Faculty of Medicine (Graduate)

Programs, Courses and University Regulations

2018-2019

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

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1 Dean©sWelcome

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 9,000 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*

8.1 Postdocs

Postdocs are recent graduates with a Ph.D. or equiv

vi. Postdocs are mandatory members of the Post-Graduate Students' Society (PGSS) and an annual association fee is automatically charged. PGSS fees are mandatory. Postdocs are permitted membership in the Faculty Club; an annual fee will be char

8.4 Leave of Absence for Health and Parental/Familial Reasons

A leave of absence may be granted for maternity or parental reasons or for health reasons (see *University Regulations & Resources* > *Graduate* > *: Leave of Absence Status*).

Such a leave must be requested on a term-by-term basis and may be granted for a period of up to 52 weeks. For a maternity or parental leave, the eligibility period of a maximum of 52 consecutive weeks is determined based on when the child is born; if the leave is interrupted for one or two terms, the eligibility period cannot be extended. Students and Postdocs must make a request for such a leave in writing to their department and submit a medical certificate. The department shall forward the request to Enrolment Services. See the procedure in *University Regulations & Resources* > *Graduate* > *: Leave of Absence Status*.

Students who have been granted such a leave will have to register for the term(s) in question and their registration will show as “leave of absence” on their record. No tuition fees will be charged for the duration of the authorized leave. Research supervisors are not obligated to remunerate students and Postdocs on leave. A summary table of various leave policies (paid or unpaid) for students and Postdocs paid from the Federal and Quebec Councils through fellowships or research grants is available at *www.mcgill.ca/gps/funding/getting-paid* under "Leave Policies and Form."

8.5 Postdoctoral Research Trainees

- Guidelines and Regulations for Academic Units on Graduate Student Advising and Supervision
- Policy on Graduate Student Research Progress Tracking
-

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.

11.1.3.2 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-mscphd*.

11.1.3.2.1 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

11.1.3.3 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.

11.1.4 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.)

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.)

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.(Iowa) (*joint appt. with Neurology and Neurosurgery*)

Carlos R. Morales; D.V.M.(U.N., Argentina), Ph.D.(McG.)

Joaquin Ortega; B.Sc.(Zaragoza), Ph.D.(Autonoma, Madrid)

Barry I. Posner; M.D.(Manit.), F.R.C.P.(C) (*joint appt. with Medicine*)

Dieter Reinhardt; M.S.(Kaiserslautern), Ph.D.(Munich) (*joint appt. with Dentistry*)

Alfredo Ribeiro-da-Silva; M.D., Ph.D.(Oporto) (*joint appt. with Pharmacology and Therapeutics*)

Wayne Sossin; S.B.(MIT), Ph.D.(Stan.) (*joint appt. with Neurology and Neurosurgery*)

Stefano Stifani; Ph.D.(Rome), Ph.D.(Alta.) (*joint appt. with Neurology and Neurosurgery*)

Hojatollah Vali; B.Sc., M.Sc., Ph.D.(Munich)

Dominique Walker; B.Sc., Ph.D.(Geneva) (*joint appt. with Psychiatry*)

Associate Professors

Orest W. Blaschuk; B.Sc.(Winn.), M.Sc.(Manit.), Ph.D.(Tor.) (*joint appt. with Surgery*)

Eugene Daniels; M.Sc., Ph.D.(Manit.)

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

Craig Mandato; B.Sc., Ph.D.(Wat.)

Geoffroy P. Noël; Ph.D.(Br. Col.)

John F. Presley; B.A., Ph.D.(Texas)

Assistant Professors

Susanne Bechstedt; B.Sc.(Flor. St.), M.Sc.(Friedrich Schiller Univ.), Ph.D.(Max Planck)

Khanh Huy Bui; M.Sc.(Chalmers Univ. of Tech.), Ph.D.(ETH Zürich)

Javier Vargas; Ph.D.(UCM, Spain)

Gabriel Venne; Ph.D.(Qu.)

Nicole Ventura; Ph.D.(Qu.)

Associate Members

Daniel Bernard (*Pharmacology and Therapeutics*)

Claire Brown (*Physiology*)

Colin Chalk (*Neurology and Neurosurgery*)

Jean-François Cloutier (*Neurology and Neurosurgery*)

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*)

Svetlana Komarova (*Dentistry*)

Associate Members

Stephane Laporte (*Medicine*)

Andréa Leblanc (*Neurology and Neurosurgery*)

Stéphanie Lehoux (*Medicine*)

Heidi McBride (*Montreal Neurological Institute*)

Peter Metrakos (*Surgery*)

Makato Nagano (*Obstetrics and Gynecology*)

Tommy Nilsson (*Medicine*)

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.(Laval)

Michel Cayouette; Ph.D.(Laval)

Frédéric Charron; B.Sc.(Montr.), Ph.D.(McG.)

Jean-François Côté; Ph.D.(McG.)

Daniel Cyr; B.Sc., M.Sc.(C'dia), Ph.D.(Manit.)

Jacques Drouin; B.Sc., D.Sc.(Laval)

Jennifer Estall; Ph.D.(Tor.)

Patrick Freud; B.Sc., D.C.(Parker)

Michael Greenwood; B.Sc., M.Sc.(C'dia), Ph.D.(McG.)

David Hipfner; B.Sc., Ph.D.(Qu.)

Artur Kania; Ph.D.(Baylor)

Justin Kollman; Ph.D.(Calif.-San Diego)

Stephane Lefrancois; B.Sc., Ph.D.(McG.)

Alexei Pshezhetsky; Ph.D.(Moscow St.)

Isabelle Rouiller; Ph.D.(Hertfordshire)

Michael Sacher; Ph.D.(McG.)

Elitza Tocheva; B.Sc., Ph.D.(Br. Col.)

11.1.5 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 Developmental Biology Stream or Human Systems Biology Stream

Cell Developmental Biology Stream

ANAT 663D1	(3)	Histology
ANAT 663D2	(3)	Histology
ANAT 690D1	(3)	Cell and Developmental Biology
ANAT 690D2	(3)	Cell and Developmental Biology

Human Systems Biology Stream

** This stream is currently under review. **

6 credits required:

ANAT 690D1	(3)	Cell and Developmental Biology
ANAT 690D2	(3)	Cell and Developmental Biology

3 credits selected from:

BMDE 502	(3)	BME Modelling and Identification
BMDE 519	(3)	Biomedical Signals and Systems
BTEC 501	(3)	Bioinformatics
COMP 564	(3)	Advanced Computational Biology Methods and Research
COMP 680	(4)	Mining Biological Sequences
EXMD 602	(3)	Techniques in Molecular Genetics
MIMM 613	(3)	Current Topics 1
MIMM 614	(3)	Current Topics 2
MIMM 615	(3)	Current Topics 3
NEUR 502	(3)	Basic and Clinical Aspects of Neuroimmunology

Upon consultation with the supervisor, students may select a 3-credit course outside of this list from Biomedical Science courses at the 500-600 level.

11.1.6 Doctor of Philosophy (Ph.D.) Cell Biology

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

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

section 11.2.6: Master of Science (M.Sc.) Biochemistry (Thesis): Bioinformatics (45 credits)

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.

M.Sc. level – Students successfully completing the Bioinformatics option at the M.Sc. level will be fluent in the concepts, language, approaches, and limitations of the field.

The option consists of a number of interdisciplinary courses and a seminar designed to bring students from many backgrounds together and to provide a thorough overview of research in this field.

section 11.2.7: Master of Science (M.Sc.) Biochemistry (Thesis): Chemical Biology (47 credits)

The Chemical Biology Thematic Group is engaged in a diverse range of research topics, which span structural biology, enzymology, nucleic acid research, signalling pathways, single molecule biophysics, and biophysical chemistry of living tissues. Among the themes that unite the research being performed in this group is the attempt to learn new chemistry and physics from biological systems. We have projects relating to pharmaceutically relevant enzymes such as those involved in drug metabolism and antibiotic resistance; development of therapeutic agents in the control of inflammation, cancer, and viral infections; the chemical biology of NO; quantification of bioenergetic markers of metabolism; self-assembly mechanisms of the HIV-1 virion capsid; liposome microarray systems to address membrane protein dynamics and recognition; studies on reactive oxygen species translocation across the aqueous/lipid membrane interface; RNAi/antisense technologies; dynamic combinatorial chemistry; protein dynamics and function; mechanistic aspects involved in cellular adhesion and transport in membrane and zeolite channels; and cutting-edge microscopes used to examine transport, motility, and reactivity in cells.

The Chemical Biology graduate option is centred on the pursuit of an original research project under the direction of one or more mentors. The program is supported by McGill University and by the Canadian Institutes of Health Research (CIHR) through its Strategic Training Initiatives program.

The program of training incorporates several important features, including a diverse curriculum and programs of seminars, workshops, and discussion groups designed to provide students with a well-rounded exposure to both the chemical and biological aspects of the discipline. The M.Sc. option provides a foundation in the concepts and approaches of Chemical Biology.

section 11.2.8: Doctor of Philosophy (Ph.D.) Biochemistry

The Ph.D. in Biochemistry trains students in laboratory-based research at the highest level. The Ph.D. program is streamlined to emphasize independent research, and the many areas of biochemistry studied in our Department offer a wide choice of specialties. Students gain in-depth expertise in biochemistry and the biomedical sciences, with the opportunity to carry out research projects at a world-class level and build collaborations with other leading research groups.

Graduates of the Ph.D. program are outstandingly prepared for leadership careers in the basic health sciences in industry, the public sector, or academia.

section 11.2.9: Doctor of Philosophy (Ph.D.) Biochemistry: Bioinformatics

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.

Ph.D. level – 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.

The option consists of a number of interdisciplinary courses and a seminar designed to bring students from many backgrounds together and to provide a thorough overview of research in this field.

section 11.2.10: Doctor of Philosophy (Ph.D.) Biochemistry: Chemical Biology

The Chemical Biology Thematic Group is engaged in a diverse range of research topics which span structural biology

Financial support for students in the program is available from a variety of sources, including competitively awarded CIHR-funded Chemical Biology Scholarship awards.

11.2.3 Bioc hemistr y Admission Requirements and Application Pr ocedures

11.2.3.1 Admission Requirements

Admission is based on the candidate's academic record, letters of recommendation, curriculum vitae, and personal statement. A minimum grade point average of 3.2/4.0 (B+) 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 a faculty member or associate member of the Department of Biochemistry. Recommendation for admission will be made once the applicant has secured a supervisor and adequate financial support. Financial support should be in the form of a stipend from the supervisor's research grant or a fellowship held by the student.

Master's Program

Candidates for the M.Sc. degree must hold a B.Sc. degree or its equivalent in Biochemistry or in related disciplines (e.g., biology, chemistry, physiology, microbiology).

Doctoral Program

Candidates who have completed their M.Sc. degree may be admitted directly to the Ph.D. program. Candidates who are admitted to the M.Sc. program and who are interested in the Ph.D. may transfer into the Ph.D. program after successfully completing the transfer seminar (BIOC 701) and all course requirements. The M.Sc. thesis requirement is then waived.

International Applicants

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 the following:

- *TOEFL* (Test of English as a F

11.2.3.3 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.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 20	June 15	June 15
			Nov	Nov. 1

Professors

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. T

Adjunct Professors

Enrico Purisima (*NRC/BRI*)

Julie St-Pierre (*Ott.*)

11.2.5 Master of Science (M.Sc.) Bioc hemistr y (Thesis) (45 credits)

Thesis Cour ses (36 credits)

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

Required Cour se (3 credits)

BIOC 696	(3)	Seminars in Biochemistry

Complementar y Cour ses* (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 am2* ComplF2* Compl0 0 1 390.776 49.63c m(2* Comple not p 0 0 1 165.8643774.78c m(2* Compl0iouslymentarytnce Cou 0 1 43.52 65T

Complementar y Cour ses* (9 credits)

3 credits to be chosen from the following courses:

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 courses:

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
	(3)	Topics in Pharmacology 6

*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

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

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.

11.3 Bioethics

11.3.1 Location

Biomedical Ethics Unit
3647 Peel Street
Montreal QC H3A 1X1
Canada

Telephone: 514-398-6668
Fax: 514-398-8349
Website: *www.mcgill.ca/biomedicalethicsunit/teaching/masters*

For information, contact the Graduate Program Director:

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

11.3.2 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.

11.3.3 Bioethics Admission Requirements and Application Pr ocedures

11.3.3.1 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.

11.3.3.2 Application Pr ocedures

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/applyy*, Sch6252g0'.4-0.3 Tw1 0 0 artment o3. 1 228.nep127.176 2861 0 0 1 402.935 252.122 Tm(, S

Associate Professors

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

C. Ells; R.R.T.(VGH), B.A.(St. Mary's), M.A., Ph.D.(Tenn.)

J.R. Fishman; B.A.(Calif., Berk.), Ph.D.(Calif., SF)

J. Kimmelman; B.S.(Duke), Ph.D.(Yale)

N.B. King; B.A.(Penn.), M.A., Ph.D.(Harv.)

Associate Members

F. Carnevale (*Ingram School of Nursing*)

M. Hunt (*School of Physical & Occupational Therapy*)

Y. Joly (

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 509	(3)	Quantitative Analysis and Modelling of Cellular Processes
BMDE 512	(3)	Finite-Element Modelling in Biomedical Engineering
BMDE 519	(3)	Biomedical Signals and Systems
BMDE 610	(3)	Functional Neuroimaging Fusion

Revision, May 2018. Start of revision.

6 credits from the list below or from other courses (at the 500-level or higher) which have both biomedical content and content from the physical sciences, engineering, or computer science, with the approval of the supervisor and Graduate Program Director.

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
BIEN 680	(4)	Bioprocessing of Vaccines
BINF 511	(3)	Bioinformatics for Genomics
BIOL 598	(3)	Advanced Design and Statistics
BIOT 505	(3)	Selected Topics in Biotechnology
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 506	(3)	Molecular Biology Techniques
BMDE 508	(3)	Introduction to Micro and Nano-Bioengineering
BMDE 509	(3)	Quantitative Analysis and Modelling of Cellular Processes
BMDE 510	(3)	Topics in Astrobiology
BMDE 512	(3)	Finite-Element Modelling in Biomedical Engineering
BMDE 519	(3)	Biomedical Signals and Systems
BMDE 610	(3)	Functional Neuroimaging Fusion
BMDE 625D1	(3)	Design of Assistive Technologies: Principles and Praxis
BMDE 625D2	(3)	Design of Assistive Technologies: Principles and Praxis
BMDE 650	(3)	Advanced Medical Imaging
BMDE 651	(3)	Orthopaedic Engineering

BMDE 652	(3)	Bioinformatics: Proteomics
BMDE 653	(3)	Patents in Biomedical Engineering
BMDE 654	(3)	Biomedical Regulatory Affairs - Medical Devices
BMDE 655	(3)	Biomedical Clinical Trials - Medical Devices
CHEE 561	(3)	Introduction to Soft Tissue Biophysics
CHEE 563	(3)	Biofluids and Cardiovascular Mechanics
CHEE 651	(4)	Advanced Biochemical Engineering
CHEM 571	(3)	Polymer Synthesis
COMP 526	(3)	Probabilistic Reasoning and AI
COMP 546	(4)	Computational Perception
COMP 551	(4)	Applied Machine Learning
COMP 558	(3)	Fundamentals of Computer Vision
COMP 561	(4)	Computational Biology Methods and Research
COMP 652	(4)	Machine Learning
COMP 761	(4)	Advanced Topics Theory 2
DENT 669	(3)	Extracellular Matrix Biology
ECSE 523	(3)	Speech Communications
ECSE 526	(3)	Artificial Intelligence
ECSE 529	(3)	Computer and Biological Vision
ECSE 618	(4)	Haptics
ECSE 626	(4)	Statistical Computer Vision
ECSE 681*	(4)	Colloquium in Electrical Engineering
EPIB 521	(3)	Regression Analysis for Health Sciences
EXMD 609	(3)	Cellular Methods in Medical Research
EXMD 610	(3)	Molecular Methods in Medical Research
FACC 510	(3)	Selected Topics in the Faculty of Engineering 1
MATH 525	(4)	Sampling Theory and Applications
MDPH 607	(3)	Medical Imaging
MDPH 612	(3)	Instrumentation and Computation in Medical Physics
MECH 500*	(3)	Selected Topics in Mechanical Engineering
MECH 548	(3)	Cellular Materials in Natural and Engineering Structures
MECH 553	(3)	Design and Manufacture of Microdevices
MECH 561	(3)	Biomechanics of Musculoskeletal Systems
MECH 562	(3)	Advanced Fluid Mechanics
MECH 563	(3)	Biofluids and Cardiovascular Mechanics
MECH 605	(4)	Applied Mathematics 1
MECH 610	(4)	Fundamentals of Fluid Dynamics
MECH 632	(4)	Advanced Mechanics of Materials
NEUR 603	(3)	Computational Neuroscience
NEUR 630	(3)	Principles of Neuroscience 1
NEUR 631	(3)	Principles of Neuroscience 2
PHGY 502	(3)	Exercise Physiology
PHGY 517	(3)	Artificial Internal Organs

PHGY 518	(3)	Artificial Cells
PHGY 556	(3)	Topics in Systems Neuroscience
PHYS 519	(3)	Advanced Biophysics
PSYT 630	(3)	Statistics for Neurosciences

* When topic is appropriate.

Revision, May 2018. End of re vision.

11.4.6 Doctor of Philosoph y (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 advancement of science and engineering in an area of Biological and Biomedical Engineering. The program will prepare students for careers in academia, industry, hospitals and government. Students who complete the program will obtain a Doctor of Philosophy in Biological and Biomedical Engineering. The best preparation for this program is a Master's degree in BBME or a related discipline.

Thesis

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 Cour se

BBME 701	(0)	Ph.D. Comprehensive Examination

Students must be registered in this course at the time of the Thesis Proposal and Comprehensive Exam Meeting.

Further courses may be required by the supervisor(s) in consultation with the Graduate Program Director, depending on the educational background of individual students.

11.5 Biomedical Engineering

11.5.1 Location

Department of Biomedical Engineering
Duff Medical Building
3775 University Street, Room 316
Montreal QC H3A 2B4
Canada
Telephone: 514-398-6736
Fax: 514-398-7461
Website: *www.mcgill.ca/bme*

11.5.2 About Biomedical Engineering

Excellent laboratory facilities for basic and applied research are available in the Department and in the laboratories of associated staff located elsewhere on campus. The Department operates a network of high-performance workstations and well-equipped mechanical and electronics workshops.

Basic research in the Department concentrates on the application of quantitative engineering analysis methods to basic biomedical research problems. Currently active areas of research include:

- neuromuscular and postural control;
- muscle mechanics;

Admission to graduate studies is competitiv

Associate Members

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*)

Fax: 514-398-8123
Email: *scsd@mcgill.ca*
Website: *www.mcgill.ca/scsd*

11.6.2 About Communication Sciences and Disorders

The School provides both professional and research training in communication sciences and disorders at the graduate level through its **M.Sc. (Applied)**, **M.Sc.**, and **Ph.D.** degrees. We were the first department in Canada to provide both clinical and research degrees. Our M.Sc.A. program aims to educate the next generation of well-prepared and innovative speech-language pathology professionals by providing enriched classroom training, clinical laboratory activities that enhance the transition from theory to practice, and outstanding clinical practicum experiences. Our research degrees are designed to develop leading researchers and scholars, who will go on to train future investigators in the field of communication sciences and disorders and who, through their research, will advance our understanding of the processes of human communication and its breakdown.

Interdisciplinary interactions are at the core of our research training approach, which includes preparation to conduct both fundamental and clinically applied investigations. Our professors have collaborative ties with many departments and institutes of McGill:

- psychology;
- linguistics;
- neuroscience;
- otolaryngology;
- biomedical engineering;
- Montreal Neurological Institute and Hospital;
- other Montreal universities.

They also maintain national and international collaborations. Students can access this rich collaborative network via the *McGill Centre for Research on Brain, Language and Music*, a world-class interdisciplinary research centre established and directed by the School. The multilingual context in which we reside provides a unique environment for language research.

The School offers:

- a professional degree in Communication Sciences and Disorders at the M.Sc. (Applied) level with specialization in Speech Language Pathology
- two research degrees: an M.Sc. (Research) and a Ph.D. in Communication Sciences and Disorders.

Requirements for Licensure

The majority of provinces in Canada and certain states in the U.S. require that those intending to practise as speech-language pathologists within their borders comply with special provincial or state licensing regulations. Graduates wishing to practise in the province of Quebec must be members of the *Ordre des Orthophonistes et Audiologistes du Québec* (OOAQ) in order to call themselves speech-language pathologists. Further information is available from the OOAQ at:

235 boulevard René-Lévesque est, bureau 601
Montreal QC H2X 1N8
Telephone: 514-282-9123
Email: *info@ooaq.qc.ca*
Website: *www.ooaq.qc.ca*

Quebec law requires that candidates seeking licensure in provincially recognized professions demonstrate a verbal and written working knowledge of the French language. See *University Regulations & Resources* > *Undergraduate* > *Admission to Professional and Graduate Studies* > *: Language Requirements for Professions*.

Funding

*IODE Canada*IODE C 0 1 0 0 1 127.475 43.0581 7.0:ss(IODo $1,000 “Sile trano SoC 0” 0 0 1 503.69223m(341 7.0:ss(IODw 0 1 245.853 257.581 7.0:ss(IOD)TjsnguagsTj

section 11.6.6: Master of Science,

3. students with degrees in related fields who wish to do research but not obtain professional qualification in Communication Sciences and Disorders.

Ph.D. in Communication Sciences and Disorders

Applicants should normally have a master's degree with thesis or its equivalent in Communication Sciences and Disorders or a related field (e.g., psychology, linguistics).

Students who possess an appropriate bachelor's degree or master's degree without thesis will also be considered for the Ph.D. program, but, if admitted, must first complete a Qualifying year of coursework and a research project.

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 documented proof of competency in oral and written English **prior to admission**:

- the Test of English as a Foreign Language (*TOEFL*) with a minimum score of 95 on the Internet-based test (iBT; 587 on the paper-based test (PBT)) with minimum component scores of 24 in both Speaking and Writing and 21 in both Reading and Listening;

  OR

- the International English Language Testing System (*IELTS*) with a minimum overall band score of 7.0.

11.6.3.2 Application Pr ocedures

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 see the *School of Communication Sciences and Disorders website* for required application materials.

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

All applications received by the application deadlines are automatically considered for any internal funding or awards made available to the Department for recruitment purposes. Students who applycally0 0 1el7afor 0 0 1 472.372(Grrn.ncoD0li. 1 tl3Tj/d Phly0 0 1el70 0 1 336.74 5er)09orgraduate or gTj33 Phly0 0 1el7x 35

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

Admission to graduate studies is competitiSummer

Faculty Lecturers (Part-Time)

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

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

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

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

Amanda Ovadia; B.Sc., M.Sc.(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*)

11.6.5 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.

11.6.6 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 (76 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 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 (6 credits)

6 credits from the following:

SCSD 664	(3)	Communication Sciences and Disorders 1
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

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

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)

SCSD 652	(3)	Advanced Research Seminar 1
SCSD 653	(3)	Advanced Research Seminar 2
SCSD 685	(3)	Research Project 1
SCSD 686	(3)	Research Project 2
SCSD 701	(0)	Doctoral Comprehensive

Complementary Courses (6 credits)

Minimum of 6 credits of graduate-level statistics from courses such as:

EDPE 676	(3)	Intermediate Statistics
EDPE 682	(3)	Univariate/Multivariate Analysis
EDPE 684	(3)	Applied Multivariate Statistics
EPIB 621	(4)	Data Analysis in Health Sciences
EPIB 622	(3)	Scientific Communication
PSYC 650	(3)	Advanced Statistics 1
PSYC 651	(3)	Advanced Statistics 2

Any other course requirements specified for the student's individual program of study.

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

Students must satisfy all program requirements for the Ph.D. The Ph.D. thesis must be on a topic relating to language acquisition.

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

At least two courses, selected from the following list.

EDSL 620	(3)	Social Justice Issues in Second Language Education
EDSL 623	(3)	Second Language Learning
EDSL 624	(3)	Educational Sociolinguistics
EDSL 627	(3)	Instructed Second Language Acquisition Research
EDSL 629	(3)	Second Language Assessment
EDSL 632	(3)	Second Language Literacy Development
LING 555	(3)	Language Acquisition 2
LING 590	(3)	Language Acquisition and Breakdown
LING 651	(3)	Topics in Acquisition of Phonology
LING 655	(3)	Theory of L2 Acquisition
LING 751	(3)	Advanced Seminar: Experimental 1
LING 752	(3)	Advanced Seminar: Experimental 2
PSYC 545	(3)	Topics in Language Acquisition
PSYC 735	(3)	Developmental Psychology and Language
SCSD 619	(3)	Phonological Development
SCSD 632	(3)	Phonological Disorders: Children
SCSD 633	(3)	Language Development
SCSD 637	(3)	Developmental Language Disorders 1
SCSD 643	(3)	Developmental Language Disorders 2

Elective Cour se

0-2 credits from the following:

EDSL 711	(2)	Language Acquisition Issues 3

11.7 Epidemiology and Biostatistics

11.7.1 Location

Department of Epidemiology, Biostatistics and Occupational Health
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*

11.7.2 About Epidemiology and Biostatistics

The Department offers **master's and doctoral programs in both Epidemiology and Biostatistics**, as well as a **Master's of Science in Public Health**. 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:

- biostatistics;

- 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;
- genetic epidemiology;
- global health;
- causal inference;
- and many cross-disciplinary activities.

F

Professors

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

R. Fuhrer; B.A.(CUNY (Brooklyn Coll.)), M.Sc., Ph.D.(Calif.-San Francisco) (*on leave Jan. to June 2018*)

C. Greenwood; B.Sc.(McG.), M.Sc.(Wat.), Ph.D.(Tor.) (*joint appt. with Oncology*)

T.W. Gyorkos; B.Sc.(McG.), M.Sc.(Bishop's), Ph.D.(McG.)

C. Hankins; B.A.(Hons.), M.D.(Calg.), M.Sc.(Lond.), Ph.D.(Amster.), C.C.F.P., F.R.C.P.(C)

J.A. Hanley; B.Sc., M.Sc.(N.U.I.), Ph.D.(Wat.)

C. Infante-Rivard; M.D.(Montr.), M.P.H.(Calif.-LA), Ph.D.(McG.), F.R.C.P.(C) (*James McGill Professor*)

L. Joseph; M.Sc., Ph.D.(McG.)

J. Kaufman; B.A.(Johns Hop.), Ph.D.(Mich.)

M.S. Kramer; B.A.(Chic.), M.D.(Yale) (*joint appt. with Pediatrics*) (*James McGill Professor*)

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. Paradis; M.D.(Montr.), M.Sc.(McG.), F.R.C.P.(C) (*Strathcona Prof*

Assistant Professors

K. Filion; B.Sc., M.Sc., Ph.D.(McG.) (*joint appt. with Medicine*) (*CIHR New Investigator*)

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

A. Koski; B.Sc.(Michigan Tech), MPH(Emory), Ph.D.(McG.)

M. Maheu-Giroux; B.Sc.(Montr.), M.Sc.(McG.), D.Sc.(Harv.)

S. Martin; M.D.(Tor.), M.Sc.(McG.) (PT)

D. Panagiotoglu; B.Sc.(Tor.), M.Sc.(Col.), Ph.D.(Br. Col.)

L. Patry; B.Sc., M.D.(Laval), F.R.C.P.(C) (PT)

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

P. Saha Chaudhuri; B.Sc.(Presidency Univ.), M.Stat.(Indian Stat. Inst.), M.S., Ph.D.(Wash.)

C. Stich; M.Sc.(Free Univ., Berlin), Ph.D.(Free Univ., Berlin/Toulouse II)

G. Tan; D.Phil.(Oxf.) (PT)

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, A. Barkun, M. Behr, S. Bernatsky, J. Bourbeau, P. Brassard, K. Dasgupta, M. Eisenberg, P. Ernst, 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*62 345.56 Tm(V)0 1 164.725 34M. Se

Adjunct Professors

Harvard Univ.: J. Brownstein

Hôpital Ste. Justine: M. Henderson

Independent: I. Arnold, L. De Montigny, K. Krishnan, C. Larson, J. Lemke, L. Scott

INESSS: D. Roy

INSPQ: N. Auger, E. Lo, S. Stock

Montreal Chest Hospital Centre: P. Rohan

Mount Sinai: M. Baltzan

Public Health Agency of Canada: G. Thomas-Reilly

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

11.7.4 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;

Health (EBOH) at McGill University. Students who have been admitted through their home department or faculty may apply for admission to the option.

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

11.7.4.3 Master of Science (M.Sc.) Epidemiology (Thesis) (48 credits)

Students will study the foundations and principles of epidemiology and applied biostatistics, in order to design, conduct, and analyze clinical, population-based, environmental, policy, and methodological health-related research. Graduates will be prepared to eng

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.

11.7.4.7 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
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 511	(3)	Fundamentals of Global Health
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 631D1	(2)	MScPH Forum 2
PPHS 631D2	(2)	MScPH Forum 2

Complementary Courses (18 credits)

12 credits of coursework at the 500 level or higher, with a minimum of 2 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, as approved by the Global Health Coordinating Committee.

SOCI 515 (3) Medicine and Society

SOCI 512	(3)	Ethnicity & Public Policy
SOCI 513	(3)	Social Aspects HIV/AIDS in Africa
SOCI 520	(3)	Migration and Immigrant Groups

In addition to the Ph.D. requirements, students admitted to the Ph.D. in Epidemiology; Global Health 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

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
EPIB 639	(4)	Pharmacoepidemiologic Methods
EPIB 654	(2)	Pharmacoepidemiology 4
EPIB 661	(2)	Pharmacoepidemiology 3
EPIB 662	(1)	Pharmacological Basis of Pharmacoepidemiology
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

Complementary Courses (3 credits)

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

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

Students admitted to the Ph.D. in Epidemiology; Population Dynamics degree program with the equivalent of the M.Sc. in Epidemiology at McGill will be required to take a minimum of 31 credits of Ph.D. courses.

In addition to the Ph.D. requirements, students admitted to the Ph.D. in Epidemiology; Population Dynamics 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 research 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 (22 credits)

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
SOCI 545	(3)	Sociology of Population
SOCI 626	(3)	Demographic Methods

Complementary Courses (9 credits)

9 credits of coursework, at the 500 level or higher, with a minimum of 3 credits in biostatistics, 3 credits in epidemiology, and 3 credits from courses approved for the Population Dynamics Option from the list below:

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 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.

11.7.5 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 heath 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. 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.

section 11.7.5.2: Master of Science (M.Sc.) Biostatistics (Thesis) (48 credits)

M.Sc. Thesis students study a foundational set of courses, and write a thesis on a topic of their choice. Thesis students should have a strong interest in research. These students are well-placed to either continue in a Ph.D. program or to work in academic research in statistics or medicine; they will also have relevant qualifications for the pharmaceutical industry and government.

section 11.7.5.3

BIOS 690	(24)	M.Sc. Thesis

Required Courses (24 credits)

Students exempted from any of the courses listed below must replace them with complementary course credits, at the 500 level or higher, chosen in consultation with the student's academic adviser or supervisor.

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

11.7.5.3 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.

11.7.5.4 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 of collaborative projects. Graduates will be able to communicate methods and results to collaborators 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 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

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

Complementar y Cour ses (46 credits)

11.10.2 About Human Genetics

M.Sc. and Ph.D. Degrees in the Department of Human Genetics

The Department of Human Genetics offers a clinical master's program, M.Sc. in Genetic Counselling, as well as research training at both the M.Sc. and Ph.D. levels in Human Genetics. Both the M.Sc. and Ph.D. in Human Genetics research programs require the completion of a thesis, which is the major focus of the student's effort. A minimal amount of coursework is required, but specific course choices are flexible and vary according to the student's previous training and current research interest.

Most of the faculty members of the Human Genetics Department are located in McGill teaching hospitals, reflecting the medically learned knowledge at the core of human genetic studies.

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 11.10.5: 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 inflammatory diseases
- non-mendelian genetics
- bioinformatics
- behavioural genetics
- neurogenetics
- bioethics
- genomics

Many of our faculty hold cross-appointments in various departments (including: biochemistry, biology, cardiology, medicine, microbiology, immunology, neurology, pathology, paediatrics, 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 11.10.6: Master of Science (M.Sc.) Human Genetics (Thesis): Bioinformatics (45 credits)

This program is currently not offered.

Students successfully completing the Bioinformatics option at the M.Sc. level will be fluent in the concepts, language, approaches, and limitations of the field. 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.

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.

Prospecti

* 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.**

11.10.4 Human Genetics Faculty

Chair

E.A. Shoubridge

Program Directors

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

A. Ryan – *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*)

B. BKnoppers Ph.D (MPTj1 0 0 1 1041.24 486.072 Tm(Paris IV). PTj1 0 0 1 109.4431486.072 Tm(BAd.E, PO.. S()Tj/F2 8.1 Tf1 0 0 1 231.821 486.072 Tm(Bir)Tj1 0 0
W. Foulkes; B.Sc., MB.BS., Ph.D.(L Rtd) (oMedicineTj/F1 8.1 Tf1 0 0 1 2841.24 452.441 Tm(o)

Associate Professors

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.)

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*)

L-C. Palma; M.Sc.

I. Ragoussis; Ph.D.(Tübingen) (*Genome Innovation Centre*)

Y. Riaz Alhosseini; Ph.D.(Heidel.) (*Genome Quebec*)

J.P. Riviere; Ph.D.(Montr.) (*RI MUHC*)

A. Ruchon; Ph.D.(Montr.) (*Biomedical Sciences*)

V. Soleimani; Ph.D.(Ott.) (*Jewish General Hospital*)

Y. Trakadis; M.D.(Montr.) (*Montreal Children's Hospital*)

L. Walsh; Ph.D.(W. Ont.)

Lecturers

N. Anoja (*Medicine*)

L. Baret (*Medicine*)

C. Bascunana (*Medicine*)

K-E. Canales (*Medicine*)

S. Drury (*Pediatrics*)

S. Fox (*Medicine*)

L. Kasprzak (*Medicine*)

M. Lalous (*Medicine*)

L. Macrae (*Medicine*)

L. Palma (*Medicine*)

M. Richard (*Pediatrics*)

G. Sillon (*Medicine*)

L. Whelton (*Medicine*)

N. Wong (*Medicine*)

Lecturers

S. Zaor (*Medicine*)

Adjunct Professors

C-M. Chisholm (*Children's Hospital of Eastern Ontario*)

T. Chiu (*Children's Hospital of Eastern Ontario*)

M. Cloutier (*Children's Hospital of Eastern Ontario*)

E. Creede (*Children's Hospital of Eastern Ontario*)

D. Gauguier (*Cordeliers Research Centre*)

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

B. Gottleib (*Medicine*)

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

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

L. Higgins (*Children's Hospital of Eastern Ontario*)

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

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

J. Rutberg (*Children's Hospital of Eastern Ontario*)

Adjunct Member

D. Vinh; M.D. (*Dept. of Medical Microbiology; Medicine*)

Associate Members

Biochemistry: P. Gros, D. Thomas

Bioethics: J. Kimmelman

Cardiology: J. Genest

Core Molecular Diagnostic Laboratory - Cytogenetics: J. Lavoie

Dentistry: L. Diatchenko

Endocrinology: C. Polychonakos, B. Richards

Epidemiology, Biostatistics and Occupational Health: C. Greenwood

Experimental Medicine: S.

Required Courses (6 credits)

HGEN 662	(3)	Laboratory Research Techniques
HGEN 692	(3)	Human Genetics

Complementary Courses (6 credits)

6 credits chosen from the departmental offerings below or from 500-, 600-, or 700-level courses offered in the Faculties of Medicine or Science:

HGEN 660	(3)	Genetics and Bioethics
HGEN 661	(3)	Population Genetics
HGEN 663	(3)	Beyond the Human Genome
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.

11.10.6 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

11.10.9 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.

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

COMP 616D1	(1.5)	Bioinformatics Seminar
COMP 616D2	(1.5)	Bioinformatics Seminar 59728 9.3r Biology
HGEN 692	(3)	Human Genetics
HGEN 701	(0)	Ph.D. Comprehensive Examination

Complementary Courses (6 credits)

* Two courses from the following:

BINF 6e	(3)	Bioinformatics: Molecular Biology

section 11.11.5: 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 11.11.6: 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.

11.11.3 Medical Ph ysics Admission Requirements and Application Pr ocedures

Admission Requirements

sent electronically by the testing centre to McGill University; to ensure successful transmission, the student's name given to the testing centre must be identical to the name used for the McGill online application, otherwise the electronic result will not be applied to the McGill application.

Note: McGill institution code = 0935; Medical Physics Unit = 99 (department not listed).

The test must have been taken within the two years prior to date of application review, i.e., not prior to May 01, 2017 for a graduate application to McGill for Fall 2019. Applicants from some countries are exempt from providing evidence of English language proficiency. For more information, see *www.mcgill.ca/gradapplicants/international/apply/proficiency*.

Reference Letters: In order for referees to receive an automated email with instructions to upload their recommendation, applicants must include referees' institutional email addresses in the online application; Gmail, Yahoo, etc. email addresses will not be accepted.

11.11.3.2.1 Additional Requirements

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

- GRE is not required for the Medical Physics M.Sc. program.
- Applicants must either complete the “Applicant Statement” portion of the online application, or alternatively, may submit a one-page Personal Statement.

11.11.3.3 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.

11.11.4 Medical Physics Faculty

Director

J. Seuntjens

Emeritus Professor

S.M. Lehnert; B.Sc.(Nott.), M.Sc., Ph.D.(Lond.) 0

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. Ph.D.(Uppsala)

section 11.12.5: Master of Science (M.Sc.) Experimental Medicine (Thesis) (45 credits)

This thesis program may lead to careers in industry, or serve as a stepping stone to further graduate studies.

section 11.12.6: Master of Science (M.Sc.) Experimental Medicine (Thesis): Bioethics (45 credits)

Applicants for the M.Sc. Bioethics Option program must hold an M.D.; a Nursing degree; a Physical and Occupational Therapy degree; and/or any other

For requirements, application deadlines, and further information regarding this program, please refer to the Bioethics entry or visit the *Biomedical Ethics Unit website*.

M.Sc. (Environment Option)

Although the requirements and application deadlines remain the same as the M.Sc., applicants wishing to apply to the Master's program (Environment Option) must submit additional documents that constitute their application to BOTH the Division of Experimental Medicine and the McGill School of Environment. Further information can be found on the *School of Environment website*.

Students in the M.Sc. in Experimental Medicine may choose to transfer to the 4 Tm:33

11.12.4 Medicine , Experimental F aculty

Chair, Department of Medicine

J. Martin

Director, Division of Experimental Medicine

A.-M. Lauzon

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)

Q.A. Hamid; M.D.(Mosul, Iraq.), Ph.D.(Lond.)

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

G. Hendy; B.Sc.(Sheff.), Ph.D.(Lond.)

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.(MontrM6m(5h1 TmY)Tj1 0indso 401.281 Tm(aul Saba86P)Tj1 0 0 10 0 1 el0 1 78.629 A.(Roch.Sc.(C'dia), M.Sc., P(P01ba86P

Associate Professors

L. Chalifour; B.Sc., Ph.D.(Manit.), M.A.(Harv.)

S.R. Cohen; B.Sc., M.Sc., Ph.D.(McG.)

D. Cournoyer; M.D.(Sher.), F.R.C.P.(C)

K. Dasgupta; B.Sc.(PEI), M.D.,C.M., M.Sc.(McG.)

S. Daskalopoulou; M.D.(Athens)

J.C. Engert; B.A.(Colby), Ph.D.(Boston)

V. Essebag; M.D.,C.M., M.Sc., Ph.D.(McG.), F.R.C.P.(C)

E. Fixman; B.Sc.(Col.), Ph.D.(Johns Hop.)

B. Gilfix; B.Sc.(Manit.), Ph.D.(W. Ont.), M.D.,C.M.(McG.), F.R.C.P.(C)

S.B. Gottfried; M.D.(Penn.)

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.)

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)

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

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

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.)

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.(Moscow St. Inst. of Food Ind.), M.Sc.(Moscow Inst. of Genetics of Microorganisms), Ph.D.(McG.)

B. Turcotte; B.Sc., Ph.D.(Laval)

Assistant Professors

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

R. Aloyz; B.A., M.Sc., Ph.D.(Buenos Aires)

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

Assistant Professors

C. Baglole; B.Sc., M.Sc.(PEI), Ph.D.(Calg.)

I. Colmegna; M.Sc.(El Salvador)

C. Costiniuk; B.A.(Western), B.Sc.(Nfld.), M.D.(McM.), M.Sc.(Ott.)

M. Divangahi; B.Sc.(McM.), Ph.D.(McG.)

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

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

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

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

E. Nashi; B.Sc., M.D.(Alta.), M.Sc.(McG.), Ph.D.(Northshore Medical Ctr.), F.R.C.P.(C)

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)

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

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

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

G. Sebastiani; M.D.(Padova)

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

Associate Members, McGill

B. Abdulkarim, H. Abenhaim, M. Basik, M. Ben-Shoshan, D. Boivin, M. Bouchard, P. Brodt, K. Brown, S. Chevalier, R.-C. Chian, H. Clarke, T. Coderre, 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. Lo, C. Loiselle, C. Mandato, K. Mann, M. O. Martel, P. Martineau, B. Mazer, L. McCaffrey, C. McCusker, T. Muanza, M. Nagano, J. Nalbantoglu, C. O'Flaherty, A. Orthwein, A. Pause, A. Philip, C. Piccirillo, C. Polychronakos, S. Prakash, R. Rajan, J. Rak, G. Rouleau, A. Ryan, G. Sant'Anna, R. Slim, N. Sonenberg, I. Topisirovic, M. Tremblay, J. Ursini-Siegel, T. Vuong, M. Witcher, J.-H. Wu, S. Wurzba, N. Ybarra, M. Zappitelli, G. Zogopoulos

Associate Members, Université de Montréal

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, J. Gutkowska, D. Hipfner, P. Jolicoeur, A. Kania, M. Kmita, E. Lecuyer, T. Moroy, F. Ni, M. Oeffinger, R. Rabasa-Lhoret, E. Racine, N. Seidah, W.-K. Suh, H. Takahashi, M. Trudel, W.Y. Tsang, J. Vacher, A. Veillette, C. Wu, J. Zwaagstra

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

Thesis Courses (36 credits)

24-36 credits selected from the following:

EXMD 690	(3)	Master's Thesis Research 1
EXMD 691	(6)	Master's Thesis Research 2
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 (21 credits)

9-21 credits of courses at the 500, 600, or 700 level chosen in consultation with the Supervisor. A minimum of 9 course credits is required for students entering the program with a bachelor's or M.D. degree.

11.12.6 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 Cour ses (6 credits)

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

Complementar y Cour ses (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.

11.12.7 Master of Science (M.Sc.) Experimental Medicine (Thesis): Envir onment (45 credits)

Thesis Cour ses (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 Cour ses (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

Complementar y Cour ses (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.

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

A minimum of 12 course credits is required for students entering the program with a prior master's degree. Students having only a B.Sc. or M.D. degree and who have been either admitted directly or fast-tracked to the Ph.D. must complete a total of 18 credits. The following courses are highly recommended: EXMD 604D1/D2 Recent Advances in Cellular and Molecular Biology; EXMD 610 Biochemical Methods in Medical Research.

After consultation with their research supervisor and the Director of the Division, students may choose their courses from those offered by Experimental Medicine, Physiology, and Biochemistry, as well as other graduate and advanced undergraduate courses in the medical and allied sciences. Where necessary, students may enrol for credit in courses offered in the physical and mathematical sciences.

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

EXMD 701D1	(0)	Comprehensive Oral Examination
EXMD 701D2	(0)	Comprehensive Oral Examination

Complementary Courses (18 credits)

(12-18 credits)

A minimum of 12 course credits is required for students entering the program with a prior master's degree. Students having been fast-tracked to the Ph.D. must complete a total of 18 credits (9 credits in addition to the 9 which were originally requested upon entry into the M.Sc. program).

11.12.9 Doctor of Philosophy (Ph.D.) Experimental Medicine: Environment

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)

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
EXMD 701D1	(0)	Comprehensive Oral Examination
EXMD 701D2	(0)	Comprehensive Oral Examination

Complementary Courses (12 credits)

(6-12 credits)

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.

One to three courses at the 500, 600, or 700 level chosen in consultation with the student's academic supervisor.

11.12.10 Graduate Diploma (Gr . Dip.) Clinical Resear ch (30 credits)

The core element of the diploma is the Practicum in Clinical Research. It is a six-step program with active “clerkship” or “intern/resident type” participation in each component that is essential to the successful development and evaluation of a clinical trial.

Required Cour ses (6 credits)

EXMD 617	(1)	Workshop in Clinical Trials 1
EXMD 618	(1)	Workshop in Clinical Trials 2
EXMD 619	(1)	Workshop: Clinical Trials 3
EXMD 620	(1)	Clinical Trials and Research 1
EXMD 625	(1)	Clinical Trials and Research 2
EXMD 626	(1)	Clinical Trials and Research 3

Complementar y Cour ses (6 credits)

Two courses chosen from: Experimental Medicine (EXMD), Pharmacology and Therapeutics (PHAR), Epidemiology and Biostatistics (EPIB). With approval, courses from other Allied Health Sciences departments may be considered.

Required Practicum (18 credits)

EXMD 627	(18)	Practicum in Clinical Research

11.13 Medicine , Famil y

11.13.1 Location

Department of Family Medicine
5858 Côte-des-Neiges Road, 3rd Floor
Montreal QC H3S 1Z1
Telephone: 514-399-9103
Fax: 514-398-4202
Email: *graduateprograms.fammed@mcgill.ca*
Website: *www.mcgill.ca/familymed/education/graduate-programs*

11.13.2 About F amil y Medicine

The McGill Family Medicine Department is home to an exceptional community of health care professionals, researchers, students, and support staff, whose mission is to contribute to the health of the population and the sustainability of the health care system in Quebec, in Canada, and internationally by:

- training medical students, residents, and other health care professionals to become committed to primary care, contributing to accessibility, continuity, coordination, accountability, patient-centredness, and health promotion and prevention;
- promoting innovation in family medicine and primary health care delivery and practice;
- developing research and scholarly activity to contribute to the academic discipline;
- promoting curriculum innovation and education research;
- engaging in international and global health activities;
- 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.

Ph.D. (*Ad Hoc*)

The Department of Family Medicine offers the possibility of entering a Ph.D. program on an *ad hoc* basis.

section 11.13.5: 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 appr**

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 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.

11.13.3.2 Application Pr ocedures

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.
- **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 ad hoc Ph.D. in Family Medicine.
- **Curriculum Vitae:** Please upload the latest version of your resumé, which should include a listing of previous research experience and publications. All relevant research experience should be included in your CV since you are essentially applying for a research position in the Department.
- **Letters of Reference:** Two (2) or three (3) letters of reference must accompany any application to our program. These letters must be no more than six months old, must be on letterhead paper, and are required to be uploaded to the admissions processing system. Applicants are encouraged to request references from academic or other professional employers who can evaluate their potential for graduate studies and research, and who can attest to the applicant's research skills. Referees will also be asked to rank each applicant and to provide a size of the comparison (i.e., out of 50 supervised students). **Any applicant having undertaken previous graduate studies (whether at McGill or elsewhere) should make sure that one of the letters of reference is from their graduate supervisor**. **Please note:** On the application form, applicants must provide the names and email addresses of referees. McGill will contact these referees via email and invite them to upload reference letters on the applicant's behalf (along with the instructions on how to upload the documents). **Neither of these reference letters should be from the proposed supervisor.**
- **Personal Statement:** Applicants must submit a personal statement in which they:

  1. describe their background and the reasons why they are applying to the desired program;
  2. describe their research interests and with whom they would like to work among the list of potential supervisors;
  3. describe how they hope to impact family medicine practice; and
  4. describe future plans upon graduation from the desired program.

  The statement should be no more than two (2) pages long.
- **Writing Assessment**
- **Interview**
- **Official Transcripts:** Applicants must submit one (1) official copy of all transcripts for all post-secondary education undertaken (Quebec students need not submit CEGDr3.1 459.k6oeh.U6(2.)Tj/medicot submit CEGD50.2 Tm(Writing 8lw0 0 1 487.089the p5361.42 T (vide the an tw)Tj1 0 0 1 215.473 (vide the an

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	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 1	March 1	March 1
Winter Term:	N/A	N/A	N/A	N/A
Summer Term:	N/A	N/A	N/A	N/A

All supporting documents must be received by March 1. Admissions are preferable for the Fall term. Students may be accepted to the Winter term on a case-by-case basis.

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

11.13.4 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)

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.(Ne

Assistant Professors

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

Associate Members

Sara Ahmed (*Physical and Occupational Therapy*)

Olivier Beauchet (*Medicine*)

David Buckeridge (*Epidemiology*)

Carolyn Ells (*Bioethics*)

Jennifer Fishman (*Bioethics*)

Matthias Friedrich (*Medicine*)

Richard Hovey (*Dentistry*)

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-Thérèse Lussier (Montr.)

Emily Marshall (Dal.)

Viv Ramsden (Sask.)

Christian Rochefort (Sher.)

Jon Salsberg (Limerick)

11.13.5 Master of Science (M.Sc.) Family Medicine (Thesis) (45 credits)

Thesis Courses (24 credits)

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

Required Courses (15 credits)

FMED 505	(3)	Basic Analysis for Health Data
FMED 509	(3)	Foundations of Epidemiology in Family Medicine
FMED 600	(1)	Mixed Studies Reviews

FMED 603	(1)	Participatory Research: Patient & Public Engagement
[illegible]	(1)	Applied Literature Reviews
FMED 625	(3)	Qualitative Health Research
FMED 672	(3)	Applied Mixed Methods in Health Research

Complementar y Cour ses (6 credits)

6 credits chosen from:

[illegible]	(.5)	Family Medicine Research Seminars
[illegible] 504D2	(.5)	Family Medicine Research Seminars
[illegible] 511	(1)	Introduction to Art in Healthcare: Making Art Accessible
[illegible]	(3)	Foundations of Translational Science
FMED 601	(3)	Advanced Topics in Family Medicine
FMED 604	(3)	dvanced Participatory Research in Health
FMED 605	(1)	Canadian Healthcare Policy and Decision-Making
[illegible]	(1)	Operational Issues in Survey Methods in Primary Care
FMED 607	(1)	Intro to Discourse Analysis & Interpretive Health Research
[illegible]	(1)	Advanced Mixed Methods Seminar in Health Research
FMED 610	(2)	Foundations of Family Medicine
FMED 611	(1)	Healthcare Systems and Primary Care Reform
FMED 612	(1)	Evaluation Research and Implementation Science
[illegible] FMEDProgra[illegible]ngnent	(1)	Applied Knowledge Translation and Exchange in Health

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Topics in Ph3 1 rmacoeconomin , Drug Safetd Decic

Elective Course (9 credits)

9 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.

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

The M.Sc. in Family Medicine; Medical Education option is a thesis program designed to provide research training to family physicians, and exceptionally, other health professionals, and students interested in medical education research. This M.Sc. Option will have very close ties to the Family Medicine Educational Research Group (FMER), which is the corollary of the educational innovations in teaching and research conceived and established in McGill's Department of Family Medicine in 2005. 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 through four interrelated streams: (1) family physicians' professional identity formation; (2) information use and technology in the learning episodes of practicing physician and organizational learning; (3) program evaluation of educational innovations, 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 (15 credits)

FMED 505	(3)	Basic Analysis for Health Data
FMED 509	(3)	Foundations of Epidemiology in Family Medicine
FMED 600	(1)	Mixed Studies Reviews
FMED 603	(1)	Participatory Research: Patient & Public Engagement
FMED 616	(1)	Applied Literature Reviews
FMED 625	(3)	Qualitative Health Research
FMED 672	(3)	Applied Mixed Methods in Health Research

Complementary Courses (3 credits)

3 credits from the following:

EDPE 555	(3)	Theoretical Foundations of Learning Sciences
EDPE 635	(3)	Theories of Learning and Instruction
EDPH 689	(3)	Teaching and Learning in Higher Education

Elective Courses (3 credits)

3 credits, at the 500 level or higher, chosen in consultation with the student's academic supervisor, specifically involving educational issues, and always relating to the student's thesis topic within the medical education field.

11.14 Microbiology and Immunology

11.14.1 Location

Department of Microbiology and Immunology
Duff Medical Building, Room 511
3775 University Street
Montreal QC H3A 2B4
Canada
Telephone: 514-398-3061

F

Associate Professors

S. Fournier; Ph.D.(Montr.)

J. Fritz; Ph.D.(Vienna)

S. Gruenheid; B.Sc.(Br. Col.), Ph.D.(McG.)

G. T. Marczynski; B.Sc., Ph.D.(Ill.)

Assistant Professors

I. King; B.Sc.(Ohio St.), M.Sc.(Pitt. St.), Ph.D.(Roch.)

C. Krawczyk; Ph.D.(Tor.)

C. Maurice; M.S., Ph.D.(Montpellier II)

M. Richer; B.Sc.(McG.), M.Sc.(Montr.), Ph.D.(Br. Col.)

S. Sagan; B.Sc.(McG.), Ph.D.(Ott.)

Associate Members

Epidemiology and Infectious Diseases: M. Behr, A. Dascal, V. Loo

Immunology, Autoimmunity, Host Defense: J. Antel, M. Burnier, I. Colmegna, P. Gros, A. Kristof, J. Mandl, A. Orthwein, J. Rauch, M. Saleh, J. Spicer, C. Tsoukas, S. Vidal

Immunology and Parasitology: B. Brenner, M. Ndao, P. Rohrbach, B. Ward, J. Zhang

Microbiology: D. Cuong Vinh, M. Divangahi, C. Liang, D. Nguyen, M. Reed

Molecular Biology: N. Cermakian, S. Hussain, A. Jardim, A. Mouland, K. Pantopoulos, M. Tremblay, B. Turcotte, J. Xia

Virology: A. Gatignol, A.E. Koromilas, R. Lin, T. Mesplede, J.Teodoro

Adjunct Professors

A. Bar-Or

E. Cohen

A. Descoteaux

J.M. Di Noia

E. Emani

A. Finzi

N. Grandvaux

G. Kukolj

P. Lau

S. Lesage

S.L. Liu

J. Madrenas

R. Moutih

C. Paradis-Bleau

A. Petronela

K. Pike

W-K. Suh

S. Tran

11.14.5 Master of Science (M.Sc.) Micr obiology and Imm unology (Thesis) (45 credits)

Thesis Cour ses (24 credits)

MIMM 697	(8)	Master's Research 1
MIMM 698	(8)	Master's Research 2
MIMM 699	(8)	Master's Research 3

Required Courses (15 credits)

MIMM 611	(3)	Graduate Seminars 1
MIMM 612	(3)	Graduate Seminars 2
MIMM 613	(3)	Current Topics 1
MIMM 614	(3)	Current Topics 2
MIMM 615	(3)	Current Topics 3

Complementary Courses (6 credits)

Minimum 6 credits from:

MIMM 607	(3)	Biochemical Pathology
MIMM 616	(3)	Reading and Conference 1
MIMM 617*	(3)	Reading and Conference 2
MIMM 618*	(3)	Reading and Conference 3
MIMM 619*	(3)	Reading and Conference 4
NEUR 502	(3)	Basic and Clinical Aspects of Neuroimmunology

Any life sciences-related 500-level or above course (3 credits). Department approval required.

* Not offered in every academic year.

11.14.6 Doctor of Philosophy (Ph.D.) Microbiology and Immunology

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 (18 credits)

MIMM 611	(3)	Graduate Seminars 1
MIMM 612	(3)	Graduate Seminars 2
MIMM 613	(3)	Current Topics 1
MIMM 614	(3)	Current Topics 2
MIMM 615	(3)	Current Topics 3
MIMM 701	(0)	Comprehensive Examination-Ph.D. Candidate
MIMM 713	(3)	Graduate Seminars 3

Complementary Courses (9 credits)

MIMM 616	(3)	Reading and Conference 1
MIMM 617	(3)	Reading and Conference 2
MIMM 618	(3)	Reading and Conference 3
MIMM 619	(3)	Reading and Conference 4

OR

Any life sciences-related courses at the 500 level or higher. Departmental approval is required.

11.15 Neuroscience (Integrated Program)

11.15.1 Location

Montreal Neurological Institute, Room 141
3801 University Street
Montreal QC H3A 2B4
Canada
Telephone: 514-398-1905; 514-398-6243; or 514-398-1229
Fax: 514-398-4621
Email: *ipn@mcgill.ca* or *ipn.admissions@mcgill.ca*
Website: *www.mcgill.ca/ipn*

11.15.2 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 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 3.3 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 3.3 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 hypothesis being tested, the relevant literature, and a summary of the methods that will be used to address the research question. This proposal will then be orally presented to the student's Advisory Committee, which will review the written proposal and communicate its 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 11.15.5: 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 11.15.6: Doctor of Philosophy (Ph.D.) Neuroscience

The IPN offers a highly competitive Ph.D. degree 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.

11.15.3 Neuroscience (Integrated Program) Admission Requirements and Application Procedures

11.15.3.1 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) prefers applicants to show a higher academic standing, and 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 the *TOEFL* exam with their application and have 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.

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 3.3 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.

Applicants are expected to have a high academic standing in their previous academic studies and research.

To meet the diversity of individual interests and backgrounds, the graduate program for each student is designed 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.

11.15.3.2 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.

11.15.3.2.1 Additional Requirements

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

- Curriculum Vitae
- Personal Statement

11.15.3.3 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. 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	March 15	June 1	June 1

	Application Opening Dates		Application Deadlines	
Winter Term:	Feb. 15	Sept. 10	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.

11.15.4 Neuroscience (Integrated Program) Faculty

Director

J. Rochford

Associate Director

E. Ruthazer

Emeritus Professors

A. Aguayo; M.D. (Cordoba Nat.) F.R.C.P.(C) (*Dept. of Neurology and Neurosurgery*

Professors

H. Chertkow; M.D.(W. Ont.), F.R.C.P M.D.(W

Professors

P.S. McPherson; M.Sc.(Manit.), Ph.D.(Iowa) (*James McGill Professor*) (*Dept. of Neurology and Neurosurgery*)

M.J. Meaney; B.A.(Loyola), M.A., Ph.D.(C'dia.) (*Dept. of Psychiatry*)

B. Milner; B.A., Sc.D.(Cant.), Ph.D.(McG.) (*Dept. of Neurology and Neurosurg678.4 Tm(osur2b.641678.4 Tm(gry)Tj/F1 8.1 Tf1 0 0 1 433.9485678.4 Tm(g))Tj1 0 0 1*

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*)

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 Ther*

Associate Professors

R. Postuma; M.D. (Manit.), M.Sc. (McG.) (*Dept. of Neurology and Neurosurgery*)

D. Ragsdale; B.S.(Ill.), Ph.D.(Calif.) (*Dept. of Neurology and Neurosurgery*)

N. Rajah; Ph.D.(Tor.) (*Dept. of Psychiatry*)

Y. Rao; B.Sc.(Sichuan), Ph.D.(Tor.) (*Dept. of Neurology and Neurosurgery*)

A. Raz; M.Sc., Ph.D.(Hebrew) (*Dept. of Psychiatry*)

A. Reader; Ph.D.(King's Coll., Lond.) (*Dept. of Neurology and Neurosurgery*)

J. Renaud; M.D., M.Sc. (Montr.), F.R.C.P.(C) (*Dept. of Psychiatry*)

J. Rochford; Ph.D.(C'dia) (*Dept. of Psychiatry*)

B. Rosenblatt; B.Sc., M.D.,C.M.(McG.), F.R.C.P.(C) (*Dept. of Neurology and Neurosurgery*)

E. Ruthazer; A.B.(Princ.), Ph.D.(Calif.-SF) (*Dept. of Neurology and Neurosurgery*)

J.T. Sakata; B.A. (Cornell), Ph.D. (Texas-Austin) (*Dept. of Biology*)

A. Shmuel; B.Med., M.Sc.(Hebrew), Ph.D.(Weizmann Institute of Science) (*Dept. of Neurology and Neurosurgery*)

P.J. Sjostrom; M.Sc. (Uppsala), Ph.D. (Brandeis) (*Dept. of Neurology and Neurosurgery*)

N. Spreng; M.A., Ph.D. (Tor.) (*Dept. of Neurology and Neurosurgery*)

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.) (*Dept. of Dentistry*)

K.-F. Storch; Ph.D.(Max Planck) (*Dept. of Psychiatry*)

D. Van Meyel; Ph.D.(W. Ont.) (*Dept. of Neurology and Neurosurgery*)

A. Watt; Ph.D. (Brandeis) (*Dept. of Biology*)

P. Wintermark; M.D. (Lausanne) (*Dept. of Pediatrics*)

T.P. Wong; Ph.D. (McG.) (*Dept. of Psychiatry*)

J. Zhang; M.D. (Shanghai II Medical U.), M.Sc. (Paris XI), Ph.D. (Laval) (*Dept. of Neurology and Neurosurgery*)

Assistant Professors

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

N. Auclair Oullet; B.A., M.Sc., Ph.D. (Laval) (*School of Communication Sciences and Disorders*)

R. Bagot; Ph.D. (McG.) (*Dept. of Psychology*)

B. Bedell; B.S.(Leigh), M.D.,C.M.(McG.), Ph.D.(Texas) (*Dept. of Neurology and Neurosurgery*)

M. Berlim; M.D., M.Sc.(UFRGS) (*Dept. of Psychiatry*)

B. Bernhardt; Ph.D. (McG.) (*Department of Neurology and Neurosurgery*)

S. Blain-Moraes; B.Sc., Ph.D. (Tor.) (*School of Communication Sciences and Disorders*)

M-H. Boudrias; B.Sc.(Montr.), Ph.D.(KUMC) (*School of Physical and Occupational Therapy*)

M. Brandon; B.A.(Conn.), Ph.D.(Boston) (*Dept. of Psychiatry*)

J.P. Britt; Ph.D.(Chic.) (*Dept. of Psychology*)

M. Brossard-Racine; B.Sc. (Montr.), Ph.D. (McG.) (*School of Communication Sciences and Disorders*)

M. Chakravarty; B.Eng.(Wat.), M.Eng., Ph.D.(McG.) (*Dept. of Psychiatry*)

B. Chen; Ph.D.(SUNY) (*Dept. of Neurology and Neurosurgery*)

E. de Villers-Sidani; M.D.(McG.)

R. Diaz; B.Sc., M.D., Ph.D. (Tor.), F.R.C.S.(C) (*McG.) (*

Assistant Professors

R. Farivar; B.Sc.(Vic., BC), Ph.D.(McG.) (*Dept. of Ophthalmology*)

C. Ferland-Legault; Ph.D. (Montr.) (*Dept. of Anesthesia*)

Z. Gan-Or; M.D., Ph.D. (Tel Aviv) (*Dept. of Neurology and Neurosurgery*)

C. Grova; Ph.D.(Rennes) (*Depts. of Biomedical Engineering & Neurology and Neurosurgery*)

P. Haghighi; Ph.D.(McG.) (*Dept. of Physiology*)

L. Healy; B.Sc. (Univ. Coll. Cork), Ph.D. (Trinity Coll. Dublin) (*Dept. of Neurology and Neurosurgery*)

A. Hendricks; Ph.D.(Mich.) (*Dept. of Bioengineering*)

M. Hendricks; B.A.(Bowdoin), Ph.D. (Sing.) (*Dept. of Biology*)

P. Huot; M.D, M.Sc. (Laval), Ph.D. (Tor.) (*Dept. of Neurology and Neurosurgery*)

A. Jahani-Asl; B.Sc. (Tor.), M.Sc., Ph.D. (Ott.) (*Dept. of Oncology*)

S. Karama; M.D., Ph.D. (Montr.), F.R.C.P.(C) (*Dept. of Psychiatry*)

J. Karamchandani; B.Sc. (Harv.), M.D. (Stan.) (*Dept. of Pathology*)

A. Khadra; B.Sc. (C'dia), M.Sc., Ph.D. (Wat.) (*Dept. of Physiology*)

A. Khoutorsky; DVM, Ph.D. (Hebrew) (*Dept. of Anesthesia*)

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*

Assistant Professors

A. Suvrathan; B.Sc. (Delhi), Ph.D. (Tata Inst.) (*Depts. of Pediatrics, Neurology and Neurosurgery*)

V. Sziklas; Ph.D.(McG.) (*Dept. of Neurology and Neurosurgery*)

H. Takahashi; M.D., Ph.D.(Gunma), (*IRCM, Dept. of Experimental Medicine*)

C. Tardif; B.Sc. (McG.), M.Sc. (Imperial), Ph.D. (McG.) (*Depts. of Biomedical Engineering, Neurology and Neurosurgery*)

S. Trenholm; B.Sc. (Vic. BC) M.Sc., Ph.D. (Dal.) (*Dept. of Neurology and Neurosurgery*)

J. Van Raamsdonk; Ph.D. (Br. Col.) (*Dept. of Neurology and Neurosurgery*)

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

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

S.C. Woolley; B.Sc.(Duke), Ph.D.(Texas-Austin) (*Dept of Biology*)

T.Y. Zhang; M.D., M.Sc. (Yanbian), Ph.D. (Yonsei) (*Dept. of Psychiatry*)

Lecturer

TBA

Adjunct Professors

E. Racine; B.A.(Ott.), M.A., Ph.D.(Montr.) (*Dept. of Neurology and Neurosurgery*)

L. Xiong; Ph.D. (McG.)

11.15.5 Master of Science (M.Sc.) Neur oscience (Thesis) (45 credits)

Required Cour ses (36 credits)

NEUR 696	(6)	Master's Thesis Research
NEUR 697	(9)	Master's Thesis Proposal
NEUR 698	(9)	Master's Seminar Presentation
NEUR 699	(12)	Master's Thesis Submission
NEUR 705	(0)	Responsible Research Conduct

Complementar y Cour ses (9 credits)

3 credits from the following:

NEUR 630	(3)	Principles of Neuroscience 1
NEUR 631	(3)	Principles of Neuroscience 2

And 6 credits in other courses at the 500 level or higher that are relevant to the program.

Upon recommendation, depending upon their particular background and needs, students may be requested to take additional selected courses at the 500 level or higher.

Note: All M.Sc.-level students must register for a minimum of 12 credits per term during the first three terms of their master's program.

11.15.6 Doctor of Philosoph y (Ph.D.) Neur oscience

Students with an M.Sc. degree continuing in this Department will receive credit exemptions for graduate coursework accomplished (including NEUR 630 or NEUR 631). It may be recommended that they take specialty courses related to their field of study in neuroscience. Students with an M.Sc. degree from another program will be required to take NEUR 630 and NEUR 631 and/or other courses listed under the M.Sc. degree depending upon their background and field of study.

Students with an M.D. degree proceeding directly into a Ph.D. program will be required to take NEUR 630 and NEUR 631. They will also be required to take 6 credits of graduate-level courses.

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)

NEUR 630	(3)	Principles of Neuroscience 1
NEUR 631	(3)	Principles of Neuroscience 2
NEUR 700	(0)	Doctoral Candidacy Examination
NEUR 705	(0)	Responsible Research Conduct

Complementary Courses

11.16.6 Master of Science , Applied (M.Sc.A.) Occupational Health (Non-Thesis) (Distance) (45 credits)

This program is currently not accepting applicants.

Research Project (15 credits)

OCCH 699	(15)	Project Occupational Health and Safety

Required Cour ses (30 credits)

Note: Students must pass the Master's Integrative Examination (OCCH 600) before writing their Project.

Each course has a final (proctored) examination at the end of the term.

OCCH 600	(0)	Master's Integrative Exam
OCCH 602	(3)	Occupational Health Practice
OCCH 603	(3)	Work and Environment Epidemiology 1
		Monitoring Occupational En

11.17 Otolaryngology – Head and Neck Surgery

11.17.1 Location

Department of Otolaryngology – Head and Neck Surgery
Jewish General Hospital
3755 Chemin de la Côte-Sainte-Catherine, Suite E-903
Montreal QC H3T 1E2
Canada
Telephone: 514-340-8222, ext. 23179
Fax: 514-340-7934
Website: *www.mcgill.ca/ent*

11.17.2 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 11.17.5: 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.

11.17.3 Otolaryngology Admission Requirements and Application Procedures

11.17.3.1 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).

11.17.3.2 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.

11.17.3.2.1 Additional Requirements

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

- Curriculum Vitae
- Personal Statement
- Acceptance by a research supervisor

11.17.3.3 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*.

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	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	March 15	March 15
Wil 1 Br	Feb. 15	Sept. 10	Sept. 15	Sept. 15

Associate Professors

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.)

Adjunct Professors

L. Picard; M.D.(Montr.), F.R.C.S.(C)

The Pathology Department offers research training in a wide variety of areas such as:

- cancer research, including the fundamental biology of breast cancer, ovarian cancer, brain tumors, and the mechanisms of metastasis;
- immunology and transplantation;
- autoimmune disorders;
- ophthalmic pathology;
- cell biology;
- pulmonary disease;
- neurodegenerative disorders;
- smooth muscle pathophysiology; and
- gastrointestinal disease.

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11.18.3.3 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.

11.18.4 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., M.Sc., Ph.D.

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*)

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)

V.A. Marcus; M.D.,C.M.(McG.), F.R.C.P.(C)

R. Onerheim; M.D.(Alta.), F.R.C.P.(C)

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Associate Members

G.O.R. Arena; M.D., Chir.Vasc.(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.(Glasgow), F.R.S.C.

A. Schwertani; M.D.,C.M., Ph.D.(Lond.)

11.18.5 Master of Science (M.Sc.) P athology (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 Cour ses (30 credits)

PATH 690	(9)	M.Sc. Thesis Research Project 1
PATH 691	(9)	M.Sc. Thesis Research Project 2
PATH 692	(12)	M.Sc. Thesis Research Project 3

Required Cour ses (6 credits)

PATH 620	(3)	Research Seminar 1
PATH 622	(3)	Research Seminar 2

Complementar y Cour ses (9 credits)

3 credits, one of the following courses:

PATH 613	(3)	Research Topics in Pathology 1
PATH 614	(3)	Research Topics in Pathology 2

6 credits, two 500-, 600-, or 700-level courses offered by the Department; subject to approval of the research director and Graduate Students Committee, up to 3 credits of 500-, 600-, or 700-level credits may be taken in another department.

11.18.6 Doctor of Philosoph y (Ph.D.) Pathology

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 Cour ses (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

11.19.4 Pharmacology and Therapeutics F aculty

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. Saragovi; Ph.D.(Miami)

M. Szyf; Ph.D.(Hebrew)

J. Trasler; M.D.,C.M., Ph.D.(McG.)

Associate Professors

S. Nattel; M.D.,C.M.(McG.)

J. Tanny; Ph.D.(Harv.)

E. Zorychta; Ph.D.(McG.)

Assistant Professors

B. Castagner; Ph.D.(Col.)

L. Münter; Ph.D.(Free Univ., Berlin)

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)Associgh0213o; M1 0 0 1 93.45.9719.m(Associghws.D., Ph..(McG.))Tj.D.(Oxf.)

Associate Members

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 K

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.

11.19.6 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.

11.19.7 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.

11.19.8 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
PHAR 701	(0)	Ph.D. Comprehensive Exam
PHAR 712	(3)	Statistics for Pharmacologists

One additional 700-level PHAR course (3 credits), or the equivalent, upon approval by the Graduate Training Committee (GTC.)

Complementary Courses (3 credits)

3 credits, chosen 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 GTC on the basis of previous courses.

11.20 Physiology

11.20.1 Location

Department of Physiology
McIntyre Medical Sciences Building
3655 Promenade Sir-William-Osler
Montreal QC H3G 1Y6
Canada
Telephone: 514-398-4343
Website: *www.mcgill.ca/physiology*

11.20.2 About Ph ysiology

The Physiology Department offers training leading to **M.Sc.** and **Ph.D.** degrees. The scope of the ongoing research, and close connections with the McGill teaching hospitals, offer excellent opportunities for collaborations with hospital-based scientists. Research in the Department covers a broad range of topics from systems neuroscience to molecular and cellular biology. Interests include studies of nuclear and membrane receptors, transporters, channels, and signal transduction pathways, to the broader integration of physiological systems (cardiovascular, respiratory, renal, endocrine, immune, and central nervous systems) using an array of molecular and cellular approaches as well as quantitative techniques in data collection, analysis, and mathematical modelling by computational means.

All graduate students in Physiology receive financial support. Any faculty or associate member who agrees to supervise a graduate student who does not hold a fellowship is financially responsible for that student. Students are encouraged to apply for a fellowship; further information is available at *www.mcgill.ca/physiology/graduate-studies/financial-other-assistance*.

section 11.20.5: Master of Science (M.Sc.) Physiology (Thesis) (45 credits)

The M.Sc. program is intended for students from an academic background wishing to pursue careers in academia, industry, or in medicine. The multidisciplinary nature of the Department exposes students to a vast array of research interests and experimental approaches. Thesis work is available in

	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 1	May 15	May 15
Winter Term:	Feb. 15	Aug. 15	Sept. 1	Sept. 1
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.

Interested candidates should refer to the Department's *website* for details regarding application procedures, as well as other important information.

11.20.4 Physiology Faculty

Chair

John White

Graduate Program Director

Alvin Shrier

Emeritus Professors

Thomas M.S. Chang; B.Sc., M.D.,C.M., Ph.D.(McG.), F.R.C.P.(C)

Kresimir Krnjevic; O.C., B.Sc., Ph.D., M.B., Ch.B.(Edin.), F.R.S.C.

Wayne S. Lapp; M.S.A.(Tor.), Ph.D.(McG.)

Mortimer Levy; B.Sc., M.D.,C.M.(McG.), F.R.C.P.(C) (*joint appt with Medicine*)

George Mandl; B.Sc.(C'dia); Ph.D.(McG.)

Michael Mackey; B.A., Ph.D.(Wash.) (*Joseph Morley Professor of Physiology*)

Geoffrey Melvill Jones; B.A., M.A., M.B., B.Ch., M.D.(Cant.)

Joseph Milic-Emili; M.D.(Milan) (*joint appt with Medicine*)

Canio Polosa; M.D., Ph.D.(McG.)

Douglas G.D. Watt; M.D., Ph.D.(McG.)

Professors

Maurice Chacron; Ph.D.(Ott.)

Monroe W. Cohen; B.Sc., Ph.D.(McG.)

Ellis J. Cooper; B.Eng.(Sir G. Wms.), M.Sc.(Surr.), Ph.D.(McM.)

Leon Glass; B.S.(Brooklyn), Ph.D.(Chic.) (*Rosenfeld Professor of Medicine*) (*joint appt. with Medicine*)

Phil Gold; C.C., B.Sc., M.Sc., Ph.D., M.D.,C.M.(McG.), F.R.C.P.(C), F.R.S.C. (*Douglas G. Cameron Professor of Medicine*) (*joint appt. with Medicine*)

John Hanrahan; Ph.D.(Br. Col.)

David Goltzman; B.Sc., M.D.,C.M.(McG.) (*Antoine G. Massabki Professor of Medicine*) (*joint appt. with Medicine*)

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*)

Premsyl Ponka; M.D., Ph.D.(Prague) (*joint appt. with Medicine*)

Alvin Shrier; B.Sc.(C'dia), Ph.D.(Dal.) (*Hosmer Professor of Physiology*)

John White; B.Sc., M.Sc.(Car.), Ph.D.(Harv.) (*joint appt. with Medicine*)

Associate Professors

Erik Cook; Ph.D.(Baylor Coll., Tx)

Mladen Glavinovic; B.Sc.(Zagreb), M.Sc.(Tor.), Ph.D.(McG.)

Michael Guevara; Ph.D.(McG.)

Russell Jones; Ph.D.(Tor.)

Ursula Stochaj; Ph.D.(Cologne)

Associate Professor (Part-time)

Nicole Bernard; B.Sc.(McG.), Ph.D.(Duke)

Assistant Professors

Claire Brown; B.Sc.(St. Mary's), Ph.D.(W. Ont.)

Gil Bub; B.Sc., Ph.D(McG.)

Anmar Khadra; B.Sc.(C'dia), M.Sc., Ph.D.(Wat.)

Connie Krawczyk; B.Sc.(Guelph), Ph.D.(Tor.) (*joint appt. with Microbiology & Immunology*)

Arjun Krishnaswamy; B.Sc. Ph.D.(McG.)

Judith Natalia Mandl; B.Sc.(Warw.), Ph.D.(Emory)

Anastasia Nijnik; M.Biochem., Ph.D.(Oxf.)

Masha Prager-Khoutorsky; B.Sc., Ph.D.(Hebrew)

Daniela Quail; B.Sc., Ph.D.(W.Ont.)

Reza Sharif-Naeini; B.Sc.(Montr.), M.Sc., Ph.D.(McG.)

11.20.5 Master of Science (M.Sc.) Physiology (Thesis) (45 credits)

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

Elective Courses (6 credits)

Students must select 6 approved credits in Physiology or Science at the 500 level or above.

11.20.6 Master of Science (M.Sc.) Physiology (Thesis): Bioinformatics (45 credits)

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)

COMP 616D1	(1.5)	Bioinformatics Seminar
COMP 616D2	(1.5)	Bioinformatics Seminar
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

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

11.20.7 Master of Science (M.Sc.) Ph ysiology (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 Cour ses (27 credits)

PHGY 621	(12)	Thesis 1
PHGY 622	(12)	Thesis 2
PHGY 623	(3)	M.Sc. Final Seminar

Required Cour ses (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

Complementar y Cour ses (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

Seminars in Chemical Biology 1 (BIOC 610) and Seminars in Chemical Biology 3 (BIOC 611) 221.inars in Ch1Ch8negres2)

PHGY 720	(1)	Ph.D. Seminar Course 1
PHGY 721	(1)	Ph.D. Seminar Course 2
PHGY 722	(1)	Ph.D. Seminar Course 3
	(1)	Ph.D. Seminar Course 4

section 11.21.5: 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.

11.21.3 Psychiatry Admission Requirements and Application Procedures

11.21.3.1 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

11.21.3.2 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 procedures.

11.21.3.2.1 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

11.21.3.3 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*.

Director of Graduate Program

N. Mechawar

Emeritus Professors

F. Abbott; B.Sc.(McM.), M.Sc., Ph.D.(McG.)

L. Annable; B.Sc.(Liv.), Dipl. in Stat.(Edin.)

M.K. Birmingham; B.A.(Bennington), M.Sc., Ph.D.(McG.)

F. Engelsmann

N. Frasure-Smith; B.A. Ph.D.(Johns Hop.)

A. M. Ghadirian

C. Gianoulakis; Ph.D.

H. A. Guttmann; M.D.

J.C. Negrete; M.D., Dip.Psych.

G. Pinard, M.D.

S. Young

Professors

C. Benkelfat; M.D.(Rabat) (*James McGill Professor*)

D. Boivin; Ph.D.(Montr.)

P. Boksa; B.Sc., Ph.D.(McG.)

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

J. Breitner; B.A.(Harv.), M.P.H.(Johns Hop.), M.D.(Penn.)

A. Brunet; Ph.D.(Montr.)

N. Cermakian; B.Sc.(UQTR), M.Sc., Ph.D.(Montr.)

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

S. El Mestikawy; Ph.D.(Paris VI)

M.-J. Fleury; M.A., Ph.D.(Montr.)

C. Flores; B.Sc., M.A., Ph.D.(C'dia)

S. Gauthier; B.A., M.D.(Montr.)VIar

Professors

R. Palmour; B.A., Ph.D.(Texas)

J. Paris; M.D.,C.M.(McG.)

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.)

Associate Professors

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)

M. Lalinec-Michaud; B.A., M.D.,C.M.(Paris IV)

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.(La

Assistant Professors

J. Friedland; M.D.(Calg.)

G. Gagnon

M. Gauthier; M.D.,C.M.(Montr.)

K. Geagea; M.D.,C.M.(SJU)

M.-C. Geoffroy; Ph.D.(Montr.)

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.)

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

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.)

F. Key

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)

S. Lamarre; B.A., M.D.,C.M.(Laval)

M. Laporta; Dip.Psychol., M.D.,C.M.(McG.)

L. Laporte; B.A.(McG.), M.Psychol., Ph.D.(Montr.)

M. Larose; M.D.(Laval)

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)

G.L. Low; B.A.(Qu.), Dip.Psychol.(McG.), M.D.,C.M.(Ott.)

N.C.P. Low; M.D., M.Sc.(McG.)

W. Ma; M.D., M.Sc.(Tongji), Ph.D.(McG.)

S. K. Margolese; Ph.D.

R. Martins; Ph.D.(Montr.)

N. Masrouha; M.D.(Sher.)

T. Measham; B.Sc., M.D.(McG.)

X. Meng; Ph.D.

Assistant Professors

M. Messier; B.A.(Montr.), M.B.A.(HEC)

G. Meterissian; Gr.Dip.Psychiat.(McG.), M.D.,C.M.(Montr.)

T.M. Milroy; B.Sc., M.D.,C.M.(Md.), Gr. Dip. Psychiat.(McG.)

M. Miresco; M.D.,C.M.(McG.)

F. Nazlie; M.D.

J.P. Near; Ph.D.(W. Ont.)

T. V. Nguyen; M.D.

K.P. O'Donnell; Ph.D.(Imp. Coll. Lon.)

J.A. O'Neil; B.A.(C'dia), Dip.Psychol., M.D.,C.M.(McG.)

M.A. Ouimet; D.M.D.(Sher.), Gr.Dip.Psychiat.(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. RosenblMOm(M.A. (.(C4O F)Tj1 0 0 1 157.Mrr97.992 458.32 Tmork.))Tj1 0 0 1 70.52 452.2 TmCB. RV
y; B.Sc.(McG.), M.D.,C.M.DalG.)

TMcG.), M.D.,C.M.(Sher
L.P

F

J Russnell; Ph.D.(McG.)

Assistant Professors

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.)

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

M.A. Wolf; M.Sc., M.D.,C.M.(Strasbourg)

Y. Wolf; M.D.(McG.)

G. Zahirney; M.D.(McG.)

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.)

11.22 Surgery, Experimental

11.22.1 Location

Surgery, Experimental
Montreal General Hospital, Room C9-169
1650 Cedar Avenue
Montreal QC H3G 1A4
Canada
Graduate Program Coordinator: Sharon Turner
Telephone: 514-934-1934, ext. 42837

section 11.22.10: 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 11.22.11: 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-based foundation in the innovation process.

section 11.22.12: 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.

11.22.3 Experimental Surgery Admission Requirements and Application Procedures

11.22.3.1 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.

11.22.3.2 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.

11.22.3.2.1 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 f

Professors

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)

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.(Lund)

K.J. Lachapelle; M.Sc., M.D.,C.M.(McG.)

J. Lapointe; M.D., Ph.D.(Laval)

L. Lessard; B.Sc., M.D.(Laval), F.R.C.S.(C)

A. Meguerditchian; M.D., M.Sc.(Montr.), F.R.C.S., F.A.C.S.

C. O'Flaherty; D.V.M., Ph.D.(Buenos Aires)

S. Paraskevas; M.D., Ph.D.(Laval)

P. Puligandla; M.D., M.Sc.(W. Ont.), F.R.C.S.(C)

J. Sampalis; M.Sc., Ph.D.(McG.)

T. Steffen; M.D.(Switz.), Ph.D.(McG.)

A. Thomson; Ph.D.(Lond.)

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

Assistant Professors

A. Dragomir; M.Sc., Ph.D.(Montr.)

J. Faria; M.D.,C.M., M.Sc.(McG.), F.R.C.S.(C)

J. Fiore; M.Sc.(Fed. U. Sao Paulo), Ph.D.(Melb.)

L. Haglund; B.Sc., Ph.D.(Lund)

O. Huk; B.Sc., M.D.,C.M.(McG.), M.Sc.(Montr.)

Revision, March 2018. End of re vision.

11.22.9 Master of Science (M.Sc.) Experimental Sur gery (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.

& IP), and ETS (prototyping). the first semester of the program core focuses on team building and, supported by lectures, the students embark on a needs-finding process by observing all aspect of clinical activity in their focus themes. Trainees learn basic prototyping skills, start up organization and project management, supplemented by a basic statistics course and an introduction to the current status of biomedical research innovation. This certificate provides a solid foundation in the innovation process.

Required Cour ses (15 credits)

12 credits in:

EXSU 605	(3)	Biomedical Research Innovation
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

Some courses may be substituted with equivalents if timetabling requires it.

Revision, March 2018. End of re vision.

11.22.12 Graduate Diploma (Gr . Dip.) Sur gical Inno vation (30 credits)

Revision, March 2018. Star t of re vision.

The cores of this 30-credit program are two-1 0 0 1 26 403.3re tw

CMR2 542	(3)	Marketing Principles and Applications
CPL2 510	(3)	Communication and Networking Skills

Or:

9 credits of graduate-level courses taken at Concordia University, chosen in consultation with the program director/adviser.

Elective Cour se (3 credits)

3 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.

Revision, March 2018. End of re vision.