functional imaging using radio-nuclides and MRI;
- applications of radiation biology to therapy and radiation protection.

Graduate students are part of the *Medical Physics Research Training Network* (MPRTN) supported by the *Collaborative Research Education Training Experience* (CREATE) of the Natural Sciences & Engineering Research Council (NSERC).

The M.Sc. and Ph.D. programs in Medical Physics are accredited by the Commission on Accreditation of Medical Physics Education Programs, Inc., sponsored by the *American Association of Physicists in Medicine* (AAPM), the *American College of Radiology* (ACR), the *American Society for Radiation Oncology* (ASTRO), the *Canadian Organization of Medical Physicists* (COMP), and the *Radiological Society of North America* (RSNA).

section 12.11.5: Master of Science (M.Sc.) Medical Radiation Physics (Thesis) (52 credits)

This two-year program provides a comprehensive introduction to the academic, research, and practical aspects of physics applied to radiation medicine. Students may go on to careers in clinical service as medical physicists in research-oriented hospital settings after clinical residency training; may consider development careers in industry in radiation therapy, diagnostic radiology, or nuclear medicine or nuclear energy; in governmental organizations as radiation safety experts, etc.; or pursue academic careers in university, industry, or government organizations. Our graduate programs are accredited by *CAMPEP* (Commission for Accreditation of Medical Physics Education Programs). Medical physicists must go through CAMPEP training (M.Sc. or Ph.D., followed by a residency training) to be eligible to sit certification exams. Certification is becoming a mandatory requirement for eligibility to practise in a clinical environment. The McGill M.Sc. program is research oriented, which has the additional advantage that the roads toward a Ph.D., followed by academic, industry, or clinical careers, are wide open. The practical and laboratory sections of the program are conducted in various McGill teaching hospitals.

The program comprises:

1. didactic courses in radiation physics, radiation dosimetry, the physics of nuclear medicine and diagnostic radiology, medical imaging, medical electronics and computing, radiation biology, and radiation hazards and protection;
2. seminars in radiation oncology, diagnostic radiology, and miscellaneous aspects of medical physics, e.g., lasers;
3. laboratory courses in radiation dosimetry and medical imaging;
4. an individual research thesis.

section 12.11.6: Graduate Diploma (Gr. Dip.) Medical Radiation Physics (31 credits)

The Medical Physics Unit offers a Graduate Diploma in Medical Radiation Physics which is accredited as a Certificate in Medical Physics by the *CAMPEP* (Commission on Accreditation of Medical Physics Education Programs). It allows eligible individuals to retrain in Medical Physics. Applicants should hold a Ph.D. degree and also a B.Sc. in Honours Physics, Physics Major, or related Physics-oriented science.

12.11.3 Medical Physics Admission Requirements and Application Procedures

12.11.3.1 Admission Requirements

Candidates applying to the M.Sc. program must normally hold a B.Sc. de

12.11.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Medical Physics Unit and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill departmental website; please consult the list at *www.mcgill.ca/gps/contact/graduate-program*.

Admissions to the M.Sc. program are open for the Fall term (beginning in September) only. Applications must be **completed** by January 15 to be considered for the following Fall term, i.e., online application submitted and all required documents uploaded.

	Application Opening Dates	Application Deadlines		
	All Applicants	**Non-Canadian citizens (incl. Special, Visiting & Exchange)**	**Canadian citizens/Perm. residents of Canada (incl. Special, Visiting & Exchange)**	**Current McGill Students (any citizenship)**
Fall Term:	Sept. 15	Jan. 15	Jan. 15	Jan. 15
Winter Term:	N/A	N/A	N/A	N/A
Summer Term:	N/A	N/A	N/A	N/A

Admission to graduate studies is competitive; accordingly, late and/or incomplete applications are considered only as time and space permit.

12.11.4 Medical Physics Faculty

Director

J. Seuntjens

Emeritus Professor

S.M. Lehnert; B.Sc.(Nott.), M.Sc., Ph.D.(Lond.)

E.B. Podgorsak; Dipl.Ing.(Ljubljana), M.Sc., Ph.D.(Wisc.), F.C.C.P.M., F.A.A.P.M., D.A.B.M.P., D.A.B.R.

Professors

D. Louis Collins; M.Eng., Ph.D.(McG.), Post Doc.(Rennes), F.C.C.P.M.

J. Seuntjens; M.Sc., Ph.D.(Ghent), F.C.C.P.M., F.A.A.P.M., F.C.O.M.P.

Assistant Professors

S. Devic; M.Sc., Ph.D.(Belgrade), F.C.C.P.M.

S. Enger; Ph.D.(Uppsala)

M.D.C. Evans; B.A.(Qu.), M.Sc.(McG.), F.C.C.P.M.

M. Hobson; PhD.(Wisc. Madison)

J. Kildea; Ph.D.(Dublin), M.Sc.(McG.)

I. Levesque; Ph.D.(McG.), Post Doc.(Stan.)

W. Parker; M.Sc.(McG.), F.C.C.P.M.

P. Pater; Ph.D.(McG.)

H.J. Patrocinio; M.Sc.(McG.), F.C.C.P.M., D.A.B.R.

M. Popovic; Ph.D.(McM.)

G. Stroian; M.Sc.(McG.), Ph.D.(Montpellier), F.C.C.P.M.

N. Ybarra; Ph.D.(Montr.)

Affiliate Members

K. Asiev, H. Bekerat, T. Connell, S. Darvasi, S. Davis, C. Furstoss, A. Gauvin, D. Guillet, G. Hegyi, L. Liang, P. Papaconstadopoulos, E. Poon, R. Richardson, R. Ruo, M. Serban, N. Tomic, P.G. Watson

Adjunct Professors

F. DeBlois; M.Sc., Ph.D.(McG.), F.C.C.P.M.

I. El Naqa; B.Sc., M.S.(Jordan), Ph.D.(Chic.), M.A.(Wash.), D.A.B.R.

C. Janicki; B.Sc., M.Sc., Ph.D.(Montr.)

B. Moftah; B.Sc.(Winn.), M.Sc., Ph.D.(Br. Col.)

G.B. Pike; B.Eng.(St. John's), M.Eng., Ph.D.(McG.)

A. Reader; B.Sc.(Kent), Ph.D.(Lond.)

A. Sarfehnia; B.Sc.(Br.Col.), M.Sc., Ph.D.(McG.)

E. Soisson; M.Sc., Ph.D.(Wisc.)

12.11.5 Master of Science (M.Sc.) Medical Radiation Physics (Thesis) (52 credits)

The M.Sc. program in Medical Radiation Physics provides candidates with the knowledge required to enter into the field of medical physics. The program relies on a strong fundamental science background and enables candidates to undergo further training through a clinical residency program or to further advanced graduate studies in medical ph

MDPH 612	(3)	Instrumentation and Computation in Medical Physics
MDPH 613	(2)	Health Physics
MDPH 614	(3)	Physics of Diagnostic Radiology
MDPH 615	(2)	Physics of Nuclear Medicine
MDPH 618	(3)	Anatomy and Physiology for Medical Physics
PHIL 643	(3)	Seminar: Medical Ethics

12.12 Medicine, Experimental

12.12.1 Location

Division of Experimental Medicine
Department of Medicine
1001 Decarie Boulevard
Montreal QC H4A 3J1
Canada
Telephone: 514-934-1934, ext. 34699 or 34700
Email: *experimental.medicine@mcgill.ca*
Website: *www.mcgill.ca/expmed*

12.12.2 About Experimental Medicine

Experimental Medicine is a Division of the Department of Medicine charged with the task of providing graduate education in the Department, and enabling professors located in the research institutes of the McGill teaching hospitals and other centres to supervise graduate students. The Division offers various programs, each of which has different training objectives (see below). The internationally-recognized high-quality training our graduates receive is in essence what distinguishes graduates of our programs from the graduates of comparable programs in peer institutions.

section 12.12.5: Master of Science (M.Sc.) Experimental Medicine (Thesis) (45 credits)

Applicants for the M.Sc. in Experimental Medicine must hold either an M.D. de

section 12.12.7: Master of Science (M.Sc.) Experimental Medicine (Thesis): Environment (45 credits)

12.12.3.2 Application Procedures

McGill’

Professors

M. Alaoui-Jamali; D.V.M.(Rabat, Morocco), Ph.D.(Paris V)

S. Ali; B.Sc.(C'dia), Ph.D.(McG.)

C. Autexier; B.Sc.(C'dia), Ph.D.(McG.)

A. Bateman; B.Sc., Ph.D.(Lond.)

G. Batist; B.Sc.(Col.), M.D.,C.M.(McG.), F.R.C.P.(C)

O. Beauchet; B.Sc.(Sainte-Etienne), M.Sc.(Claude Bernard), Ph.D.(Jean Monnet)

M. Behr; B.Sc.(Tor.), M.D.(Qu.), M.Sc.(McG.)

H. Bennett; B.A.(York, UK), Ph.D.(Brunel)

V. Blank; B.Sc., M.Sc.(Konstanz), Ph.D.(Inst. Pasteur)

J. Bourbeau; M.D.(Laval), M.Sc.(McG.), F.R.C.P.(C)

A. Cybulsky; M.D.(Tor.), F.R.C.P.(C)

G. Di Battista; B.Sc.(C'dia), M.Sc., Ph.D.(Montr.)

A. Fuks; B.Sc., M.D.,C.M.(McG.)

A. Gatignol; M.Sc., Ph.D.(Paul Sabatier)

J. Genest Jr.; M.D.,C.M.(McG.), F.R.C.P.(C)

V. Giguere; B.Sc., Ph.D.(Laval)

M. Goldberg; B.Sc., M.Sc., Ph.D.(McG.)

D. Goltzman; B.Sc., M.D.,C.M.(McG.), F.R.C.P.(C)

S.A. Grover; B.A.(Roch.), M.D.,C.M.(McG.), M.P.A.(Harv.), F.R.C.P.(C)

L.J. Hoffer; B.Sc., M.D.,C.M.(McG.), Ph.D.(MIT)

S. Hussain; M.D.(Baghdad), Ph.D.(McG.)

A.C. Karaplis; B.Sc., M.D., Ph.D.(McG.)

R. Kremer; M.D., Ph.D.(Paris VI)

A.-M. Lauzon; B.Sc., M.Sc., Ph.D.(McG.)

C. Liang; B.Sc., Ph.D.(Nankai)

J.-J. Lebrun; B.Sc., M.Sc.(Rennes), Ph.D.(Paris V)

M.S. Ludwig; M.D.(Manit.), F.R.C.P.(C)

S. Magder; M.D.(Tor.), F.R.C.P.(C)

D. Malo; D.V.M., M.Sc.(Montr.), Ph.D.(McG.)

A. J. Marelli; B.Sc.(McG.), M.D.(Montr.)

J. Martin; B.Sc., M.B., B.Ch., M.D.(Cork), F.R.C.P.(C)

W.H. Miller; A.B.(Princ.), Ph.D.(Rock.), M.D.(Cornell)

A. Mouland; B.A., B.Sc., Ph.D.(McG.)

W.J. Muller; B.Sc., Ph.D.(McG.)

A. Nepveu; B.Sc., M.Sc.(Montr.), Ph.D.(Sher.)

T. Nilsson; B.Sc., Ph.D.(Uppsala)

M. Olivier; B.Sc., M.Sc.(Montr.), Ph.D.(McG.)

L. Panasci; B.Sc., M.D.(G’town)

K. Pantopoulos; B.Sc., Ph.D.(Aristotelian, Greece)

M. Park; B.Sc., Ph.D.(Glas.)

B.J. Petrof; M.D.(Laval)

L. Pilote; M.D.,C.M.(McG.), M.Sc.(Harv.), Ph.D.(Calif.)

Professors

M.N. Pollak; M.D.,C.M.(McG.), F.R.C.P.(C)

P. Ponka; M.D., Ph.D.(Charles Univ., Prague)

B. Posner; M.D.(Manit.), F.R.C.P.(C)

W.S. Powell; B.A.(Sask.), Ph.D.(Dal.)

S. Rabbani; M.B.B.S.(King Edward Med. Coll., Lahore)

D. Radzioch; M.Sc., Ph.D.(Jagiellonian, Cracow)

S. Richard; B.Sc., Ph.D.(McG.)

J.-P. Routy; B.Sc., M.D., Ph.D.(Aix-Marseille)

D. Sasseville; M.D.(Laval), F.R.C.P.(C)

E. Schiffrin; M.D.(Buenos Aires), Ph.D.(McG.)

E. Schurr; Diplom., Ph.D.(Al. Ludwigs U., Freiburg)

A. Schwertani; D.V.M.(Baghdad), M.D., Ph.D.(Lond.)

D. Sheppard; M.D.(Tor.), F.R.C.P.(C)

A.D. Sniderman; M.D.(Tor.)

M.M. Stevenson; B.A.(Hood), M.Sc., Ph.D.(Catholic U. of Amer.)

T. Takano; M.D., Ph.D.(Tokyo)

M. Trifiro; B.Sc., M.D.,C.M.(McG.)

C.

Associate Professors

T. Jagoe; B.A., M.D.(Camb.), Ph.D.(Newcastle, UK), F.R.C.P.(C)

B. Jean-Claude; B.Sc., M.Sc.(Moncton), Ph.D.(McG.)

N. Johnson; B.Sc.(C'dia), M.D.(Ott.), Ph.D.(Br. Col.), F.R.C.P.(C)

M. Kokoeva; B.Sc.(Lomonosov Moscow), Ph.D.(Acad. of Sci., Moscow)

A. Kristof; B.Sc., M.D.,C.M.(McG.), F.R.C.P.(C)

P. Laneuville; B.Sc.(McM.), M.D.(Ott.), F.R.C.P.(C)

S. Laporte; B.Sc., M.Sc., Ph.D.(Sher.)

L. Larose; B.Sc., Ph.D.(Montr.)

S. Lehoux; B.Sc.(Bishop's), Ph.D.(Sher.)

S. Lemay; M.D.(Montr.), F.R.C.P.(C)

R. Lin; B.Sc., B.Sc.(Xiamen), M.Sc.(Peking Union), Ph.D.(C'dia)

M. Lipman; M.D.,C.M.(McG.), F.R.C.P.(C)

J.-L. Liu; B.Sc., M.Sc.(Beijing), Ph.D.(McG.)

J.A. Morais; M.D.(Montr.), F.R.C.P.(C)

S. Morin; B.Sc., M.D.(Laval), M.Sc.(McG.)

M. Murshed; M.Sc.(Brussels), Ph.D.(Cologne)

M. Ndao; B.Sc., D.V.M.(Senegal), M.Sc., Ph.D.(Belgium)

D. Nguyen; M.D.,C.M.(McG.), F.R.C.P.(C)

A.C. Peterson; B.Sc.(Vic., BC), Ph.D.(Br. Col.)

S. Qureshi; B.Sc., M.D.(Alta.), F.R.C.P.(C)

E. Rahme; B.Sc.(Lebanese), Ph.D.(Penn. St.), M.Sc., Ph.D.(McG.)

J. Rauch; B.Sc., Ph.D.(McG.)

C. Rocheleau; B.A.(Assum. Coll.), Ph.D.(Mass.)

S. Rousseau; B.Sc., M.Sc., Ph.D.(Laval)

M. Saleh; B.Sc., M.Sc.(Beirut), Ph.D.(McG.)

G. Sebastiani; M.D.(Padova)

C. Seguin; B.Sc.(McG.), M.D.(Montr.), F.R.C.P.(C)

P. Siegel; B.Sc., Ph.D.(McM.)

R. Sladek; B.Sc., M.D.(Tor.), F.R.C.P.(C)

G. Thanassoulis; B.Sc., M.Sc.(McG.), M.D.(Tor.), F.R.C.P.(C)

E. Torban; B.Sc.(Mosco

Assistant Professors

L. Garcia; M.Sc.(UNINA), Ph.D.(Camb.)

M. Kaminska; B.Sc., M.Sc., M.D.,C.M.(McG.), F.R.C.P.(C)

T.C. Lee; B.Sc., M.D.(Tor.), M.Sc.(Harv.)

I. Litvinov; B.Sc., B.A.(Kent'y), Ph.D.(Johns Hop.), M.D.,C.M.(McG.)

E.G. McDonald; B.Sc.(C'dia), M.D.,C.M., M.Sc.(McG.)

B. McDonald Smith; B.Sc., M.D.,C.M.(McG.), F.R.C.P.(C)

F. Mercier; M.D.,C.M.(McG.)

G. Merle; Ph.D.(Montp.)

L. Nguyen; M.D., M.Sc.(McG.)

M. Paliouras; B.Sc.(Tor.), M.Sc.(Flor.), Ph.D.(McG.)

S. Pamidi; B.Sc.(McG.), M.D.(Tor.), M.Sc.(McG.)

D. Rosenzweig; B.Sc.,(FAU), Ph.D.,(Miami)

R. Sapir-Pichhadze; B.Sc., M.D.(Hebrew), M.Sc., Ph.D.(Tor.)

M. Sebag; B.Sc., Ph.D.(McG.), M.D.(Tor.), F.R.C.P.(C)

J. Spicer; M.D., Ph.D.(McG.)

L. N. Veilleux; B.Sc, M.Sc., Ph.D.(Montr.)

Associate Members, McGill

B. Abdulkarim, H. Abenhaim, M. Basik, M. Ben-Shoshan, M. Bouchard, P. Brodt, K. Brown, S. Chevalier, H. Clarke, T. Coderre, S. del Rincon, L. Diatchenko, T. Duchaine, D. Dufort, C. Ells, K. Eppert, M. Fabian, L. Ferri, C. Goodyer, P. Goodyer, W. Gotlieb, I. Gupta, A. Haidar, M. Hunt, N. Jabado, A. Jahani-Asl, D. Juncker, M. Kaartinen, A. Khoutorsky, J. Kimmelman, A. Koromilas, D. Labbé, L. Lands, J. Lapointe, B.W.Y. Lo, C. Loiselle, C. Mandato, K. Mann, M. O. Martel, P. Martineau, B. Mazer, L. McCaffrey, C. McCusker, T. Muanza, M. Nagano, C. O'Flaherty, A. Orthwein, A. Pause, A. Philip, C. Piccirillo, C. Polychronakos, S. Prakash, D.F. Quail, R. Rajan, J. Rak, G. Rouleau, A. Ryan, G. Sant'Anna, R. Slim, J. Spicer, I. Topisirovic, M. Tremblay, J. Ursini-Siegel, T. Vuong, M. Witcher, J.-H. Wu, S. Wurzba, N. Ybarra, M. Zappitelli, G. Zogopoulos

Adjunct Professors

J. Archambault, M. Cayouette, F. Charron, E. Cohen, C.F. Deschepper, J.M. Di Noia, J. Drouin, J. Estall, M. Ferron, N. Francis, H. Gu, Q.A. Hamid, D. Hipfner, P. Jolicoeur, A. Kania, M. Kmita, E. Lecuyer, T. Moroy, M. Oeffinger, R. Rabasa-Lhoret, E. Racine, F. Robert, N. Seidah, W.-K. Suh, H. Takahashi, M. Trudel, W.Y. Tsang, J. Vacher, A. Veillette, C. Wu, J. Zwaagstra

12.12.5 Master of Science (M.Sc.) Experimental Medicine (Thesis) (45 credits)

The overall objective of this program is to train students in the in-depth analysis of fundamental, translational and/or clinical research.

Students perform studies at diverse levels, from molecular, cellular, and tissue to whole animal, human, and population in order to elucidate mechanisms behind human diseases, leading to drug discovery. Students are trained to perform research in both academic and industrial settings.

Thesis Courses (36 credits)

EXMD 690	(3)	Master's Thesis Research 1
EXMD 692	(9)	Master's Thesis Research 3
EXMD 693	(12)	Master's Thesis Research 4
EXMD 694	(12)	Master's Thesis Research 5

Complementary Courses (9 credits)

9 credits at the 500 level or higher.

Course choices should be made in consultation with research supervisor(s). Courses may be taken outside the department at the 500 level or higher in medical and allied sciences*.

* Note that some seminar, current topics and readings, and conference courses may not count towards your de

12.12.6 Master of Science (M.Sc.) Experimental Medicine (Thesis): Bioethics (45 credits)

Thesis Courses (24 credits)

BIOE 690	(3)	M.Sc. Thesis Literature Survey
BIOE 691	(3)	M.Sc. Thesis Research Proposal
BIOE 692	(6)	M.Sc. Thesis Research Progress Report
BIOE 693	(12)	M.Sc. Thesis

Required Courses (6 credits)

BIOE 680	(3)	Bioethical Theory
BIOE 681	(3)	Bioethics Practicum

Complementary Courses (15 credits)

3 credits, one of the following:

BIOE 682	(3)	Medical Basis of Bioethics
CMPL 642	(3)	Law and Health Care
PHIL 643	(3)	Seminar: Medical Ethics
RELG 571	(3)	Ethics, Medicine and Religion

12 credits, four 3-credit BIOE or EXMD graduate courses (500, 600, or 700 level) chosen in consultation with the Supervisor.

12.12.7 Master of Science (M.Sc.) Experimental Medicine (Thesis): Environment (45 credits)

Thesis Courses (24 credits)

EXMD 690	(3)	Master's Thesis Research 1
EXMD 692	(9)	Master's Thesis Research 3
EXMD 693	(12)	Master's Thesis Research 4

Required Courses (6 credits)

ENVR 610	(3)	Foundations of Environmental Policy
ENVR 650	(1)	Environmental Seminar 1
ENVR 651	(1)	Environmental Seminar 2
ENVR 652	(1)	Environmental Seminar 3

Complementary Courses (15 credits)

3 credits from one of the following courses*:

ENVR 519	(3)	Global Environmental Politics
ENVR 544	(3)	Environmental Measurement and Modelling
ENVR 620	(3)	Environment and Health of Species
ENVR 622	(3)	Sustainable Landscapes
ENVR 630	(3)	Civilization and Environment
ENVR 680	(3)	Topics in Environment 4

* or another course at the 500, 600, or 700 level recommended by the Advisory Committee and approved by the Environment Option Committee.

12 credits of courses at the 500, 600, or 700 level chosen in consultation with the student's academic supervisor.

12.12.8 Doctor of Philosophy (Ph.D.) Experimental Medicine

The overall objective of this program is to train students in the in-depth analysis of fundamental, translational and/or clinical research. Students perform studies at diverse levels, from molecular, cellular, and tissue to whole animal, human, and population in order to elucidate mechanisms behind human diseases, leading to drug discovery. Students are trained to become research leaders in both academic and industrial settings.

Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

Required Courses

(0)	Comprehensive Oral Examination

ENVR 622	(3)	Sustainable Landscapes Civilization and En

- developing and engaging in public policy discussions.

We understand that research in family medicine and primary care is essential to the achievement of excellence in health care delivery, patient care, and education. Our research division is composed of Ph.D. and clinical researchers who dedicate their efforts to producing and translating knowledge that advances the discipline, practice, and teaching of family medicine and primary care while supporting the scholarly activities of clinicians and residents in the Department. We have developed unique and rigorous research programs for **M.Sc.** and **Ph.D.** students that advance academic excellence in family medicine and primary health care through patient-oriented, community-based research with innovative methodologies and participatory approaches.

section 12.13.5: Master of Science (M.Sc.) Family Medicine (Thesis) (45 credits)

The M.Sc. in Family Medicine is a **research-oriented thesis-based graduate program** in family medicine. The objective is to increase the skills of those interested in carrying out research pertinent to the practice of family medicine.

As many relevant research questions cross conventional boundaries of disciplines and research traditions, we incorporate an **interdisciplinary approach** with an emphasis on **participatory research** and **community engagement**.

This program provides training in epidemiology and statistics as well as in qualitative, quantitative and mixed methods. Students are also oriented for knowledge syn1 8.1 dx0 0 ertinent to the p2y 38riented for

amily medicine and primTm(health Tm(.)T0/F6 8.1 Tf1 0 80 407 0 1 95.0.4 Tly medim(v)Tj1 0 0 1 192 0 1 95.0.4 ,m(v)Tj1 0 0 9.360.1 1 95.0.4 . in F)T

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Proof of competency in oral and written English: TOEFL: International students who have not received their instruction in English, or whose mother tongue is not English, must pass the Test of English as a Foreign Language (*TOEFL*) with a minimum score of 86 on the Internet-based test (iBT; 567 on the paper-based test (PBT)), with each component score not less than 20 (internet-based test).

Note: The TOEFL institution code for McGill University is 0935. For further information, please refer to the *TOEFL website*.

Alternatively, students may submit International English Language Testing System (*IELTS*) scores with a minimum overall band score of 6.5. Original score reports must be submitted (photocopies will not be accepted). For further information please refer to www.toefl.org

For overseas graduates, an attempt is made to situate the applicant's academic grades among the standards of their universities. Grades are, however, converted to their McGill equivalent. Conversion charts, as well as required admission documentation for each country, are provided by *Graduate and Postdoctoral Studies* and prospective students should refer to these in order to determine if they are admissible to our program.

12.13.3.2 Application Procedures

McGill's online application form for graduate program candidates is available at *www.mcgill.ca/gradapplicants/apply*.

See *University Regulations & Resources* > *Graduate* > *Graduate Admissions and Application Procedures* > *: Application Procedures* for detailed application procedures.

All supplemental application materials and supporting documents must be uploaded directly to the McGill admissions processing system.

- **Supervisor:** All students must be matched to a *supervisor* to be admitted to our graduate programs; this matching will occur during the application process (i.e., after the applicant has submitted a complete application). After the application has been received, the applicants will have an opportunity to be chosen for an interview with one of our supervisors if the minimum admission requirements have been met. After the application has been changed to "In Review" status in Uapply, candidates may contact potential supervisors who interest them for an interview.
- **Application form and fee:** All applicants must complete the *Online Application*. The application must be accompanied by a non-refundable application fee payable by credit card (Visa or Mastercard); fee amounts and details are listed on the *Student Accounts* website. Please ensure you apply for the M.Sc. in Family Medicine or the Ph.D. in Family Medicine and Primary Care.
- **Curriculum Vitae:** Please upload1 0 oe6card (V

12.13.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Department of Family Medicine and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill departmental website; please consult the list at *www.mcgill.ca/gps/contact/graduate-program*.

	Application Opening Dates	Application Deadlines		
	All Applicants	**Non-Canadian citizens (incl. Special, Visiting & Exchange)**	**Canadian citizens/Perm. residents of Canada (incl. Special, Visiting & Exchange)**	**Current McGill Students (any citizenship)**
Fall Term:	September 15	February 1	February 1	February 1
Winter Term:	Ph.D. applicants only	June 1	October 1	October 1
Summer Term:	N/A	N/A	N/A	N/A

All supporting documents must be received by February 1 for the Fall semester. Candidates who are interested in our MSc programs are only allowed to apply for the Fall semester. Candidates who are interested in our Ph.D. in Family Medicine and Primary Care program may apply in either the Fall or Winter semesters.

Admission to graduate studies is competitive; accordingly, late and/or incomplete applications are considered only as time and space permit.

12.13.4 Medicine, Family Faculty

Chair

Howard Bergman

Graduate Program Director

Gillian Bartlett

Professors

Neil Andersson; M.D., M.Sc., M.Phil.(Lond.), Ph.D.(City, UK), M.F.P.H.(UK)

Gillian Bartlett; B.A., M.Sc., Ph.D.(McG.)

Howard Bergman; B.Sc., M.D.,C.M.(McG.), C.C.F.P, F.C.F.P.

Jeannie Haggerty; B.Sc.(S. Fraser), M.Sc., Ph.D.(McG.)

Ann Macaulay; M.B., Ch.B.(St. And.), C.C.F.P.

Pierre Pluye; M.D.(P. Sabatier), M.Sc., Ph.D.(Montr.)

Charo Rodriguez; M.D.(Alicante), M.P.H.(Valencia), Ph.D.(Montr.)

Mark Yaffe; B.Sc., M.D.,C.M.(McG.), M.Cl.Sc.(W. Ont.), C.C.F.P., F.C.F.P.

Associate Professors

Eugene Bereza; B.A., M.D.,C.M.(McG.), C.C.F.P.

Anne Cockcroft; M.B., B.S., M.D.(Lond.), F.R.C.P., F.F.O.M., D.I.H.(UK)

Perle Feldman M.D.,C.M.(McG) C.C.F.P., F.C.F.P., M.H.P.E.

Roland Grad; M.D.,C.M.(McG.), M.Sc.(McM.), C.C.F.P.

Ellen Rosenberg; B.A.(Smith), M.D.,C.M.(McG.), C.C.F.P.

Ian Shrier; M.D.,C.M., Ph.D.(McG.)

Pierre-Paul Tellier; M.D.,C.M.(McG.)

Isabelle Vedel; M.D.(Paris XI), D.E.A.(Sciences Po), Ph.D.(Reims Champagne-Ardenne)

Mark Ware; B.A.(Qu.), M.B., B.S.(W. Indies), M.Sc.(Lond.)

Assistant Professors

Anne Andermann; B.Sc., M.D.,C.M.(McG.), M.Phil.(Camb.), D.Phil.(Oxf.), C.C.F.P., F.R.C.P.(C), F.F.P.H.(UK)

Yves Bergevin; B.Sc.(Coll. Stanislas, Montreal), M.D.,C.M., M.Sc.(McG.), C.C.F.P., F.R.C.P.(C), F.C.F.P.

Alexandra De Pokomandy; M.D.,C.M., M.Sc.(McG.)

Bertrand Lebouche; M.D., M.A., Ph.D.(Laval)

Peter Nugus; M.A., M.Ed., Ph.D.(New South Wales)

Samira Rahimi, Eng.(Tabriz), Ph.D.(Laval), B.Eng.(Cornell)

Kathleen Rice, M.A.(Concordia), Ph.D.(Tor.), MA.(Concordia)

Tibor Schuster; B.Sc., M.Sc.(Ludwig Maximilians), Ph.D.(TU Berlin)

Machelle Wilchesky; B.A., M.A.(Qu.), Ph.D.(McG.)

Associate Members

Sara Ahmed (Physical and Occupational Therapy)

Olivier Beauchet (Medicine)

David Buckeridge (Epidemiology)

Robin Cohen (Palliative Care)

Carolyn Ells (Bioethics)

Jennifer Fishman (Bioethics)

Matthias Friedrich (Medicine)

Richard Hovey (Dentistry)

Matthew Hunt (Physical and Occupational Therapy)

Patricia Li (Pediatrics)

Francesca Luconi (Continuing Professional Development – Faculty of Medicine)

Antonia Maioni (Political Science)

Melissa Park (Physical and Occupational Therapy)

Erin Strumpf (Epidemiology and Economics)

Daniel Weinstock (Institute of Health and Social Policy)

Meredith Young (Centre of Medical Education)

Adjunct Professors

Tracie Barnett (Institut Armand Frappier)

Julie Bruneau (Montr.)

Yves Couturier (Sher.)

Catherine Hudon (Sher.)

Amalia Issa (Houston)

Janusz Kaczorowski (Montr.)

Edeltraut Kroger (CEVQ)

Susan Law (Tor.)

Marie-Th

BIOE 690	(3)	M.Sc. Thesis Literature Survey
BIOE 691	(3)	M.Sc. Thesis Research Proposal
BIOE 692	(6)	M.Sc. Thesis Research Progress Report
BIOE 693	(12)	M.Sc. Thesis
FMED 603	(1)	Foundations of Participatory Research

Complementary Course (3 credits)

3 credits from the following:

FMED 505	(3)	Basic Analysis for Health Data
FMED 625	(3)	Qualitative Health Research

Elective Courses (11 credits)

11 credits, at the 500 level or higher, of coursework may be chosen from inside or outside the Department in consultation with the student's academic adviser or supervisor.

12.13.7 Master of Science (M.Sc.) Family Medicine (Thesis): Medical Education (45 credits)

The MSc in Family Medicine; Medical Education option is a thesis option graduate program designed to provide research training to family physicians, and exceptionally other health professionals and other students interested in family medicine education research. This MSc Option has very close ties to the Family Medicine Educational Research Group (FMER), which integrates family medicine researchers deeply committed to the development of the family medicine education field of inquiry. The FMER's ultimate goal is to advance knowledge to: (1) constantly inform family medicine curricula innovations and continuing professional development to better family physicians' clinical practice, (2) significantly contribute to the development of the family medicine education field of inquiry, and (3) rigorously develop and inform medical education policy. This research agenda of FMER is articulated into four interrelated streams: (1) family physicians' professional identity formation; (2) information use and technology in the learning episodes of practicing physicians and organizational learning; (3) mentoring in family medicine education, and (4) knowledge synthesis.

Thesis Courses (24 credits)

Thesis subject should be related to medical education.

FMED 697	(12)	Master's Thesis Research 1
FMED 698	(12)	Master's Thesis Research 2

Required Courses (13 credits)

Revision,

Research topics in the field of family medicine and primary health care cross conventional discipline boundaries and research traditions. Our training program focuses on patient-oriented, community-based research using innovative methodologies and participatory approaches. The program advances academic excellence in family medicine and primary health care.

Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

PhD Comprehensive Exam

PhD students are expected to demonstrate proficiency in the following topics: basic statistics, epidemiology, qualitative and mixed methods, literature synthesis, knowledge translation and participatory research approaches. If a PhD candidate does not have prior training in any of these areas and believes

section 12.14.5: Master of Science (M.Sc.) Microbiology and Immunology (Thesis) (45 credits)

The primary goal of this program is to provide students with unique opportunities to learn experimental designs and fundamental research techniques, and objectively synthesize information from scientific literature. These tools enable the students to focus on major research topics offered by the Department: molecular microbiology, mycology, microbial physiology, virology, genetics, immunology, drug design, and aspects of host-parasite relationships. Each M.Sc. student chooses their preferred major research area and research supervisor. Following an interview, the student is presented with a research topic and offered a studentship (amounts vary). Each student must register for our graduate courses (two seminars, two reading and conference courses, and three current topics). If pertinent to the student's research program, the research adviser may advise the student to take additional courses.

Most of our students, after one year, are proficient researchers, and some first authors of a research publication. M.Sc. students may fast-track to the Ph.D. program after three terms of residency. The remaining students advance their microbiology background by opting to enter into medicine, epidemiology, biotechnology, or pharmaceutical disciplines.

section 12.14.6

12.14.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Department of Microbiology and Immunology and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill departmental website; please consult the list at *www.mcgill.ca/gps/contact/graduate-program*.

gy, Autoimmunity, Host Defense: J. , I. Colme . Gros, A. Kristof, J. Mandl, A. Orthwein, J. Rauch, M. Saleh, J. Spicer

Biochemical P

12.15.2 About the Integrated Program in Neuroscience

Montreal is home to the largest concentration of neuroscientists in North America. Neuroscience research at McGill University is internationally renowned, and its Integrated Program in Neuroscience (IPN) provides graduate training in this outstanding research environment. With approximately 340 M.Sc. and Ph.D. students and more than 230 supervisors, the IPN is the largest graduate program in the Faculty of Medicine and one of the largest neuroscience graduate programs in North America.

Neuroscience training within the IPN spans the full spectrum of research fields, from cellular and molecular neuroscience to behavioural and cognitive neuroscience. In addition to laboratory research, the IPN offers an extensive range of courses, hosts an annual *Neuroscience Retreat*, and maintains a seminar program to facilitate communication between students in different neuroscience disciplines. Neuroscience trainees from McGill have gone on to successful careers in academia and industry.

A prospective graduate student may *identify a supervisor* from one of several research streams, spanning the full spectrum of neuroscience research. A student with a bachelor's degree may apply to the **M.Sc.** program; it is common to transfer to the **Ph.D.** program if suitable progress is made. Students with M.Sc. degrees may apply directly to the Ph.D. program. IPN also offers a Ph.D. Rotation program each September.

GENERAL

1. Students must select an Advisory Committee, in conjunction with their thesis supervisor. This committee will consist of the thesis supervisor and two (maximum three) other individuals who will participate in discussions with students about their research program.
2. All Ph.D. students are required to complete a candidacy examination before the end of Ph.D. 3. The exam serves to evaluate the students' ability to perform original scholarship and to demonstrate their suitability for a Ph.D. degree. An M.Sc. student may be eligible to transfer to the Ph.D. program without submitting a master's thesis by taking the *Transfer Seminar/Candidacy Exam*. This exam is allowed if the master's CGPA is 3.5 or higher and if the student's Advisory Committee recommends the student as an appropriate candidate for Ph.D. studies. M.Sc. students who wish to pursue a Ph.D. degree, but who have not obtained the minimum 3.5 CGPA in their M.Sc. coursework while in the IPN, must submit a master's thesis and apply for the Ph.D. level afterwards.
3. Students are required to submit a written thesis proposal (18 months after the start of the program for M.Sc. students, and at least one month prior to the candidacy exam for Ph.D. students). This document must state the research question, present the hypothesis being tested, review the relevant literature, summarize the methodology used, and present the research data to date. This proposal will then be orally presented to the student's Advisory Committee members, who will review the written proposal and communicate their recommendations to the student.
4. Students will present a formal seminar on their research work prior to writing their thesis. This presentation will be attended by the student's Advisory Committee who will report their impressions and recommendations to the student.
5. Before final thesis submission, Ph.D. students must successfully complete an oral defence, which is a final, in-depth, formal presentation of their research.
6. An annual oral informal presentation of research work accomplished will be presented to the student's Advisory Committee.
7. The Graduate Program Committee has instituted a mentorship program by which each student will be matched with a specific member of the Committee. The Program Mentor ensures that the student, the supervisor(s), and other members of the Advisory Committee are aware of and meet key milestones, in a timely manner, throughout the course of the student's graduate study.
8. All incoming students are required to take the workshops on Responsible Conduct of Research. These will be included as part of the milestones for annual progress reports.

section 12.15.5: Master of Science (M.Sc.) Neuroscience (Thesis) (45 credits)

The M.Sc. program offers opportunities to a great diversity of individual interests and backgrounds, and prepares our students for scientific careers in neuroscience and related fields. Programs leading to an M.Sc. degree require the completion of intensive academic and research training.

section 12.15.6: Doctor of Philosophy (Ph.D.) Neuroscience

The IPN offers a highly competitive Ph.D. program that prepares students for successful scientific careers in the field of neuroscience. Over half of the students registered in the neuroscience graduate program at McGill University are in the doctoral stream.

12.15.3 Neuroscience (Integrated Program) Admission Requirements and Application Procedures

12.15.3.1 Admission Requirements

General

Applicants must hold a bachelor's degree, or its equivalent, from a recognized institution in a field related to the subject selected for graduate work, and must display an adequate background in basic sciences.

The applicant must present evidence of high academic achievement. A standing equivalent to a cumulative grade point average (CGPA) of 3.0 out of a possible 4.0 is required by Graduate and Postdoctoral Studies; however, the Integrated Program in Neuroscience (IPN) seeks applicants with a higher academic standing, and thus, requires a minimum CGPA of 3.3

Applicants to graduate studies whose mother tongue is not English, and who have not completed an undergraduate or graduate degree from a recognized foreign institution where English is the language of instruction or from a recognized Canadian institution (anglophone or francophone), must submit results of a *TOEFL* or *IELTS* exam with their application. Consult the Integrated Program in Neuroscience's *website* for details.

M.Sc. Degree

Bachelor's degree with adequate background in basic sciences, or an M.D.

Ph.D. Degree

Applicants must hold a graduate-level degree in a field related to neuroscience or have an M.D. degree, preferably with postgraduate training. Applicants will also be considered for admission if enrolled in the Doctor of Medicine & Master of Surgery with Ph.D. (Joint M.D.,C.M. & Ph.D.) program through the Faculty of Medicine at McGill University.

Students currently registered in the Master's in Neuroscience may be permitted to transfer to the Ph.D. program without submitting a master's thesis. Applicants are expected to have attained a high scholastic standing equal to, or greater than, the minimum cumulative grade point average of 3.5 out of 4.0 in all levels of study. In exceptional circumstances, a student **may** enter the Ph.D. program directly from their undergraduate degree if a CGPA of 3.7 is attained and if the student already presents extensive research experience.

To meet incoming students' diversity of individual interests and backgrounds, a graduate program is designed for each student at the time of entry. As part of the admission process, each applicant will identify, with the participation of the prospective thesis supervisor and the Graduate Studies Committee, a research thesis topic and the coursework required to complete the training deemed necessary for the degree. These decisions become an integral part of the graduation requirements for the student.

12.15.3.2 Application Procedures

McGill's online application form for graduate program candidates is available at *www.mcgill.ca/gradapplicants/apply*.

See *University Regulations & Resources* > *Graduate* > *Graduate Admissions and Application Procedures* > *: Application Procedures* for detailed application procedures.

12.15.3.2.1 Additional Requirements

The items and clarifications below are additional requirements set by this department:

- Curriculum Vitae
- Personal Statement
- Letters of Recommendation (2)

Consult the Integrated Program in Neuroscience's *website* for further details

12.15.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the IPN and may be revised at any time.

Emeritus Professors

M. Diksic; Ph.D. (*Dept. of Neurology and Neurosurgery*)

K. Franklin; Ph.D. (*Dept. of Psychology*)

P.C. Holland; B.A.(Lanc.), Ph.D.(Newcastle, UK) (*Dept. of Neurology and Neurosurgery*)

M. Rasminsky; B.A. (Tor.), M.D. (Harv.), Ph.D. (Lond.), F.R.C.P.(C) (*Dept. of Neurology and Neurosurgery*)

C. Thompson; D.Sc., F.C.C.P.M. (*Dept. of Neurology and Neurosurgery*)

N. White; B.A.(McG.), Ph.D.(Pitt.) (*Dept. of Psychology*)

Professors

G. Almazan; B.Sc.(N'eastern), Ph.D.(McG.) (*Dept. of Pharmacology and Therapeutics*)

E. Andermann; M.D.,C.M., M.Sc., Ph.D.(McG.), F.C.C.M.G. (*Dept. of Neurology and Neurosurgery*)

J. Antel; M.D., B.Sc.(Med.)(Manit.), F.R.C.P.(C) (*Dept. of Neurology and Neur*

Professors

E. Fon; M.D.(Montr.), F.R.C.P.(C) (*Dept. of Neurology and Neurosurgery*)

S.G. Gauthier; B.A., M.D.(Montr.), F.R.C.P.(C) (*Dept. of Neurology and Neurosurgery*)

B. Giros; M.Sc., Ph.D.(Paris VI) (*Dept. of Psychiatry*)

J. Gotman; M.Eng.(Dart.), Ph.D.(McG.) (*Dept. of Neurology and Neurosurgery*)

V. Gracco; Ph.D.(Wisc.) (*School of Communication Sciences and Disorders*)

A. Gratton; Ph.D.(C'dia) (*Dept. of Psychiatry*)

J. Grodzinsky; Ph.D.(Brandeis) (*Dept. of Linguistics*)

D. Guitton; Dipl. IVK(Univ. Libre de Brux.), B.Eng., M.Eng., Ph.D.(Eng.), Ph.D.(Physiol.)(McG.) (*Dept. of Neurology and Neurosurgery*)

D. Haegert; M.D.(Br. Col.), F.R.C.P.(C) (*Dept. of Pathology*)

E. Hamel; B.Sc.(Sher.), Ph.D.(Montr.) (*Dept. of Neurology and Neurosurgery*)

K. Hastings; B.Sc., Ph.D.(McG.) (*Dept. of Neurology and Neurosurgery*)

R.T. Hepple; Ph.D.(Tor.) (*Dept. of Kinesiology and Physical Education*)

Professors

G. Plourde; M.D.(Laval), M.Sc.(Ott.) (*Dept. of Anesthesia*)

J. Poirier; Ph.D.(Montr.) (*Dept. of Psychiatry and Medicine*)

A. Ptito; Ph.D.(Montr.) (*Dept. of Neurology and Neurosurgery*)

A. Ribeiro-da-Silva; M.D., Ph.D.(Porto) (*Dept. of Pharmacology and Therapeutics*)

G. Rouleau; M.D. (Ott.), Ph.D. (Harv.), F.R.C.P.(C), F.R.S.C. (*Dept. of Neurology and Neurosurgery*)

A. Sadikot; M.D.,C.M.(McG.), Ph.D.(Laval), F.R.C.S.(C) (*Dept. of Neurology and Neurosurgery*)

H.U. Saragovi; Ph.D.(Miami) (*Dept. of Pharmacology and Therapeutics*)

H. Schipper; M.D., Ph.D.(McG.), F.R.C.P.(C) (*Dept. of Neurology and Neurosurgery*)

G. Sebire; M.D., Ph.D.(Paris VI) (*Dept. of Pediatrics*)

P. Seguela; Doct. 3e Cycle(Bord.), Ph.D.(Montr.) (*Dept. of Neurology and Neurosurgery*)

M. Shevell; B.Sc., M.D.(Vanderbilt) (*Dept. of Neurology and Neurosurgery*)

T. Shultz; M.Phil., Ph.D.(Yale) (*Dept. of Psychology*)

E. Shoubridge; M.Sc., Ph.D.(Br. Col.) (*Dept. of Neurology and Neurosurgery*)

N. Sonenberg; B.Sc., M.Sc. (Tel Aviv), Ph.D. (Weizmann) (James McGill Professor) (*Dept. of Biochemistry*)

W. Sossin; B.S.(MIT), Ph.D.(Stan.) (*Dept. of Neurology and Neurosurgery*)

L. Srivastava; Ph.D.(J. Nehru) (*Dept. of Psychiatry*)

S. Stifani; D.Chem.(Rome), Ph.D.(Alta.) (*Dept. of Neurology and Neurosurgery*)

M. Sullivan; B.A.(McG.), M.A., Ph.D.(C'dia) (*Dept. of Psychology*)

G. Tannenbaum; M.Sc., Ph.D.(McG.) (*Dept. of Neurology and Neurosurgery*)

A. Thiel; Ph.D. (Cologne), M.D. (Bonn) (*Dept. of Neurology and Neurosurgery*)

D. Titone; B.A.(NYU), M.A., Ph.D.(SUNY) (*Dept. of Psychology*)

G. Turecki; M.D.(Fed. Univ. São Paulo), Ph.D.(McG.) (*Dept. of Psychiatry*)

C.-D. Walker; Ph.D.(Geneva) (*Dept. of Psychiatry*)

S.Williams; Ph.D. (Montr.) (*Dept. of Psychiatry*)

C. Wolfson; Ph.D.(McG.) (*Dept. of Epidemiology and Biostatistics*)

R.J. Zatorre; A.B.(Boston), M.Sc., Ph.D.(Brown) (*Dept. of Neurology and Neurosurgery*)

Associate Professors

P. Archambault; B.Sc.(McG.), M.Sc., Ph.D.(Montr.) (*Dept. of Physical and Occupational Therapy*)

J. Armony; Ph.D.(NYU) (*Dept. of Psychiatry*)

E. Balaban; Ph.D.(Rockefeller) (*Dept. of Psychology*)

S. Beaulieu; M.D., Ph.D., F.R.C.P.(C) (*Dept. of Psychiatry*)

G. Bernard; M.D., M.Sc. (Montr.) F.R.C.P.(C) (*Depts. of Pediatrics and Neurology and Neurosurgery*)

A. Bertone; M.A. (C'dia), M.A., Ph.D. (Montr.) (*Dept. of Educational and Counselling Psychology*)

M. Blanchette; B.Sc., M.Sc. (Montr.), Ph.D. (Wash.) (*School of Computer Science*)

V. Bohbot; Ph.D.(Ariz.) (*Dept. of Psychiatry*)

B. Brais; M.D., Ph.D. (McG.), F.R.C.P.(C) (*Depts. of Neurology and Neurosurgery and Human Genetics*)

A. Brunet; Ph.D.(Montr.) (*Dept. of Psychiatry*)

M. Cayouette; M.Sc., Ph.D.(Laval) (*Depts. of Anatomy and Cell Biology, Biology, and Experimental Medicine*)

N. Cermakian; Ph.D.(Montr.) (*Dept. of Psychiatry*)

M.J. Chacron; B.Sc., Ph.D.(Ott.) (*Dept. of Physiology*)

F. Charron; B.Sc., Ph.D.(McG.) (*Institut de Recherches Clinique de Montreal, Depts. of Anatomy and Cell Biology, Biology, and Experimental Medicine*)

Associate Professors

J.-F. Cloutier; B.Sc.(C'dia), Ph.D.(McG.) (*Depts. of Neurology and Neurosurgery, and Anatomy and Cell Biology*)

E. Cook; B.Sc.(Ariz. St.), M.Sc.(Rice), Ph.D.(Baylor) (*Dept. of Physiology*)

A. Dagher; M.Eng.(McG.), M.D.(Tor.), F.R.C.P.(C) (*Dept. of Neurology and Neurosurgery*)

B. Debruille; M.D.(Paris XI), Ph.D.(Paris VI) (*Dept. of Psychiatry*)

C. Ernst; B.Sc. (McG.), M.Sc. (Br. Col.), Ph.D. (McG.) (*Dept. of Psychiatry*)

A. Fournier; B.Sc., Ph.D.(McG.) (*Dept. of Neurology and Neurosurgery*)

I. Gold; B.A.(McG.), Ph.D.(Princ.) (*Dept. of Psychiatry*)

R. Gruber; Ph.D.(Tel Aviv) (*Dept. of Psychiatry*)

P. Haghighi; Ph.D. (McG.) (*Dept. of Physiology*)

R.D. Hoge; Ph.D.(McG.) (*Dept. of Neurology and Neurosurgery*)

R. Joober; M.D.(Tunisia), Ph.D.(McG.) (*Dept. of Psychiatry*)

D. Juncker; Dipl., Ph.D.(Neuchâtel) (*Dept. of Biomedical Engineering*)

A. Kania; Ph.D.(Baylor) (*Depts. of Biology, Anatomy and Cell Biology, and Experimental Medicine*)

M. Kokoeva; Ph.D. (Russian Acad. Of Sci.) (*Dept. of Medicine*)

S. King; B.A.(McG.), M.Ed., Ed.S.(James Madison Univ.), Ph.D.(Virginia Tech) (*Dept. of Psychiatry*)

A. Lamontagne; Ph.D.(Laval) (*School of Physical and Occupational Therapy*)

A. McKinney; Ph.D.(Ulster) (*Dept. of Pharmacology and Therapeutics*)

N. Mechawar; Ph.D.(Montr.) (*Dept. of Psychiatry*)

J. Mendola; Ph.D.(MIT) (*Dept. of Ophthalmology*)

G. Mitsis; Dipl. (Nat. T

Associate Professors

K. Steinhauer; M.Sc., Ph.D. (Free Univ., Berlin) (*School of Communication Sciences and Disorders*)

D. Stellwagen; B.Sc.(Brown), Ph.D.(Calif.) (*Dept. of Neurology and Neurosurgery*)

L. Stone; Ph.D.(Minn.) (

Assistant Professors

A. Krishnaswamy; Ph.D. (McG.) (*Dept. of Physiology*)

D. Klein; B.A., Ph.D.(Witw./S. Af.) (*Dept. of Neurology and Neurosurgery*)

E. Kobayashi; M.D., Ph.D.(Campinas State) (*Dept. of Neurology and Neurosurgery*)

L. Koski; B.Sc.(Tor.), Ph.D.(McG.) (*Dept. of Neurology and Neurosurgery*)

A. Kostikov; Ph.D.(Georgia) (*Dept. of Neurology and Neurosurgery*)

N. Ladbon-Bernasconi; M.D.(Lausanne), Ph.D.(McG.) (*Dept. of Neurology and Neurosurgery*)

G. Leonard; Ph.D.(McG.) (*Dept. of Neurology and Neurosurgery*)

J. Marcoux; M.Sc., M.D.(Montr.) (*Dept. of Neurology and Neurosurgery*)

A. Milnerwood; B.Sc. (Hertfordshire), Ph.D. (Open, UK) (*Dept. of Neurology and Neurosurgery*)

B. Misic; B.Sc., M.A., Ph.D. (Tor.) (*Dept. of Neurology and Neurosurgery*)

L. Münter; Ph.D.(Berlin) (*Dept. of Pharmacology and Therapeutics*)

S. Narayanan; B.Sc. (C'dia), M.Sc., Ph.D. (McG.) (*Dept. of Neurology and Neurosurgery*)

J. Near; B.Sc. (Qu.), Ph.D. (Western) (*Dept. of Psychiatry*)

T. Nguyen; M.D., M.Sc. (McG.), F.R.C.P.(C) (*Dept. of Psychiatry*)

T. Ohyama; Ph.D. (Baylor) (*Dept. of Biology*)

C. Paquette; B.Sc., M.Sc. (Laval), Ph.D. (McG.) (*Dept. of Kinesiology and Physical Education*)

P. Pelufo Silveira; M.D., M.Sc., Ph.D. (UFRGS) (*Dept. of Psychiatry*)

A. Peyrache; M.Sc. (ESPCI), M.Sc., Ph.D. (Paris VI) (*Dept. of Neurology and Neurosurgery*)

M. Prager-Khoutorsky; Ph.D. (Hebrew) (*Dept. of Physiology*)

M. Roig; M.Sc. (Nott.), Ph.D. (Br. Col.) (*Dept. of Physical and Occupational Therapy*)

P. Rosa-Neto; M.D., M.Sc.(UFRGS), Ph.D.(Aarhus) (*Depts. of Neurology and Neurosurgery, Psychiatry*)

D. Rudko; M.Sc. (Vic. BC), PhD (Western) (*Depts. of Biomedical Engineering, Neurology and Neurosurgery*)

J. Shah; M.D. (Tor.), F.R.C.P.(C) (*Dept. of Psychiatry*)

R. Sharif; Ph.D.(McG.) (*Dept. of Physiology*)

M. Sharp; M.D. (McG.) (*Department of Neurology and Neurosurgery*)

D. Sinclair; B.Sc., Ph.D.(Dal.) (*Dept. of Neurology and Neurosurgery*)

M. Srour; M.D.C.M. (McG.), Ph.D. (Montr.), F.R.C.P.(C) (*Depts. of Pediatrics, Neurology and Neurosurgery*)

T. Stroh; Dip.(J. Liebig Uni

12.16 Occupational Health

12.16.1 Location

Department of Epidemiology, Biostatistics and Occupational Health
Purvis Hall
1020 Pine Avenue West
Montreal QC H3A 1A2
Canada
Telephone: 514-398-6258
Email: *graduate.eboh@mcgill.ca*
Website: *www.mcgill.ca/epi-biostat-occh*

12.16.2 About Occupational Health

The Department offers two graduate degree programs: a **master's** (M.Sc.A.) and **doctoral** (Ph.D.) in occupational health sciences. The master's program is available on campus or in distance education format. Special Student status is encouraged for students who wish to take only specific occ

Note: We are not accepting applications for the Occupational Health Distance program until further notice.

Candidates should have completed, with a standing equivalent to a minimum cumulative grade point average (CGPA) of 3.0 out of 4.0, one of the requisites below:

- a Bachelor of Science degree, or its equivalent, in a discipline relevant to occupational health or hygiene such as chemistry, engineering, environmental sciences, or physics
- an M.D. (medicine)
- a B.Sc. in health sciences or nursing

Candidates should have at least three years of experience in industrial hygiene and/or in safety.

For medical doctors and nurses, priority will be given to candidates with at least three years of experience in occupational health.

Ph.D. Program

Note: We are not accepting applications for the Occupational Health Ph.D. program until further notice.

	Application Opening Dates	Application Deadlines			
	All Applicants	**Non-Canadian citizens**	**Canadian citizens/Perm. residents of Canada**	**Current McGill Students (any citizenship)**	**Special, Visiting & Exchange Students**
Fall Term:	Sept. 15	Jan. 15	Jan. 15	Jan. 15	Apr. 30
Winter Term:	Feb. 15	N/A	N/A	N/A	Sept. 10
Summer Term:	N/A	N/A	N/A	N/A	N/A

Admission to graduate studies is competitive; accordingly, late and/or incomplete applications are considered only as time and space permit.

Note: Applications for Winter/Summer term admission will not be considered, with the for

OCCH 602	(3)	Occupational Health Practice
OCCH 603	(3)	Work and Environment Epidemiology 1
OCCH 604	(3)	Monitoring Occupational Environment
OCCH 608	(3)	Biological Hazards
OCCH 612	(3)	Principles of Toxicology
OCCH 615	(3)	Occupational Safety Practice
OCCH 616	(3)	Occupational Hygiene
OCCH 617	(3)	Occupational Diseases
OCCH 624	(3)	Social and Behavioural Aspects - Occupational Health
OCCH 625	(3)	Work and Environment Epidemiology 2
OCCH 626	(3)	Basics: Physical Health Hazards
OCCH 627	(3)	Work Physiology and Ergonomics
OCCH 630	(3)	Occupational Diseases for OHNS
OCCH 635	(3)	Environmental Risks to Health

On-campus practicum may be held at the discretion of each professor. These sessions are held in Montreal on the McGill University campus. Their aim is to offer students additional specific learning activities. Participation in the practicum is an essential component of the program.

12.16.7 Doctor of Philosophy (Ph.D.) Occupational Health

This program is currently not accepting applicants.

Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

Required Courses (2 credits)

OCCH 700	(0)	Ph.D. Comprehensive Examination
OCCH 706	(2)	Ph.D. Seminar on Occupational Health and Hygiene

Students are encouraged to take up to 12 credits in areas pertinent to their specialty or in areas necessary to complete their knowledge of occupational health.

12.17 Otolaryngology – Head and Neck Surgery

12.17.1 Location

Department of Otolaryngology – Head and Neck Surgery
Jewish General Hospital
3755 Chemin de la C

12.17.2 About Otolaryngology – Head and Neck Surgery

The Master of Science degree in Otolaryngology trains otolaryngologists and physicians for clinical or basic science research in Otolaryngology – Head and Neck Surgery. Master's programs can include research on normal function and disease of head and neck structures: otology, neuro-otology, laryngology, rhinology, oncology, surgery, auditory-vestibular sciences, middle-ear modelling, oto-toxicity, genomics, infection, thyroid disease, or genetics.

section 12.17.5: Master of Science (M.Sc.) Otolaryngology (Thesis) (45 credits)

The master's program is intended for otolaryngologists or for physicians with a strong interest in otolaryngology research. Under exceptional circumstances, others (Ph.D.s, dentists, veterinarians, medical professionals, etc.) may be considered. The program addresses research questions using an interdisciplinary approach, combining methodologies of both the clinical sciences and the basic sciences. The master's program is unique in Canada and rare elsewhere. Medical professionals graduating from the program can better treat ear-nose-throat diseases; they are better positioned to do, and to evaluate, research in Otolaryngology. They typically obtain the most highly sought positions in their fields.

12.17.3 Otolaryngology Admission Requirements and Application Procedures

12.17.3.1 Admission Requirements

Admission to the M.Sc. program requires acceptance by a research supervisor, and the proposed program must be approved by the Department.

Applicants should be otolaryngologists, or they should be currently enrolled in a residency program leading to certification in Otolaryngology, or they should be physicians. Under exceptional circumstances, others (Ph.D.s, dentists, veterinarians, medical professionals, etc.) with a strong interest in Otolaryngology Research will be considered.

The results of the Test of English as a Foreign Language (TOEFL) (minimum of 86 on the Internet-based test [iBT] with each component score not less than 20 or 567 on the paper-based test [PBT]) is required for applicants to graduate studies whose mother tongue is not English, and who have not completed an undergraduate or graduate degree from a recognized foreign institution where English is the language of instruction or from a recognized Canadian institution (anglophone or francophone).

12.17.3.2 Application Procedures

McGill's online application form for graduate program candidates is available at *www.mcgill.ca/gradapplicants/apply*.

See *University Regulations & Resources* > *Graduate* > *Graduate Admissions and Application Procedures* > *: Application Procedures* for detailed application procedures.

Prospective students should contact research supervisors individually.

12.17.3.2.1 Additional Requirements

The items and clarifications below are additional requirements set by this department:

- Curriculum Vitae
- Personal Statement
- Acceptance by a research supervisor

12.17.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Department of Otolaryngology and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill departmental website; please consult the list at *www.mcgill.ca/gps/contact/graduate-program*.

12.17.4 Otolaryngology – Head and Neck Surgery Faculty

Chair

N. Sadeghi

Graduate Program Director and Director of Research

B. Segal

Director of Residency Training Program

K. Richardson

Director of Head and Neck Oncology Program

N. Sadeghi

Director of Undergraduate Medical Education

J. Young

Director of Fellowship Training

J. Rappaport

Emeritus Professor

A. Katsarkas; M.D.(Thess.), M.Sc.(Otol.)(McG.), F.R.C.S.(C)

Professors

S. Daniel; M.D.,C.M., M.Sc.(Otol.)(McG.), F.R.C.S.(C)

S. Frenkiel; B.Sc., M.D.,C.M.(McG.), F.R.C.S.(C)

K. Kost; M.D.,C.M.(McG.), F.R.C.S.(C)

N. Sadeghi; M.D.,C.M.(McG.), F.R.C.S.(C)

M.D. Schloss; M.D.(Br. Col.), F.R.C.S.(C)

Associate Professors

M. Desrosiers; M.D.(Montr.), F.R.C.S.(C)

N. Fanous; M.B., B.CH.(Cairo), F.R.C.S.(C)

W.R.J. Funnell; B.Eng., M.Eng., Ph.D.(McG.)

M. Hier; M.D.,C.M.(McG.), F.R.C.S.(C)

J. Manoukian; M.B., Ch.B.(Alex.), F.R.C.S.(C)

L. HP. Nguyen; M.D.,C.M.(McG.), M.Sc.(Otol.)(McG.), F.R.C.S.(C)

W.H. Novick; M.D.(Qu.), F.R.C.S.(C)

R. Payne; M.D.,C.M., M.Sc.(Otol.)(McG.), F.R.C.S.(C)

J. Rappaport; M.D.(Dal.), F.R.C.S.(C)

M. Samaha; M.D.(Qu.), M.Sc.(Otol.)(McG.), F.R.C.S.(C)

B. Segal; B.Sc., B.Eng., M.Eng., Ph.D.(McG.)

M. Tewfik; M.D.,C.M., M.Sc.(Otol.)(McG.), F.R.C.S.(C)

A.G. Zeitouni; M.D.(Sher.), M.Sc.(Otol.)(McG.), F.R.C.S.(C)

Assistant Professors

F. Chagnon; M.D.,C.M.(McG.), F.R.C.S.(C)

M. Duval; M.D.(Ott.), C.M., M.Sc.(Epid.)(Lond.), F.R.C.S.(C)

V.I. Forest; M.D., M.Sc.(Exp. Med.)(Laval), F.R.C.S.(C)

Assistant Professors

Y. Lacroix; M.D.(Laval), F.R.C.S.(C)

R. Lafleur; M.D.(Ott.), F.R.C.S.(C)

A. Lehmann; B.Sc.(Franche-Comté), M.Eng.(MINES ParisTech), M.Sc.(Paris VI), Ph.D.(Collège de France)

T. Mijovic; M.D.

A. Mlynarek; M.D.,C.M., M.Sc.(Otol.)(McG.), F.R.C.S.(C)

K. Richardson; M.D., F.R.C.S.(C)

J. Schwartz; M.D., F.R.C.S.(C)

G. Sejean; M.D.(Beirut), F.R.C.S.(C)

L. Tarantino; M.D.(Naples), F.R.C.S.(C)

S.D. Wurzba; D.D.S., M.Sc., Ph.D.

J. Yeung, M.D., F.R.C.S.(C)

J. Young; M.D.,C.M.(McG.), F.R.C.S.(C)

Associate Members

H.L. Galiana; B.Eng., M.Eng., Ph.D.(McG.)

M. Henry; Ph.D.(UQAM)

N.Y.K. Li; B.Sc.(HK), M.Phil.(HK)

L. Mongeau; B.Sc., M.Sc.(Montr.), Ph.D.(Penn. St.)

M. Paliouras; B.Sc.(Hons.), M.S., Ph.D.

M. Sewitch; Ph.D.

Lecturers

C. Boucher; M.D.

S. Bouhabel; M.D.

R. Caouette; M.D.

M. Campagna-Vaillancourt; M.D.

A. Finesilver; M.D.,C.M.(McG.), F.R.C.S.(C)

O. Houle; M.D.

V. Iordanescu; M.D.

M. Lalonde; M.D.

L. Monette; M.D.

L. Picard; M.D.(Montr.), F.R.C.S.(C)

J. Rothstein; M.D.,C.M.(McG.), F.R.C.S.(C)

R. Varshney; M.D., C.M., M.Sc., F.R.C.S.(C)

T.V.T. Vu; M.D.

R. Ywakim; M.D., F.R.C.S.(C)

12.17.5 Master of Science (M.Sc.) Otolaryngology (Thesis) (45 credits)

Thesis Courses (30 credits)

OTOL 690	(3)	M.Sc. Thesis 1
OTOL 691	(3)	M.Sc. Thesis 2
OTOL 692	(6)	M.Sc. Thesis 3

OTOL 693	(6)	M.Sc. Thesis 4
OTOL 694	(12)	M.Sc. Thesis 5

Required Courses (12 credits)

When appropriate, courses OTOL 602, OTOL 612, OTOL 603, or OTOL 613 may be replaced by other Basic Science or Clinical (500, 600, or 700 level) courses of relevance to Otolaryngology, as recommended or approved by the Department.

OTOL 602	(3)	Physiology, Histopathology and Clinical Otolaryngology 1
OTOL 603	(3)	Advanced Scientific Principles - Otolaryngology 1
OTOL 612	(3)	Physiology, Histopathology and Clinical Otolaryngology 2
OTOL 613	(3)	Advanced Scientific Principles - Otolaryngology 2

Complementary Course

(3-4 credits)

EPIB 507	(3)	Biostats for Health Sciences

or equivalent.

Students aiming to acquire an interdisciplinary background will be expected to take additional elective courses, at the undergraduate level if necessary.

12.18 Pathology

12.18.1 Location

Department of Pathology
Duff Medical Building
3775 University Street, Room B4
Montreal QC H3A 2B4
Canada
Telephone: 514-398-3045
Email: *gradstudies.pathology@mcgill.ca*
Website: *www.mcgill.ca/pathology*

12.18.2 About Pathology

Pathology is the specialized area of biomedical science that emphasizes the study of disease, and it is therefore one of the most multidisciplinary fields of research. Investigators in a pathology department may be utilizing information and experimental techniques originally developed in almost any area of modern biology and, in return, may contribute new knowledge of benefit to many other disciplines. Research on disease may target any of the organ systems, in normal and abnormal conditions, and studies may be conducted from a structural, functional, or molecular perspective at any level, from the intact organism down to specific components of the individual cell. Research in pathology often provides a unique link to human data, with an opportunity to translate experimental research into improved methods of diagnosis and therapy.

The Graduate Studies Program in the Department of Pathology has been designed to achieve three major goals:

1. To train students in the design, performance, interpretation and documentation of laboratory research by guiding them as they carry out a thesis project in one of the many sub-disciplines of pathology
2. To ensure that students have a comprehensive knowledge of biomedical science, with an advanced and up-to-date understanding of pathology

- immunology and transplantation;
- autoimmune disorders;
- ophthalmic pathology;
- cell biology;
- pulmonary disease;
- neurodegenerative disorders;
- smooth muscle pathophysiology; and
- gastrointestinal disease.

Modern techniques and equipment include light, fluorescence, and electron microscopy (both transmission and scanning), laser capture, flow cytometry, DNA, RNA, protein analysis, cell culture, advanced immunological, pharmacological, biochemical, and physiological techniques, as well as morphometry and computer-aided analysis.

section 12.18.5: Master of Science (M.Sc.) Pathology (Thesis) (45 credits)

Graduates can directly enter rewarding careers in research, or opt to continue with their studies and obtain a Ph.D. Some combine their research training with subsequent training in medicine, law, or business administration.

section 12.18.6: Doctor of Philosophy (Ph.D.) Pathology

Our graduates enter successful careers in industry, academia, government/international agencies, or clinical medicine, sometimes combining two of these options. They leave McGill with experience in leadership and communication skills in addition to being highly trained in biomedical research, and their career choices include a wide range of administrative and research positions around the world.

12.18.3 Pathology Admission Requirements and Application Procedures

12.18.3.1 Admission Requirements

Applicants must have a B.Sc. or an equivalent degree with an extensive background in the physical and biological sciences. An academic record equivalent to or better than a cumulative grade point average (CGPA) of 3.2 out of 4.0 at McGill is required for at least the two final full-time years of undergraduate training, with a minimum CGPA of 3.0 overall. It is an advantage if candidates have very favourable supporting letters or have demonstrated an exceptional aptitude for research. All candidates are expected to apply for scholarships and fellowships, which usually require a higher CGPA or other evidence of excellence.

Applicants to graduate studies whose native language is not English and who have not completed an undergraduate or graduate degree from a recognized foreign institution where English is the language of instruction or from a recognized Canadian institution (anglophone or francophone), must submit documented proof of competency in oral and written English. Before acceptance, appropriate exam results must be submitted directly from the TOEFL (Test of English as a Foreign Language) or IELTS (International English Language Testing Systems) Office. These applicants are usually required to take the *GRE* in order to properly evaluate their suitability.

Students are normally accepted into the M.Sc. program, and those candidates showing exceptional ability may be permitted to transfer into the Ph.D. program after one year of training.

Applicants who already possess an additional degree (M.Sc., M.D.) with appropriate research experience may be allowed to register in the Ph.D. program

12.18.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Pathology Department and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill departmental website; please consult the list at *www.mcgill.ca/gps/contact/graduate-program*.

	Application Opening Dates	Application Deadlines		
	All Applicants	**Non-Canadian citizens (incl. Special, Visiting & Exchange)**	**Canadian citizens/Perm. residents of Canada (incl. Special, Visiting & Exchange)**	**Current McGill Students (any citizenship)**
Fall Term:	Sept. 15	May 1	June 21	June 21
Winter Term:	Feb. 15	Sept. 10	Nov. 10	Nov. 10
Summer Term:	May 15	Jan. 15	April 1	April 1

Admission to graduate studies is competitive; accordingly, late and/or incomplete applications are considered only as time and space permit.

12.18.4 Pathology Faculty

Chair

Z. Gao

Director of Graduate Program

E. Zorychta

Professors

M. Auger; M.D.,C.M.(McG.), F.R.C.P.(C)

M.N. Burnier Jr.; M.D.(UFPR, Brazil), M.Sc., Ph.D.(São Paulo)

A. Ferenczy; B.A., B.Sc., M.D.(Montr.)

R. Fraser; B.Sc., M.D.,C.M.(McG.), M.Sc.(Glas.), F.R.C.P.(C)

Z. Gao; M.D., M.Sc.(Qingdao), Ph.D.(Peking), F.R.C.P.(C)

D. Haegert; M.D.(Br. Col.), F.R.C.P.(C)

Q.A. Hamid; M.D.(Mosul), Ph.D.(Lond.) (*James McGill Professor*) (*joint appt. with Medicine*)

I. Hüttner; M.D.(Budapest), Ph.D. (McG.), F.R.C.P.(C)

R.P. Michel; B.Sc., M.D.,C.M.(McG.), F.R.C.P.(C)

A. Spatz; M.Sc.(Paris XI), M.D.(Paris VI)

C.M. Telleria; Ph.D.(UNSL, Argentina)

Associate Professors

L. Alpert; M.D., Ph.D.(Tufts)

J. Arseneau; M.D.(Laval), F.R.C.P.(C)

C. Bernard; M.D.(Sher.), F.R.C.P.(C)

F. Brimo; M.D.(Damascus), F.R.C.P.(C)

S. Camilleri-Broët; M.D., Ph.D.(Paris VI)

B. Case; B.Sc., M.D.,C.M., M.Sc.(McG.), Dipl. Occ. Hyg., F.R.C.P.(C)

M.F. Chen; M.B., B.S.(Monash), F.R.C.P.(C)

M.-C. Guiot; B.Sc., M.D.(Bordeaux)

T. Haliotis; M.D.(Athens), Ph.D.(Qu.), F.R.C.P.(C)

J. Karamchandani; M.D.(Stan.)

Associate Professors

V.A. Marcus; M.D.,C.M.(McG.), F.R.C.P.(C)

R. Onerheim; M.D.(Alta.), F.R.C.P.(C)

M. Pelmus; M.D., Ph.D.(Carol Davila, Bucharest)

M. Pusztaszeri; M.D.(UNIL, Switzerland)

L. Rochon; M.D.(Sher.), F.R.C.P.(C)

I. Roy; B.Sc., M.D.,C.M.(McG.), F.R.C.P.(C)

A.K. Watters; B.Sc., M.D.,C.M.(McG.), F.R.C.P.(C)

E. Zorychta; B.Sc.(St. FX), M.Sc., Ph.D.(McG.)

Assistant Professors

O.E. Ajise; M.D., F.C.A.P., F.R.C.P.(C)

M. Alameldin; M.D.(Alexandria), F.R.C.P.(C)

S. Albrecht; M.D.(Sher.), F.R.C.P.(C)

O. Aleynikova; M.D.(Dal.), F.R.C.P.(C)

R. Amre; M.B.B.S.(KIMS), F.R.C.P.(C)

K. Bakdounes; M.D.(Damascus), F.R.C.P.(C)

M. Blumenkrantz; M.D.,C.M.(McG.), F.R.C.P.(C)

G.D. Brandao; M.D.(UFJF)

J Burnier; Ph.D.(McG.)

D. Caglar; M.D.(Gazi)

J. Chepovetsky; M.D.(Mount Sinai Sch. of Medicine, New York)

P. Fiset, M.D.,C.M, Ph.D(McG.), F.R.C.P.(C)

A. Florea; M.D.(Iuliu Ha ieganu)

L. Florianova, M.D., M.Sc.(Laval), F.R.C.P.(C)

L. Fu; M.D.,C.M., M.Sc.(McG.), F.R.C.P.(C)

A. Gregorieff; B.Sc.(Laval), M.Sc.(McG.), Ph.D.(Utrecht)

S.-M. Jung; M.D.(Chonnam Nat.)

Y. Kanber; M.D.(Marmara)

J. Lavoie; B.Sc., M.Sc., Ph.D.(Laval)

H.R. Lopez-Valle; M.D.(Univ. Autonoma, San Luis Potosi)

A.T. Marcus; B.Sc., M.D.,C.M.(McG.), F.R.C.P.(C)

V.-H. Nguyen; M.D.(Montr.), F.R.C.P.(C)

T.N.T. Nu; MD, F.R.C.P.(C)

A. Omeroglu; M.D.(Istanbul)

G. Omeroglu-Altinel; M.D.(Istanbul)

F. Razaghi; M.D.(Beheshti Univ. Medical Sciences, Tehran)

S. Sabri; Ph.D.(Paris VII)

S. Sandhu; M.B.,B.S.(N. Bengal Medical Coll.)

H. Srolovitz; B.Sc.(Pitt), M.D.(Basie)

J. St. Cyr; M.D.,C.M.(McG.), F.R.C.P.(C)

H. Wang; M.D.(China), F.R.C.P.(C)

Visiting Professors

A.S.M. Noman; Ph.D.(Aidai, Japan)

Associate Members

B. S. Abdulkarim; B.Sc.(Univeristy of Aix-Marseille-II), M.Sc.(Paris V), M.D., Ph.D.(Paris XI), F.R.C.P.(C)

C.J. Baglole; M.Sc.(PEI), Ph.D.(Calg.)

Nancy Braverman, M.S.(Sarah Lawrence College), M.D.(Tulane University), F.A.C.M.G.

Sonia Cellot, M.D., Ph.D.(Montr.)

P.J. Chauvin; M.Sc.(W.Ont.), D.D.S.(McG.)

M. Divangahi; Ph.D.(McG.)

S.N.A. Hussain; M.D.(University of Baghdad), Ph.D.(McG.)

G.O.R. Arena; M.D., Chir.Vasc.(University of Catania), F.R.C.S.(C)

N. Jabado; M.D.(Paris VI), Ph.D.(INSERM, Paris)

W. Kassouf; M.D.,C.M.(McG.), F.R.C.S.(C)

P. Metrakos; M.D.,C.M.(McG.), F.R.C.S.(C)

V. Papadopoulos; Ph.D.(Paris VI)

M. Park; Ph.D.(Glas.), F.R.S.C.

A. Schwertani; M.D.,C.M., Ph.D.(Lond.)

12.18.5 Master of Science (M.Sc.) Pathology (Thesis) (45 credits)

All students must take PATH 300 plus a course in statistics if they have not completed these requirements before admission.

Candidates with insufficient background in one of the biomedical sciences will be required to take specific courses to remedy the deficiency. These and additional courses that are relevant to the student's area of research will be chosen in consultation with the research director and Graduate Students Committee.

Thesis Courses (30 credits)

PATH 690	(9)	M.Sc. Thesis Research Project 1
PATH 691	(9)	M.Sc. Thesis Research Project 2
P 0 1 165.864 334.44H6p562 (12) c		M.Sc. Thesis Research Project 3

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

Required Courses (12 credits)

PATH 613	(3)	Research Topics in Pathology 1
PATH 614	(3)	Research Topics in Pathology 2
PATH 620	(3)	Research Seminar 1
PATH 622	(3)	Research Seminar 2
PATH 701	(0)	Comprehensive Examination - Ph.D. Candidates

Complementary Courses (9 credits)

Three 500-, 600-, or 700-level courses offered by the Department; subject to the approval of the research director and Graduate Students Committee, up to one 500-, 600-, or 700-level course may be taken in another department.

12.19 Pharmacology and Therapeutics

12.19.1 Location

Department of Pharmacology and Therapeutics
McIntyre Medical Sciences Building
3655 Promenade Sir-William-Osler, Room 1325
Montreal QC H3G 1Y6
Canada
Telephone: 514-398-3623
Fax: 514-398-2045
Email: *gradstudies.pharmacology@mcgill.ca*
Website: *www.mcgill.ca/pharma*

12.19.2 About Pharmacology and Therapeutics

The Department of Pharmacology and Therapeutics offers training leading to **M.Sc.** (Thesis) and **Ph.D.** degrees.

Pharmacology is a multidisciplinary science that deals with all aspects of drugs and their interactions with living organisms. Thus, pharmacologists study the physical and chemical properties of drugs, their biochemical and physiological effects, mechanisms of action, pharmacokinetics, and therapeutic and other uses. The Department offers broad exposure and training in both basic and clinical research in a range of areas of specialty, including:

- neuropharmacology;
- reproductive pharmacology;
- endocrine pharmacology;
- receptor pharmacology;
- cardiovascular pharmacology;
- cancer;
- developmental pharmacology;
- autonomic pharmacology;
- clinical pharmacology;
- biochemical pharmacology;
- molecular biology;
- toxicology.

The present 51 full and affiliate members of the Department have research laboratories located in the McIntyre Medical Sciences Building and in a variety of hospitals, institutes, and industry including the Douglas Hospital Research Centre, Allan Memorial Institute, Montreal Children's Hospital, Montreal

General Hospital, Montreal Heart Institute, Lady Davis Research Institute, Pfizer Canada, and MUHC Research Institute. The participation of researchers from both industry and government ensures the relevance of the Department's applications-oriented training programs.

section 12.19.5: Master of Science (M.Sc.) Pharmacology (Thesis) (45 credits)

The objective of the M.Sc. (Thesis) and Ph.D. degree training programs is to provide in-depth independent research experience in a specific area of pharmacology. The program leading to a master's degree is designed to provide students the opportunity to acquire knowledge in pharmacology, to conduct a research project, to analyze data, and to write a thesis. Students will also receive essential training in research professionalism and scientific communication.

section 12.19.6: Master of Science (M.Sc.) Pharmacology (Thesis): Environmental Health Sciences (45 credits)

The M.Sc. in Pharmacology; Environmental Health Sciences focuses on the interplay between the environment and health. Environmental health research is highly interdisciplinary; students will be given the opportunity to acquire a broad environmental perspective on exposure sciences, hazard screening methodologies, epidemiological approaches, health implications of environmental quality, and policy approaches.

section 12.19.7: Doctor of Philosophy (Ph.D.) Pharmacology

The objective of the M.Sc. (Thesis) and Ph.D. degree training programs is to provide in-depth independent research experience in a specific area of pharmacology. The program leading to a doctoral degree is designed to provide students the opportunity to acquire knowledge in pharmacology, to conduct an original research project, to analyze data, and to write a thesis. Students will also receive essential training in research professionalism and scientific communication.

section 12.19.8: Doctor of Philosophy (Ph.D.) Pharmacology: Environmental Health Sciences

The Ph.D. in Pharmacology; Environmental Health Sciences program is designed to train professionals for advanced research, teaching, and leadership positions in environmental health sciences. The Option will add a distinct focus on the interplay between the environment and health research. Students will acquire a broad environmental perspective, including exposure sciences, hazard screening methodologies, epidemiological approaches, health implications of environmental quality, and policy approaches.

12.19.3 Pharmacology and Therapeutics Admission Requirements and Application Procedures

12.19.3.1 Admission Requirements

Candidates are required to hold a B.Sc. degree in a discipline relevant to the proposed field of study; those with the M.D., D.D.S., or D.V.M. degrees are also eligible to apply. A background in the health sciences is recommended, but programs in biology, chemistry, mathematics, and physical sciences may be acceptable.

Admission is based on a student's academic record, letters of assessment, and, whenever possible, interviews with staff members. Students are required to take the Graduate Record Examination Aptitude Test (*GRE*) and the Test of English as a Foreign Language (*TOEFL*) or the equivalent, except as follows: in accordance with McGill policy, only those whose mother tongue is English, who graduated from a recognized Canadian institution (anglophone or francophone), or who completed an undergraduate or graduate degree at a recognized foreign institution where English is the language of instruction are exempt from providing proof of competency in English.

Inquiries relating to all aspects of graduate study should be directed to the *Graduate Coordinator*, Department of Pharmacology and Therapeutics, as early as possible in each academic year.

12.19.3.2 Application Procedures

McGill's online application form for graduate program candidates is available at *www.mcgill.ca/gradapplicants/apply*.

See *University Regulations & Resources* > *Graduate* >

	Application Opening Dates	Application Deadlines		
	All Applicants	**Non-Canadian citizens (incl. Special, Visiting & Exchange)**	**Canadian citizens/Perm. residents of Canada (incl. Special, Visiting & Exchange)**	**Current McGill Students (any citizenship)**
Fall Term:	Sept. 15	March 15	May 15	May 15
Winter Term:	Feb. 15	Sept. 10	Oct. 15	Oct. 15
Summer Term:	N/A	N/A	N/A	N/A

Please refer to our *website* for complete deadlines.

Admission to graduate studies is competitive; accordingly, late and/or incomplete applications are considered only as time and space permit.

12.19.4 Pharmacology and Therapeutics Faculty

Chair

G. Multhaup

Graduate Program Director

B. Robaire

Emeritus Professors

R. Capek; M.D., Ph.D.(Prague)

H.H. Zingg; M.D., Ph.D.(McG.)

Professors

D. Bernard; Ph.D.(Johns Hop.)

D. Bowie; B.Sc., Ph.D.(Lond.)

P.B.S. Clarke; M.A.(Camb.), Ph.D.(Lond.)

A.C. Cuello; M.D.(Buenos Aires), M.A., D.Sc.(Oxf.), F.R.S.C.

B.F. Hales; Ph.D.(McG.)

T. Hébert; Ph.D.(Tor.)

D. Maysinger; Ph.D.(USC)

A. McKinney; Ph.D.(Ulster)

G. Multhaup; Ph.D.(Cologne)

A. Ribeiro-da-Silva; M.D., Ph.D.(Oporto)

B. Robaire; Ph.D.(McG.)

H. Sarago

Assistant Professors

J.F. Trempe; Ph.D.(Oxf.)

Associate Members

M. Alaoui-Jamali; Ph.D.(Paris IV)

C. Baglole; Ph.D.(Calg.)

L. Diatchenko; M.D., Ph.D.(RNRMU)

L. Fellows; M.D., C.M.(McG.) Ph.D.(Oxf.)

S. Gauthier; M.D.(Montr.)

T. Geary; Ph.D.(Mich.)

B. Jean-Claude; Ph.D.(McG.)

B. Keiffer; Ph.D.(Strasbourg)

S. Kimmins; Ph.D.(Dal.)

S. Laporte; Ph.D.(Sher.)

C. O'Flaherty; Ph.D.(Buenos Aires)

P. Rosa-Neto; M.D.(Lisbon), Ph.D.(Aarhus)

S. Rousseau; Ph.D.(Laval)

Y. Shir; M.D.(Israel), Ph.D.(Johns Hop.)

L. Stone; Ph.D.(Minn.)

M. Ware; M.B.B.S.(West Indies)

T. P. Wong; Ph.D.(McG.)

Adjunct Professors

B. Allen, B. Boivin, S. Chemtob, Y. De Koninck, G. FitzHarris, J. S. Joyal, T. Sanderson

Affiliate Members

M. Boucher; Ph.D.(Montr.)

L. Breton; Ph.D.(Paris)

L. Garolalo; Ph.D.(McG.)

J. Gillard; Ph.D.(Tasmania)

J. Mancini; M.Sc., Ph.D.(McG.)

K. Meerovitch; Ph.D.(McG.)

12.19.5 Master of Science (M.Sc.) Pharmacology (Thesis) (45 credits)

The program leading to a master's degree is designed to provide students the opportunity to acquire knowledge in Pharmacology, to conduct a research project, to analyze data, and to write a thesis. Students will also receive essential training in Research Professionalism and Scientific Communication.

Thesis Courses (24 credits)

PHAR 696	(3)	Thesis Preparation
PHAR 698	(9)	Thesis Preparation 2
PHAR 699	(12)	Thesis Preparation 3

Required Courses (12 credits)

PHAR 601	(6)	Research Seminar
PHAR 609	(1)	Research Professionalism for Pharmacologists

PHAR 610	(2)	Scientific Communication for Pharmacologists
PHAR 712	(3)	Statistics for Pharmacologists

Complementary Courses (9 credits)

6 credits, from the following courses:

PHAR 503*	(3)	Drug Discovery and Development 1
PHAR 505*	(3)	Structural Pharmacology
PHAR 562	(3)	Neuropharmacology
PHAR 563	(3)	Endocrine Pharmacology

Or completion of an equivalency exam

Or an exemption granted by the Graduate Training Committee (GTC) on the basis of previous courses.

* Students may take PHAR 503 or PHAR 505 but not both.

Students who have taken these courses as part of their undergraduate degree, passed the equivalency exam, or been exempted, will register for the following course:

PHAR 697	(6)	Thesis Preparation 1

3 credits, at the 700-level PHAR course(s), or the equivalent, upon approval by the GTC.

12.19.6 Master of Science (M.Sc.) Pharmacology (Thesis): Environmental Health Sciences (45 credits)

The M.Sc. in Pharmacology; Environmental Health Sciences will focus on the interplay between the environment and health. Environmental health research is highly interdisciplinary. Students will be given the opportunity to acquire a broad environmental perspective on exposure sciences, hazard screening methodologies, epidemiological approaches, health implications of environmental quality, and policy approaches.

Thesis Courses (24 credits)

PHAR 696	(3)	Thesis Preparation
PHAR 698	(9)	Thesis Preparation 2
PHAR 699	(12)	Thesis Preparation 3

Required Courses (18 credits)

PHAR 601	(6)	Research Seminar
PHAR 609	(1)	Research Professionalism for Pharmacologists
PHAR 610	(2)	Scientific Communication for Pharmacologists
PHAR 670	(3)	Principles of Environmental Health Sciences 1
PHAR 671	(3)	Principles of Environmental Health Sciences 2
PHAR 712	(3)	Statistics for Pharmacologists

Complementary Courses (3 credits)

3 credits from the following courses:

PHAR 503	(3)	Drug Discovery and Development 1
PHAR 505	(3)	Structural Pharmacology
PHAR 562	(3)	Neuropharmacology

PHAR 563	(3)	Endocrine Pharmacology

Or completion of an equivalency exam

Or an exemption granted by the Graduate Training Committee (GTC) on the basis of previous courses.

Students who have taken these courses as part of their undergraduate degree, passed the equivalency exam, or been exempted, will register for a 3 credit, 700-level PHAR course, or the equivalent, upon approval by the GTC.

12.19.7 Doctor of Philosophy (Ph.D.) Pharmacology

Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

Required Courses (12 credits)

PHAR 609	(1)	Research Professionalism for Pharmacologists
PHAR 610	(2)	Scientific Communication for Pharmacologists
PHAR 701	(0)	Ph.D. Comprehensive Exam
PHAR 712	(3)	Statistics for Pharmacologists

Two additional 700-level PHAR courses (3 credits each), or the equivalent, upon approval by the Graduate Training Committee (GTC.)

Complementary Courses (6 credits)

6 credits, chosen from the following courses:

* Students take PHAR 503 OR PHAR 505

PHAR 503*	(3)	Drug Discovery and Development 1
PHAR 505*	(3)	Structural Pharmacology
PHAR 562	(3)	Neuropharmacology
PHAR 563	(3)	Endocrine Pharmacology

Or completion of an equivalency exam;

Or an exemption granted by the GTC on the basis of previous courses.

12.19.8 Doctor of Philosophy (Ph.D.) Pharmacology: Environmental Health Sciences

The Ph.D. in Pharmacology; Environmental Health Sciences program is designed to train professionals for advanced basic research, teaching, and leadership positions in environmental health sciences. The Option will add a distinct focus on the interplay between the environment and health research. Students will acquire a broad environmental perspective, including exposure sciences, hazard screening methodologies, epidemiological approaches, health implications of environmental quality, and policy approaches.

Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

Required Courses (15 credits)

PHAR 609	(1)	Research Professionalism for Pharmacologists
PHAR 610	(2)	Scientific Communication for Pharmacologists
PHAR 670	(3)	Principles of Environmental Health Sciences 1
PHAR 671	(3)	Principles of Environmental Health Sciences 2

Ph.D. Comprehensive Exam

section 12.20.7: Master of Science (M.Sc.) Physiology (Thesis): Chemical Biology (45 credits)

The Chemical Biology option is designed to expose students to aspects of drug design and development, as well as their application to the study of physiological and pathophysiological processes. In addition to thesis work with appropriate mentors, students will participate in lectures, seminar courses, and thematic workshops; all of which are designed to familiarize students with the current state of the field. This interdisciplinary approach will develop researchers interested in academic careers or in the pharmaceutical and biotechnology industries.

section 12.20.8: Doctor of Philosophy (Ph.D.) Physiology

- Personal Statement
- GRE and TOEFL – for applicants whose undergraduate degree is not from a North American university
- List of supervisor preferences

12.20.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Physiology Department and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the Application openi43es 3epartmental w./F1 .9804 .9216 .8431 0 .9804 .9216 .8431 0 ET1 051andtes0 0 m1 051andF1 687 l569.4andF1 687 l569.4andtes0 0 lhtio2Tw

Professors

Gergely Lukacs; M.D., Ph.D.(Budapest)

Sheldon Magder; M.D.(Tor.) (*joint appt. with Medicine*)

Jacopo P. Mortola; M.D.(Milan)

John Orlowski; B.Sc.(McG.), M.Sc., Ph.D.(Qu.) (*James McGill Professor*)

Complementary Courses (6 credits)

6 credits to be chosen from the following:

BINF 621	(3)	Bioinformatics: Molecular Biology
BMDE 652	(3)	Bioinformatics: Proteomics
BTEC 555	(3)	Structural Bioinformatics
COMP 618	(3)	Bioinformatics: Functional Genomics

12.20.7 Master of Science (M.Sc.) Physiology (Thesis): Chemical Biology (45 credits)

The Graduate Option in Chemical Biology is centered on the pursuit of an original research project under the direction of one or more program mentors. This research training is augmented by student participation in lecture and seminar courses and in a series of thematic workshops, all of which are designed to expose students to the diverse approaches and research issues that characterize the current state of the field. Students with training in this interdisciplinary approach will be highly qualified to seek careers in academic research as well as the pharmaceutical and biotechnology industries.

Thesis Courses (27 credits)

PHGY 621	(12)	Thesis 1
PHGY 622	(12)	Thesis 2
PHGY 623	(3)	M.Sc. Final Seminar

Required Courses (12 credits)

PHGY 601	(1)	M.Sc. Proposal Seminar
PHGY 602	(2)	Literature Search and Research Proposal
PHGY 604	(0)	Responsible Conduct in Research
PHGY 607	(3)	Laboratory Research 1
PHGY 608	(3)	Laboratory Research 2
PHGY 620	(3)	Progress in Research

Complementary Courses (6 credits)

3 credits from the following Chemical Biology seminars:

BIOC 610	(1)	Seminars in Chemical Biology 1
BIOC 611	(1)	Seminars in Chemical Biology 3
BIOC 689	(1)	Seminars in Chemical Biology 2
BIOC 690	(1)	Seminars in Chemical Biology 4

3 credits from the following:

Advanced Bio-Organic Chemied Tj1 0 0 1 165.864 685 Tm(Adv)Tjnfn26e 0 1 142.00840 0 1 279.41h 5HGY 602AdvA

The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

Required Courses (8 credits)

PHGY 604	(0)	Responsible Conduct in Research
PHGY 701	(0)	Ph.D. Comprehensive Examination
PHGY 703	(1)	Ph.D. Progress Seminar 1
PHGY 704	(1)	Ph.D. Progress Seminar 2
PHGY 720	(1)	Ph.D. Seminar Course 1
PHGY 721	(1)	Ph.D. Seminar Course 2
PHGY 722	(1)	Ph.D. Seminar Course 3
PHGY 723	(1)	Ph.D. Seminar Course 4
PHGY 724	(1)	Ph.D. Seminar Course 5
PHGY 725	(1)	Ph.D. Seminar Course 6

Elective Courses (9 credits)

9 credits of Physiology or Science at the 500 level or above, in consultation with the GSAAC and the candidate's supervisor.

12.20.9 Doctor of Philosophy (Ph.D.) Physiology: Bioinformatics

** This program is currently not offered. **

Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

Required Courses (11 credits)

COMP 616D1	(1.5)	Bioinformatics Seminar
COMP 616D2	(1.5)	Bioinformatics Seminar
PHGY 604	(0)	Responsible Conduct in Research
PHGY 701	(0)	Ph.D. Comprehensive Examination
PHGY 703	(1)	Ph.D. Progress Seminar 1
PHGY 704	(1)	Ph.D. Progress Seminar 2
PHGY 720	(1)	Ph.D. Seminar Course 1
PHGY 721	(1)	Ph.D. Seminar Course 2
PHGY 722	(1)	Ph.D. Seminar Course 3
PHGY 723	(1)	Ph.D. Seminar Course 4
PHGY 724	(1)	Ph.D. Seminar Course 5
PHGY 725	(1)	Ph.D. Seminar Course 6

Complementary Courses (6 credits)

6 credits to be chosen from the following courses:

BINF 621	(3)	Bioinformatics: Molecular Biology
BMDE 652	(3)	Bioinformatics: Proteomics
BTEC 555	(3)	Structural Bioinformatics

COMP 618	(3)	Bioinformatics: Functional Genomics

12.20.10 Doctor of Philosophy (Ph.D.) Physiology: Chemical Biology

The Graduate Option in Chemical Biology is centered on the pursuit of an original research project under the direction of one or more program mentors. This research training is augmented by student participation in lecture and seminar courses and in a series of thematic workshops, all of which are designed to expose students to the diverse approaches and research issues that characterize the current state of the field. Students with training in this interdisciplinary approach will be highly qualified to seek careers in academic research as well as the pharmaceutical and biotechnology industries.

Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

Required Courses (11 credits)

BIOC 610	(1)	Seminars in Chemical Biology 1
BIOC 611	(1)	Seminars in Chemical Biology 3
BIOC 689	(1)	Seminars in Chemical Biology 2
BIOC 690	(1)	Seminars in Chemical Biology 4
PHGY 604	(0)	Responsible Conduct in Research
PHGY 701	(0)	Ph.D. Comprehensive Examination
PHGY 703	(1)	Ph.D. Progress Seminar 1
PHGY 704	(1)	Ph.D. Progress Seminar 2
PHGY 720	(1)	Ph.D. Seminar Course 1
PHGY 721	(1)	Ph.D. Seminar Course 2
PHGY 722	(1)	Ph.D. Seminar Course 3
PHGY 723	(1)	Ph.D. Seminar Course 4
PHGY 724	(1)	Ph.D. Seminar Course 5

Complementary Courses (6 credits)

6 credits from the following:

CHEM 502	(3)	Advanced Bio-Organic Chemistry
CHEM 503	(3)	Drug Discovery
PHAR 503	(3)	Drug Discovery and Development 1

12.21 Psychiatry

12.21.1 Location

Department of Psychiatry
1033 Pine Avenue West
Montreal QC H3A 1A1
Canada
Telephone: 514-398-4176
Fax: 514-398-4370
Email: *graduate.psychiatry@mcgill.ca*
Website: *www.mcgill.ca/psychiatry*

12.21.2 About Psychiatry

McGill University's Department of Psychiatry is one the most prestigious in the world. In the 1950s and 60s, Heinz Lehmann conducted the first North American clinical trials for antipsychotic and antidepressant medications. Theodore Sourkes identified the core neurobiological features of Parkinson's disease, and Eric Wittkower and Jack Fried brought together scholars from Anthropology and Psychiatry to create Transcultural Psychiatric Studies. Since then, faculty members and graduate students continue outstanding research in addictions; Alzheimer's and childhood disorders; eating, personality, and mood disorders; stress; trauma; and psychosis. The work is conducted in people and animal models, and also benefits from expertise ranging from neuroimaging and epigenetics to mental health services and public policy. Our work remains at the cutting edge of research on health, disease, and recovery.

section 12.21.5: Master of Science (M.Sc.) Psychiatry (Thesis) (45 credits)

The graduate program in Psychiatry is designed to provide advanced research training in the basic, applied, and social sciences relevant to issues in psychiatry. Applicants are admitted from a wide range of backgrounds, including undergraduate degrees in relevant areas (e.g., psychology, neuroscience, sociology, medical anthropology, nursing, and medicine), and those who are pursuing their psychiatry residency at McGill. Most, though not all students, continue to a Ph.D. program. The graduate program does not provide clinical training.

12.21.3 Psychiatry Admission Requirements and Application Procedures

12.21.3.1 Admission Requirements

- A B.Sc., B.A., B.N., or M.D. degree
- A strong background in science and/or social science, as demonstrated by academic achievement equivalent to a GPA of 3.3 (on a 4-point scale) or 3.5 in the last two years
- A written agreement from the proposed research supervisor, and student's statement of purpose for seeking an M.Sc.
- An outline of the proposed thesis research, to be written by the prospective student in collaboration with an appropriate research supervisor
- Two letters of reference
- Sufficient funding to support their studies
- *TOEFL* or *IELTS* certificate of proficiency in English for non-Canadian applicants whose mother tongue and language of education is not English, with a minimum score of 86 on the TOEFL Internet-based test (iBT; or 550 on the paper-based test [PBT]), with each component score not less than 20, or 6.5 on the IELTS test

12.21.3.2 Application Procedures

McGill's online application form for graduate program candidates is available at *www.mcgill.ca/gradapplicants/apply*.

See *University Regulations & Resources* > *Graduate* > *Graduate Admissions and Application Procedures* > *: Application Procedures* for detailed application pWeesdures.

12.21.3.2.1 Additional Requirements

The items and clarifications below are additional requirements set by this department:

- Personal Statement – describing the specific reasons for seeking a Master of Science degree in Psychiatry
- Letters of Reference – with Applicant Evaluation checklist forms (see Department *website*)
- Written Confirmation of Supervision form (see Department *website*) from the proposed research supervisor

12.21.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Department of Psychiatry and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill departmental website; please consult the list at *www.mcgill.ca/gps/contact/graduate-program*.

Application Opening Dates	Application Deadlines	
	C AApplica(es)Tj/F1 8.1 Tf1 0 0 59-0.0C1 1 135.0 42 TMcGill Students (any : Gr:	**Current McGill Students (any citizenship)**

iBTesA

Admission to graduate studies is competitive; accordingly, late and/or incomplete applications are considered only as time and space permit.

12.21.4 Psychiatry Faculty

Chair
G.

Professors

M. Leyton; Ph.D.(C'dia) (*William Dawson Scholar*)

G. Luheshi; Ph.D.(Newcastle, UK)

A. Malla; M.B.B.S.(Panjab)

M.J. Meaney; B.A.(Loyola), M.A., Ph.D.(C'dia) (*James McGill Professor*)

V.N.P. Nair; M.B., B.S.(Kerala), D.P.M.(Mys.)

R. Palmour; B.A., Ph.D.(Texas)

J.C. Perry; M.D.(Duke)

R.O. Pihl; B.A.(Lawrence), Ph.D.(Ariz.) (*Psychology*)

J. Poirier; Ph.D.(Montr.)

R. Quirion; M.Sc., Ph.D.(Sher.)

C. Rousseau; M.Sc.(McG.), M.D.,C.M.(Sher.)

L.K. Srivastava; B.Sc., M.Sc.(Allahabad), Ph.D.(J. Nehru)

H. Steiger; Ph.D.(McG.)

B. Thombs; B.A.(N'western), M.A.(Ariz.), Ph.D.(NYU)

G. Turecki; M.Sc., M.D.,C.M., Ph.D.(McG.) (*William Dawson Scholar*)

C.-D. Walker; B.Sc., Ph.D.(Geneva)

A. Young; B.A., M.A., Ph.D.(Penn.)

Associate Professors

L. Amirali; M.D.(Athens)

J. Armony; B.Sc.(Buenos Aires), M.Sc., Ph.D.(NYU)

P. Assalian; Dip.Psychol.(McG.), M.B.,Ch.B.(Cairo)

S. Beaulieu; M.D./Ph.D.(Laval)

M. Berlim; M.Med., M.D.(Rio Grande do Sul)

V. Bohbot; B.A.(McG.), M.A., Ph.D.(Ariz.)

M.J. Brouillette; M.D.,C.M.(Sher.)

N. Casacalenda; M.D.(Sher.), F.R.C.P.

E. Chachamovich; M.D.(Rio Grande do Sul), Ph.D.(Edin.)

D. Charney; M.D.,C.M.(McG.)

J.B. Debruille; M.D.(Paris XI), Ph.D.(Paris VI)

D. Dunkley; B.Sc.(Tor.), Ph.D.(McG.)

F. Elgar; M.Sc.(Nfld.), Ph.D.(Dal.)

P. Étienne; M.D.(Liege)

C. Fichten; B.Sc.(McG.), M.Sc.(C'dia), Ph.D.(McG.)

D. Frank; Dip.Psychol., M.D.,C.M.(McG.)

R. I. Fraser; M.D.(Dal.)

M.-C. Geoffroy; Ph.D.(Montr.)

K.G. Gill; B.Sc.(Br. Col.), M.A., Ph.D.(C'dia)

G. Gobbi; M.D.(Rome), Ph.D.(Cagliari)

I. Gold; Ph.D.(Princ.)

A. Granich; M.D.(McG.), F.R.C.P.

B. Greenfield; M.D.(Wash.)

Associate Professors

N. Grizenko; M.D.,C.M.(Sher.)

D. Groleau; B.Sc., M.Sc., Ph.D.(Montr.)

R. Gruber; B.A., M.S., Ph.D.(Tel Aviv)

K. Igartua; M.D.,C.M.(McG.), F.R.C.P.(C)

M. Israël; B.Sc., Gr.Dip.Psych.(McG.), M.A.(Qu.), M.D.,C.M.(McG.)

E. Jarvis; M.D.(Alta.), M.Sc.(McG.), F.R.C.P.

T. Kolivakis; M.D.(Athens)

K. Looper; B.Sc., M.D.(Ott.), M.Sc.(McG.)

O. Mantere; M.D.(Helsinki)

H.C. Margolese; M.D.(McG.), C.M., M.Sc.

N. Mechawar; B.Sc., M.Sc., Ph.D.(Montr.)

R. Montoro; M.D.,C.M., M.Sc., F.R.C.P.(C)

G. Myhr; M.D.,C.M., M.Sc.(McG.)

L. Nadeau; M.D.(Montr.)

J. Naiman; B.A., M.D.,C.M.(McG.)

J. Palacios-Boix; M.D., F.R.C.P.(C)

J. Pecknold; B.Sc.(C'dia), M.D.,C.M.(McG.)

M. Perreault; Ph.D.(Montr.)

A. Propst; B.Sc., Dip.Psychol., M.D.,C.M.(McG.)

M.N. Rajah; B.Sc., M.A., Ph.D.(Tor.)

R.A. Ramsay; B.Sc., Gr.Dip.Psychiat., M.D.,C.M.(McG.)

A. Raz; M.Sc., Ph.D.(Hebrew)

J. Renaud; M.Sc., M.D.(Montr.)

S. Renaud; M.D.(Laval)

B.M. Robertson; Dip.Psychol.(McG.), M.B.,Ch.B.(Otago)

J. Rochford; M.A.(Qu.), Ph.D.(C'dia)

P. Rosa; M.D.(Rio Grande do Sul), Ph.D.(Aarhus)

Z. Rosberger; Ph.D.(C'dia)

M. Ruiz Casares Yebenes; Ph.D.(Cornell)

R. Russell; M.D.(McG.)

N. Schmitz; Dipl., Ph.D.(Univ. Dortmund)

S. Singh; M.D.(Calg.), F.R.C.P.

D. Sookman; B.A.(McG.), M.A.(Guelph), Ph.D.(C'dia)

W. Steiner; M.D.,C.M.(McG.)

F.K. Storch; M.Sc.(Munich), Ph.D.(Max Planck Inst. Biochem.)

B. Suranyi-Cadotte; B.Sc., M.Sc.(McG.), M.D.,C.M.(Montpellier)

A. Wazana; B.A.(McM.), M.Sc.(Col.), M.Sc.(McG.), M.D.(McM.)

S. Williams; Ph.D.(Montr.)

G. Wiviott; B.Sc.(Wisc.), Gr.Dip.Psychiat.(McG.), M.D.,C.M.(NYU)

T.P. Wong; B.Sc., M.Ph.(HK), Ph.D.(McG.)

P. Zelkowitz; Ph.D.(McG.)

M. Zoccolillo; B.Sc.(New Orleans), M.D.(Norfolk)

Assistant Professors

E. Foley; B.Sc.(Tor.)

J. Friedland; M.D.(Calg.)

M. Gauthier; M.D.,C.M.(Montr.)

K. Geagea; M.D.,C.M.(SJU)

J. Glass; B.A.(Boston), M.D.,C.M.(McG.)

K. Goddard; M.D.,C.M.(Manit.)

M. Grignon; B.A.(Montr./Ott.), M.A.(Ott.)

P. Habib; M.D.(Beirut Med. Sch.)

B. Hayton; B.A.(Williams), M.D.,C.M.(McG.)

L. Hoffman; M.D.(McG.)

F. Ianni; B.Sc.(McG.), M.D.,C.M.(Montr.)

H. Iskandar; Dip.Psychol.(McG.), M.B.,Ch.B.(Alexandria)

S. Iyer; M.A.(Mumbai), Ph.D.(Nebraska–Lincoln)

C. Jolicoeur; M.D.,C.M.(Laval)

J. Joly; M.D.,C.M.(McG.)

M. Kapuscinska; M.D.,C.M.(Medical U. Gdansk)

S. Karama; Ph.D.(Montr.)

M. Koch; M.D.(McM.)

T. Kolivakis; M.D.(Athens)

R. Kronick; M.D.(McG.)

R. Kuyumjian; M.D.,C.M.(McG.)

P. Lageix; B.Sc., M.D.,C.M.(Paris IV)

M. Laporta; Dip.Psychol., M.D.,C.M.(McG.)

L. Laporte; B.A.(McG.), M.Psychol., Ph.D.(Montr.)

M. Lashley; Ph.D.(McG.)

J.D. Leccia; M.D.(Provence Aix-Marseille)

E. Levy; Gr.Dip.Psychiat.(McG.), M.Ed.(Sher.)

E. Libman; B.A., M.Sc., Ph.D.(McG.)

E. Lizondo; M.D.,C.M.(Nat. Univ. Central Buenos Aires)

N.C.P. Lo

Assistant Professors

T. V. Nguyen; M.D.

K. O'Donnell; Ph.D.(Imp. Coll. Lon.)

J.A. O'Neil; B.A.(C'dia), Dip.Psychol., M.D.,C.M.(McG.)

M. Piat; Ph.D.(Laval)

L. Pinard; M.D.(Montr.), F.R.C.P.(C)

Z. Prelevic; Dip.Psychol.(McG.), M.D.,C.M.(Belgrade)

A. Propst; M.D.

M. Rabinovitch; B.Sc., M.D.,C.M.(McG.)

S. Rej; M.D., M.Sc.(McG.)

S.B. Rosenbloom; B.A.(C'dia), M.A.(York)

C. Roy; B.Sc.(McG.), M.D.,C.M.(Dal.)

T. Said; B.Sc.(McG.), M.D.,C.M.(Sher.)

H. Schwartz; M.D.(McG.)

M. Segal; B.A.(C'dia), B.Sc.(O.T.)(McG.), M.D.,C.M.(Ott.)

J. Seguin; B.A., B.Sc., M.D.,C.M.(Ott.)

T. Semeniuk; B.Sc., M.Ed., M.D.,C.M.(Alta.)

J. Shah; M.Sc.(Lond.), M.D.(Tor.)

O. Sidhom; M.D.

M. Sigman; B.A.(McG.), M.A., Ph.D.(C'dia)

P.P. Silveira; M.D., Ph.D.

I. Spector; B.A.(McG.), M.Sc., Ph.D.(Syrac.)

K.A. Steger; M.D., Ph.D.(Texas, Southwest. Med. Cent.)

A. St-Hilaire; M.Sc.(McG.), Ph.D.(Ohio)

M. St-Laurent; M.D.(Montr.)

N. Szkrumelak; B.Sc., M.D.,C.M.(McG.)

K. Tabbane; M.D., Ph.D.(Tunisia)

M. Temple; M.D.

P. Tetreault; M.D.,C.M.(Sher.)

L. Thaler; Ph.D.(Nevada)

Z. Thomas; M.D.(McG.)

L. Tourian; M.D.(McG.)

A. Traicu; M.D.(McG.)

J. Tremblay; B.A.(Montr.), M.Sc.(McG.), M.D.,C.M.(Montr.)

J. Guimezap Tsopmo; M.D.(Laval)

S. Veissière; Ph.D.(Mc.G.)

S. Vida; B.Sc.(Ott.), M.D.,C.M.(McG.)

S. Villeneuve; Ph.D.(Montr.)

J. Vogel; M.D.,C.M.(Manit.)

R. Whitley; B.S., M.S., Ph.D.(Lond.)

M.A. Wolf; M.Sc., M.D.,C.M.(Strasbourg)

Y. Wolf; M.D.(McG.)

G. Zahirney; M.D.(McG.)

Assistant Professors

T.Y. Zhang; Ph.D.(McG.)

V. Zicherman; B.Sc., M.D.,C.M.(McG.)

D. Zigman; M.D.(McG.)

E. Zikos; M.D.(Montr.)

Lecturers

F. Amdiss, N. Beauchemin, T

Telephone: 514-934-1934, ext. 42837
Email: *gradstudies.surgery@mcgill.ca*
Website: *www.mcgill.ca/experimentalsurgery*

12.22.2 About Experimental Surgery

Experimental Surgery offers graduate-level training leading to an **M.Sc.** or a **Ph.D.** degree. At the master's level, in addition to the core program, those who are interested have a new opportunity to choose a concentration in Surgical Innovation, Surgical Education, or Global Surgery. The Experimental Surgery Department is responsible for the administration of the graduate programs and allows excellent opportunities for training under the supervision of professors located in the Research Institute of the McGill University Health Centre or other McGill teaching hospitals. The scope of the research and close connections with other Montreal research centres and McGill departments provide ample opportunities for collaboration. Research in the Department covers a wide spectrum, including injury, repair, recovery, tissue engineering, transplantation, fibrosis, cancer and stem cell biology, biomechanics, organ failure, surgical stimulation, surgical innovation, education, and evaluative/outcomes research.

A list of research directors and their research topics is available on our *website*.

section 12.22.5: Master of Science (M.Sc.) Experimental Surgery (Thesis) (45 credits)

The M.Sc. core program is intended for students wishing to pursue careers in academia, the medical field, or industry. Thesis projects available in the various laboratories of the Department are multidisciplinary and ensure that students are exposed to a broad spectrum of research projects and experimental approaches. Students who have achieved superior progress in their research have the option to transfer to the Ph.D. program, waiving the M.Sc. thesis submission.

section 12.22.6: Master of Science (M.Sc.) Experimental Surgery (Thesis): Global Surgery (45 credits)

This concentration emphasizes healthcare needs specifically within the surgical field in resource-limited settings. It comprises three main pillars: research, education, and mentorship. Through extensive research work, students will participate in the design and implementation of innovative approaches in surgical care and injury surveillance, advancing the surgical capacities in low- and middle-income countries. Students will also participate in global surgical endeavors allowing professionals from partner countries and Canada to engage in a learning and knowledge transfer experience through training and courses. Students choosing this option will have the opportunity to engage in international projects and orient their work depending on their research interest (i.e., health economics, injury epidemiology, etc.) aligned with the Centre for Global Surgery's (CGS) mission.

section 12.22.7: Master of Science (M.Sc.) Experimental Surgery (Thesis): Surgical Education (45 credits)

This concentration provides a foundation in surgical education practice and research. The program highlights the unique teaching and learning environment of surgery coupled with a basis in educational theory, curricular design, and implementation. A major emphasis of this program is surgical educational research with the elaboration, designs, implementation, and analysis of a research project founded in best practices of educational research. The research project may encompass, but is not limited to, surgical stimulation, technical skills acquisition, surgical technology, and assessment.

section 12.22.8: Master of Science (M.Sc.) Experimental Surgery (Thesis): Surgical Innovation (45 credits)

This concentration is intended for residents interested in developing new devices and software solutions for surgical needs, as well as non-clinician trainees with a passion for healthcare technology. The program allows for a hands-on learning experience for students to develop skills necessary to work within multidisciplinary teams in the creation of novel, needs-driven and marketable prototypes used in development of novel surgical and medical devices. As such, participants work in these teams to identify clinical needs and to innovate solutions to them.

section 12.22.9: Master of Science (M.Sc.) Experimental Surgery (Non-Thesis) (45 credits)

This is a graduate level training program in fundamentals of modern surgical research. The program is based primarily on academic course work and short projects. It is designed to be flexible and provide students the opportunity to gain knowledge in various surgical core disciplines while allowing training opportunities in more specific areas such as global surgery, innovation, education or as the interest of the students dictates.

section 12.22.10: Doctor of Philosophy (Ph.D.) Experimental Surgery

The doctoral program is intended for students with excellent academic standing who wish to pursue research-focused careers in academia, the medical field, or industry. Thesis projects, available in the various laboratories of the Department, ensure that students receive in-depth training and exposure to varied conceptual frameworks and a wide array of experimental strategies.

section 12.22.11: Graduate Certificate (Gr. Cert.) Surgical Innovation (15 credits)

The centre of this graduate program is two innovation courses (EXSU 620 and EXSU 621) delivered by the McGill Department of Surgery. The first semester of the program focuses on team building and, supported by lectures, the students embark on a needs-finding process by observing all aspects of clinical activity in their focus themes. The trainees learn basic prototyping skills, start-up organization, and project management. This is supplemented by a basic statistics course and an introduction to the current status of biomedical research innovation. This certificate then gives a solid non-thesis-

section 12.22.12: Graduate Diploma (Gr. Dip.) Surgical Innovation (30 credits)

The cores of this program are two-fold. Firstly, two innovation courses are offered by the McGill Department of Surgery, Experimental Surgery (EXSU 620 Surgical Innovation 1 and EXSU 621 Surgical Innovation 2) and supporting courses are delivered by the McGill Department of Surgery with some sessions in those courses provided by external partners, Local Industry (Regulatory & IP), the John Molson School of Business (JMSB) (lean start-up), Concordia University (software design), and *L'École de technologie supérieure* (ETS) (prototyping). Secondly, fundamental business and management courses are taken concurrently provided by Continuing Studies (McGill) and JMSB and reinforce the innovation project team experience.

12.22.3 Experimental Surgery Admission Requirements and Application Procedures

12.22.3.1 Admission Requirements

M.Sc. Core Program

Usually a B.Sc., M.D., or D.V.M. degree is required, with a minimum CGPA of 3.2/4.0. Applications will be accepted from candidates sponsored by a research supervisor willing to provide laboratory space, funding, and direction for their research work.

M.Sc. Concentrations

Generally a B.Sc. in biological, biomedical and life science; physical science; computer science; an M.D. degree; or a B.Eng. is required. Exceptionally, on a case-by-case basis, an applicant holding a B.Com.; B.C.L./LL.B.; or B.A. or B.Sc. in humanities and social sciences will be considered. An applicant must have a minimum CGPA of 3.2/4.0.

Ph.D. Program

Admission is usually through one of the M.Sc. programs, either upon completion of the M.Sc. degree, or by transfer from the first year of M.Sc. to the second year of Ph.D. studies, within the Department. Request for such transfer is to be made in writing by the thesis supervisor during the candidate's first year of M.Sc. studies. A candidate for transfer must submit an application to the doctoral program according to normal procedures and deadlines. **Transfer is granted on the basis of an examination administered by the student's Research Advisory Committee.** Exceptional students with a minimum 3.5/4.0 CGPA may apply directly to the Ph.D. program.

Students with an M.Sc. degree from other departments or from other recognized universities whose M.Sc. topic is closely related to the subject of their Ph.D. research may be admitted directly into the Ph.D. program, at the level of Ph.D. 2, at the discretion of the Department. Exceptional students with a master's degree unrelated to their proposed research may be admitted to Ph.D. 1.

Graduate Certificate and Graduate Diploma

Generally a B.Sc. in biological, biomedical and life science; physical science; computer science; an M.D. degree; or a B.Eng. is required. Exceptionally, on a case-by-case basis, an applicant holding a B.Com.; B.C.L./LL.B.; or B.A. or B.Sc. in humanities and social sciences will be considered. An applicant must have a minimum CGPA of 3.2/4.0.

12.22.3.2 Application Procedures

McGill's online application form for graduate program candidates is available at *www.mcgill.ca/gradapplicants/apply*.

See *University Regulations & Resources* > *Graduate* > *Graduate Admissions and Application Procedures* > *: Application Procedures* for detailed application procedures.

12.22.3.2.1 Additional Requirements

The items and clarifications below are additional requirements set by this department:

- Curriculum Vitae
- Research Project Proposal
- Confirmation of Supervisor
- Memorandum of Agreement
- Tuition Assistance

Additional Requirements for the Concentrations in Surgical Education and Surgical Innovation

- Letter of Intent – A letter of intent from the students describing their reasons for pursuing the concentration of their choice, what their qualifications are, and why they should be accepted.
- Interview session – Students applying to the concentration in Surgical Education or in Surgical Innovation may be requested to attend an interview session either in person, by phone, or via Skype.

Application Dates and Deadlines

	Application Opening Dates	Application Deadlines		
	All Applicants	**Non-Canadian citizens (incl. Special, Visiting & Exchange)**	**Canadian citizens/Perm. residents of Canada (incl. Special, Visiting & Exchange)**	**Current McGill Students (any citizenship)**
Fall Term:	Sept. 15	April 30	June 15	June 15
Winter Term*:	Feb. 15	Sept. 1	Nov. 1	Nov. 1
Summer Term:	N/A	N/A	N/A	N/A

* *Application to the Graduate Certificate in Surgical Innovation is only available for the Fall term.*

Admission to graduate studies is competitive; accordingly, late and/or incomplete applications are considered only as time and space permit.

12.22.4 Surgery, Experimental Faculty

Director

A. Philip

Associate Director

L. Haglund

Professors

J. Antoniou; M.D.,C.M., Ph.D.(McG.), F.R.C.S.(C)

A. Aprikian; M.D.(Sher.), F.R.C.S.(C)

J. Barkun; M.D., M.Sc.(McG.)

J. Barralet Beng; Ph.D.(Lond.)

P. Brodt; B.Sc.(Bar-Ilan), M.Sc.(Ott.), Ph.D.(McG.)

S. Chevalier; B.Sc., M.Sc., Ph.D.(Montr.)

P. Chan; M.D.,C.M., M.Sc.(McG.), F.R.C.S.(C)

M.M. Elhilali; M.B., B.Ch., D.S., DU, M.Ch.(Cairo), Ph.D.(McG.)

S. Emil; M.D.,C.M.(McG.), F.R.C.S.(C)

L. Feldman; M.D.,C.M., M.Sc.(McG.)

L. Ferri; M.D.,C.M., M.Sc.(McG.)

G.M. Fried; B.Sc., M.D.,C.M.(McG.)

P.H. Gordon; M.D.(Sask.)

R. Hamdy; M.Sc., M.D.(Egypt), F.R.C.S.(C)

E. Harvey; B.Sc.(Ont.), M.D.,C.M., M.Sc.(McG.)

T.E. Hebert; Ph.D.(Tor.)

J.E. Henderson; Ph.D.(McG.)

J.M. Laberge; M.D.(Laval)

S. Meterissian; M.D.,C.M., M.Sc.(McG.)

P. Metrakos; B.Sc., M.D.(McG.), F.R.C.S.(C)

D.S. Mulder; M.D.(Sask.), M.Sc.(McG.)

A. Philip; M.Sc., Ph.D.(McG.)

L. Rosenberg; M.Sc., M.D., Ph.D.(McG.)

D. Shum-Tim; M.Sc., M.D.,C.M.(McG.)

R. St. Arnaud; Ph.D.(Laval)

Professors

T. Taketo-Hosotani; B.Sc., M.Sc., Ph.D.(Kyoto)

M. Tanzer; M.D.,C.M.(McG.), F.R.C.S.(C)

C.I. Tchervenkov; B.Sc., M.D.,C.M.(McG.), F.R.C.S.(C)

J.I. Tchervenkov; M.D.,C.M.(McG.), F.R.C.S.(C)

R. Turcotte; M.D.(Montr.)

Associate Professors

M. Basik; M.D.,C.M., M.Sc.(McG.)

S. Bergman; M.Sc., M.D.,C.M.(McG.), F.R.C.S.(C)

O. Blaschuk; B.Sc.(Winn.), M.Sc.(Manit.), Ph.D.(Tor.)

R. Cecere; M.D.,C.M., B.Sc.(McG.), F.R.C.S.(C), A.B.S., F.A.C.S.

D. Fleiszer; B.Sc., M.D.,C.M.(McG.)

S. Fraser; B.Sc., M.D.(Tor.), M.Sc.(McG.), F.R.C.S.(C)

M. Gilardino; M.D.,C.M., M.Sc.(McG.), F.R.C.S.(C), F.A.C.S.

L. Haglund; B.Sc., Ph.D.(Lunds)

K.J. Lachapelle; M.Sc., M.D.,C.M.(McG.)

J. Lapointe; M.D., Ph.D.(Laval)

Associate Members

J.C. Chen

F. Cury

C.E. Ferland-Legault

P. Goldberg

A. Gursahaney

J. Henderson

D. Juncker

S. Komarova

J.J. Lebrun

N.M. Makhoul

S. Mayrand

M. Murshed

P.H-N. Nguyen

S. Prakash

L.A. Stein

M. Tabrizian

B.M. Willie

Professor of Practice

S. Arless; B.Sc.(McG.)

12.22.5 Master of Science (M.Sc.) Experimental Surgery (Thesis) (45 credits)

The M.Sc. in Experimental Surgery offers a graduate-level training program in experimental surgery, leading to a Master's degree. This program allows for a hands-on learning experience for students to develop skills necessary to work within multidisciplinary teams in the creation of novel, needs driven, and marketable prototypes used in development of novel surgical and medical devices. As such participants work in multidisciplinary teams. The program offers both specialized and broad-based training through the use of the most recent techniques in molecular biology, biochemistry, pharmacology, physiology, pathologyThe is CorTss i(30credits)

Complementary Courses (6 credits)

6 credits, taken from 500, 600, or 700 level courses in consultation with the Research Advisory Committee.

Depending on their individual background, students may be asked by their Research Supervisory Committee to take additional courses.

12.22.6 Master of Science (M.Sc.) Experimental Surgery (Thesis): Global Surgery (45 credits)

The M.Sc. in Experimental Surgery, Concentration in Global Surgery, emphasizes health care needs specifically within the surgical field in resource-limited settings. It comprises three main pillars: research, education, and mentorship. Through extensive research work, students will participate in the design and implementation of innovative approaches in surgical care and injury surveillance, advancing the surgical capacities in low and middle income countries. Students will also participate in global surgical endeavors allowing professionals from partner countries and Canada to engage in a learning and knowledge transfer experience through training and courses. Students choosing this option will have the opportunity to engage in international research projects including injury epidemiology surveillance and assessment of surgical access through the study of databases.

3 credits from the following:

EDPE 575	(3)	Statistics for Practitioners
EDPE 637	(3)	Issues in Health Professions Education
EXSU 606	(3)	Statistics for Surgical Research

And:

6 credits, taken from 500-, 600-, or 700-level courses in consultation with the Research Advisory Committee.

Depending on their individual backgrounds, students may be asked by their Research Advisory Committee to take additional courses.

12.22.8 Master of Science (M.Sc.) Experimental Surgery (Thesis): Surgical Innovation (45 credits)

The M.Sc. in Experimental Surgery, Concentration in Surgical Innovation, offers graduate-level training program in experimental surgery, leading to a Master's degree. This concentration allows for a hands-on learning experience for students to develop skills necessary to work within multidisciplinary teams in the creation of novel, needs driven, and marketable prototypes used in development of novel surgical and medical devices. As such participants work in multidisciplinary teams to identify clinical needs and to innovate solutions to them.

Thesis Courses (30 credits)

EXSU 690	(4)	M.Sc. Research 1
EXSU 691	(4)	M.Sc. Research 2
EXSU 692	(4)	M.Sc. Research 3
EXSU 693	(18)	M.Sc. Thesis

Required Courses (12 credits)

EXSU 619	(3)	The Hospital Environment
EXSU 620	(3)	Surgical Innovation 1
EXSU 621	(3)	Surgical Innovation 2

And:

3 credits from the following:

EDPE 575	(3)	Statistics for Practitioners
EPIB 507	(3)	Biostats for Health Sciences
EXSU 606	(3)	Statistics for Surgical Research

Complementary Courses (3 credits)

3 credits taken from 500-, 600-, or 700- level courses in consultation with the Research Advisory Committee.

Depending on their individual background, students may be asked by their Research Supervisory Committee to take additional courses.

12.22.9 Master of Science (M.Sc.) Experimental Surgery (Non-Thesis) (45 credits)

This M.Sc. in Experimental Surgery (Non Thesis) offers a graduate level training program in core fundamentals of modern surgical research. The program is based primarily on academic course work and short projects. It is designed to be flexible and provide students the opportunity to gain core disciplines whilst allowing training opportunities in more specific areas such as global surgery, innovation, education, or as the interest of the students dictates. The individual research interests of the faculty cover a wide spectrum, from injury, repair, recovery, tissue engineering, transplantation, fibrosis, cancer and stem cell biology, biomechanics, and organ failure, to surgical simulation, surgical innovation, education, and evaluative/outcomes research. Importantly, the project(s) is performed in a collaborative spirit with basic and clinician scientists working together using interdisciplinary approaches to solve the most challenging problems in the field of surgery. Upon graduation, students will have acquired core skills on statistics, knowledge management, biomedical research, epidemiology as well as education, global surgery, and innovation.

Required Courses (24 credits)

EXSU 500	(3)	Artificial Intelligence in Medicine

EXSU 601	(3)	Knowledge Management 1
EXSU 602	(3)	Knowledge Management 2
EXSU 622D1	(6)	Surgery Research Project 1
EXSU 622D2	(6)	Surgery Research Project 1

And:

3 credits from:

EDPE 575	(3)	Statistics for Practitioners
EPIB 507	(3)	Biostats for Health Sciences
EXSU 606	(3)	Statistics for Surgical Research

Complementary Courses (15 credits)

3 credits selected from:

EXSU 603	(3)	Skills Acquisition and Performance
FMED 525	(3)	Foundations of Translational Science

6 credits selected from:

EDPE 637	(3)	Issues in Health Professions Education
EDPH 689	(3)	Teaching and Learning in Higher Education
EPIB 521	(3)	Regression Analysis for Health Sciences
EXSU 505	(3)	Trends in Precision Oncology
		Surgical Innovation 1

EXMD 610	(3)	Molecular Methods in Medical Research
EXSU 605	(3)	Biomedical Research Innovation
EXSU 620	(3)	Surgical Innovation 1
EXSU 621	(3)	Surgical Innovation 2
EXSU 623	(6)	Surgery Research Project 2
EXSU 684	(3)	Signal Transduction
FMED 619	(3)	Program Management in Global Health & Primary Health Care
PHGY 5176)	(3)	Artificial Internal Organs

EXSU 619	(3)	The Hospital Environment Surgical Innov

6 credits at the 500 lever or higher, taken in consultation with the program director/adviser.

Some courses may be substituted with equivalents at the 500 level or higher if timetabling or background of the student requires it, e.g., prior qualification in accounting.