Interfaculty Studies

Programs, Courses and University Regulations

2019-2020

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

1 . McGill University reserves the right to mak

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1 Dean's Welcome

To Graduate Students and Postdoctoral Fellows:

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

4 Graduate Studies at a Glance

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

5 Program Requirements

Refer to *University Regulations & Resources* > *Graduate* > *Regulations* > *: Program Requirements* for graduate program requirements for the following:

- Master's Degrees
- Doctoral Degrees
- Ad Personam Programs (Thesis Option Only)
- Coursework for Graduate Programs, Diplomas, and Certificates

6 Graduate Admissions and Application Procedures

Please refer to *University Regulations & Resources* > *Graduate* > *: Graduate Admissions and Application Procedures* for information on:

- Application for Admission
- Admission Requirements
- Application Procedures
- Competency in English

and other important information regarding admissions and application procedures for Graduate and Postdoctoral Studies.

7 Fellowships, Awards, and Assistantships

Please refer to *University Regulations & Resources* > *Graduate* > *: Fellowships, Awards, and Assistantships* for information and contact information regarding fellowships, awards, and assistantships in Graduate and Postdoctoral Studies.

8 Postdoctoral Research

Students must inform themselves of University rules and regulations and keep abreast of any changes that may occur. The *Postdoctoral Research* section of this publication contains important details required by postdoctoral scholars during their studies at McGill and should be periodically consulted, along with other sections and related publications.

8.1 Postdocs

Postdocs are recent graduates with a Ph.D. or equivalent (i.e., Medical Specialist Diploma) engaged by a member of the University's academic staff, including Adjunct Professors, to assist him/her in research.

Postdocs must be appointed by their department and registered with Enrolment Services in order to have access to University facilities (library, computer, etc.).

8.2 Guidelines and Policy for Academic Units on Postdoctoral Education

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

1. **Definition and Status**

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

2. **Registration**

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

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

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

   i. Appointments may not exceed your registration eligibility status.

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

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

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

5. **Responsibilities**

i. Postdocs are subject to the responsibilities outlined at

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 leav

12.1.2 About Biological and Biomedical Engineering

The Biological and Biomedical Engineering (BBME) graduate program is an interfaculty program involving the Department of Bioengineering in the Faculty of Engineering and the Department of Biomedical Engineering in the Faculty of Medicine. The BBME interfaculty program builds on the excellence and high standard of its predecessor graduate program in Biomedical Engineering. This broader interfaculty restructuring supports the growing trend in research universities toward formalized interdisciplinary studies and multifaculty collaboration.

BBME students come from a wide range of backgrounds including engineering, physics, chemistry, biology, and dentistry, among others. The multicultural diversity of our student body is a strength of the program, as networking and collaborative opportunities are vast. Students in BBME have supervisors

presentation skills that will form the foundation for his/her future 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. Through independent research and thesis writing, 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.

For more information please consult *www.mcgill.ca/bbme/prospective-students/doctoral-program*.

12.1.3 Biological and Biomedical Engineering Admission Requirements and Application Procedures

12.1.3.1 Admission Requirements

For up-to-date admission requirements, please consult *www.mcgill.ca/bbme/prospective-students/how-apply* and *University Regulations & Resources* > *Graduate* > *Graduate Admissions and Application Procedures* > *: Admission Requirements (Minimum Requirements to be Considered for Admission)*.

12.1.3.2 Application Procedures

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

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

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

12.1.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Biological and Biomedical Engineering Graduate Program and may be revised at any time. Applicants must verify all deadlines and documentation

Thesis Courses (24 credits)

BBME 693	(6)	Thesis Research 1
BBME 694	(6)	Thesis Research 2
BBME 695	(12)	Thesis Submission

Required Courses (3 credits)

BBME 600D1	(1.5)	Seminars in Biological and Biomedical Engineering
BBME 600D2	(1.5)	Seminars in Biological and Biomedical Engineering

OR

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

Complementary Courses (18 credits)

3 credits from the following quantitative courses:

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

6 credits from the following:

BIEN 510	(3)	Engineered Nanomaterials for Biomedical Applications
BIEN 520	(3)	High Throughput Bioanalytical Devices
BIEN 530	(3)	Imaging and Bioanalytical Instrumentation
BIEN 540	(3)	Information Storage and Processing in Biological Systems
BIEN 550	(3)	Biomolecular Devices
BIEN 560	(3)	Biosensors
BIEN 570	(3)	Active Mechanics in Biology
BIEN 590	(3)	Cell Culture Engineering
BIEN 680	(4)	Bioprocessing of Vaccines
BMDE 501	(3)	Selected Topics in Biomedical Engineering
BMDE 502	(3)	BME Modelling and Identification

BMDE 503	(3)	Biomedical Instrumentation
BMDE 504	(3)	Biomaterials and Bioperformance
BMDE 505	(3)	Cell and Tissue Engineering
BMDE 508	(3)	Introduction to Micro and Nano-Bioengineering
BMDE 512	(3)	Finite-Element Modelling in Biomedical Engineering
BMDE 519	(3)	Biomedical Signals and Systems
BMDE 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 653	(3)	Patents in Biomedical Engineering
BMDE 654	(3)	Biomedical Regulatory Affairs - Medical Devices
BMDE 655	(3)	Biomedical Clinical Trials - Medical Devices
BMDE 660	(3)	Advanced MR Imaging and Spectroscopy of the Brain
MDPH 607	(3)	Medical Imaging

9 credits at the 500-level or higher chosen from a list on the program web site https://www.mcgill.ca/bbme/students/courses or from other courses, at the 500 level or higher, at least 3 credits of which have both life sciences content and content from the ph

12.2 Neuroscience (Integrated Program)

12.2.1 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*

12.2.2 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 12.2.5: Master of Science (M.Sc.) Neuroscience (Thesis) (45 credits)

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

section 12.2.6: 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.

12.2.3 Neuroscience (Integrated Program) Admission Requirements and Application Procedures

12.2.3.1 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 a 3.7 Tpec6 423.061 Tmxceptional cirogram for each stu

12.2.4 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*)

B. Collier; Ph.D. (*Dept. of Pharmacology*)

R. Del Maestro; Ph.D. (Uppsala) (*Dept. of Neurology and Neurosurgery*)

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

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

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

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

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

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

Professors

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

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

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

D. Arnold; B.Sc., M.D.(Cornell), F.R.C.P.(C) (*James McGill Professor*) (*Dept. of Neurology and Neurosurgery*)

M. Avoli; M.D.(Rome), Ph.D.(McG.) (*Dept. of Neurology and Neurosurgery*)

S. Baillet; Ph.D.(Paris XI) (*Dept. of Neurology and Neurosurgery*)

C. Baker; Ph.D.(Calif.-San Diego) (*Dept. of Ophthalmology*)

S. Baum; Ph.D.(Brown) (*School of Communication Sciences and Disorders*)

C. Benkelfat; M.D., C.S.P.Q., D.E.R.B.H. (*Dept. of Psychiatry*)

D. Bernard; Ph.D. (Johns Hop.) (*Dept. of Pharmacology*)

A. Bernasconi; M.D.(Basel) (*Dept. of Neurology and Neurosurgery*)

D. Boivin; M.D. (Laval), Ph.D. (Montr.) (*Dept. of Psychiatry*)

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

C. Bourque; B.Sc.(Ott.), Ph.D.(McG.) (*Dept. of Neurology and Neurosurgery*)

D. Bowie; Ph.D.(Lond.) (*Dept. of Pharmacology and Therapeutics*)

J.C.S. Breitner; M.D.(Penn.), MPH (Johns Hop.) (*Dept. of Psychiatry*)

C. Bushnell; Ph.D.(Amer.) (*Dept. of Anaesthesia*)

S. Carbonetto; M.Sc.(Mass.), Ph.D.(N. Carolina) (*Dept. of Neurology and Neurosurgery*)

F. Cervero; M.D., Ph.D.(Madrid), D.Sc.(Edin.) (*Dept. of Anesthesia*)

H. Chertkow; M.D.(W. Ont.), F.R.C.P.(C) (*Dept. of Neurology and Neurosurgery*)

P. Clarke; M.A.(Camb.), Ph.D.(Lond.) (*Dept. of Pharmacology and Therapeutics*)

T. Coderre; Ph.D.(McG.) (*Depts. of Anesthesia, Neurology and Neurosurgery, Psychology, and Experimental Medicine*)

D.L. Collins; M.Eng., Ph.D.(McG.) (*Depts. of Neurology and Neurosurgery, Biomedical Engineering*)

E. Cooper; Ph.D.(McM.) (*Dept. of Physiology*)

C. Cuello; M.D.(Buenos Aires), M.A., D.Sc.(Oxf.) (*Dept. of Pharmacology and Therapeutics*)

Professors

G. Multhaup; Ph.D.(Cologne) (*Dept. of Pharmacology and Therapeutics*)

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

J. Orlowski; B.Sc. (McG.), M.Sc., Ph.D. (Qu.) (*Dept. of Physiology*)

D.J. Ostry; B.A.Sc., M.A.Sc., Ph.D.(Tor.) (*Dept. of Psychology*)

O. Overbury; Ph.D.(C'dia) (*Dept. of Ophthalmology*)

C. Palmer; B.Sc., M.Sc., Ph.D.(Cornell) (*Dept. of Psychology*)

K. Pantopoulos; B.Sc., Ph.D. (Aristotle) (*Dept. of Medicine*)

M. Pell; B.A.(Ott.), M.Sc., Ph.D.(McG.) (*School of Communication Sciences and Disorders*)

M. Petrides; B.Sc., M.Sc.(Lond.), Ph.D.(Cant.) (*James McGill Professor*) (*Depts. of Neurology and Neurosurgery, Psychology*)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

C. Wolfson; Ph.D.(McG.) (*Dept. of Epidemiology and Biostatistics*)

R.J. Zatorre; A.B.(Boston), M.Sc., Ph.D.(Brown) (*Dept. of Neurology and Neurosurgery*)

Associate Professors

P. Archambault; B.Sc.(McG.), M.Sc., Ph.D.(Montr.) (*Dept. of Physical and Occupational Therapy*)

J. Armony; Ph.D.(NYU) (*Dept. of Psychiatry*)

E. Balaban; Ph.D.(Rockefeller) (*Dept. of Psychology*)

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

G. Bernard; M.D., M.Sc. (Montr.) F.R.C.P.(C) (*Depts. of Pediatrics and Neurology and Neurosurgery*)

Associate Professors

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), 8.1 Tf1 0 0 1 178.017 584.08 Tm(Instica6601238.36 Tm(. Clu5N9.8 Tm())Tjaa)46.96Cluronal and Co6(. 7Clu5N9.8 Tmaa)46.96Cluro8 T

Associate Professors

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) (*Dept. of Neurology and Neurosurgery*)

S. Ducharme; M.D. (Montr.), M.Sc. (McG.), F.R.C.P.(C) (*Depts. of Psychiatry, Neurology and Neurosurgery*)

M. Elsabbagh; B.Sc. (McG.), Ph.D. (UQAM) (*Dept. of Neurology and Neurosurgery*)

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

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

Assistant Professors

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*)

L. Koski; B.Sc.(T

Assistant Professors

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. (Y

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

Complementary Courses (6 credits)

6 credits at the 500, 600, or 700 level, approved by the graduate program adviser.

12.3 Quantitative Life Sciences

12.3.1 Location

Telephone: 514-398-4826
Email: *coordinator.qls@mcgill.ca*
Website: *www.mcgill.ca/qls*

12.3.2 About Quantitative Life Sciences

Quantitative Life Sciences is the broad application of mathematical, computational and other quantitative methods to study biological systems at all scales—from single molecules to the environment. It is part of a rapidly expanding field that includes such specializations as systems biology, bioinformatics, biophysics, medical informatics, computational biology, computational pharmacology, computational neuroscience, and mathematical biology.

section 12.3.5: Doctor of Philosophy (Ph.D.) Quantitative Life Sciences

Please refer to the *QLS website* for further details.

12.3.3 Quantitative Life Sciences Admission Requirements and Application Procedures

12.3.3.1 Admission Requirements

General

Applicants are expected to hold an undergraduate degree in one of the following areas (or equivalent): biology, chemistry, physiology, genetics, engineering, computer science, mathematics, statistics, physics, or chemistry.

Applicants must have a strong quantitative background. Such a background may be obtained by having at least the equivalent of a minor in computer science, mathematics, statistics, physics,

QLSC 603D2	(0)	Quantitative Life Sciences Seminars 3
QLSC 701	(0)	Ph.D. Comprehensive Exam

Complementary Courses

9-11 credits

Students will be required to take one or two courses from each of the Quantitative and Life Science Blocks for a total of three, stream-specific courses.

Biophysics Stream

Quantitative

BIEN 530	(3)	Imaging and Bioanalytical Instrumentation
BMDE 512	(3)	Finite-Element Modelling in Biomedical Engineering
BMDE 519	(3)	Biomedical Signals and Systems
CHEM 514	(3)	Biophysical Chemistry
CHEM 520	(3)	Methods in Chemical Biology
COMP 551	(4)	Applied Machine Learning
PHYS 519	(3)	Advanced Biophysics
PHYS 559	(3)	Advanced Statistical Mechanics
QLSC 611	(3)	Directed Readings

Life Sciences

BIOC 605	(3)	Protein Biology and Proteomics
BIOL 551	(3)	Principles of Cellular Control
PHGY 518	(3)	Artificial Cells
PHGY 520	(3)	Ion Channels
QLSC 611	(3)	Directed Readings

Computational and Statistical Molecular Biology Stream

Quantitative

BIOS 601	(4)	Epidemiology: Introduction and Statistical Models
BMDE 502	(3)	BME Modelling and Identification
COMP 551	(4)	Applied Machine Learning
COMP 561	(4)	Computational Biology Methods and Research
COMP 598	(3)	Topics in Computer Science 1
HGEN 677	(3)	Statistical Concepts in Genetic and Genomic Analysis
MATH 523	(4)	Generalized Linear Models
MATH 533	(4)	Honours Regression and Analysis of Variance
MATH 680	(4)	Computation Intensive Statistics
QLSC 611	(3)	Directed Readings

Life Sciences

BIOC 603	(3)	Genomics and Gene Expression
BIOL 551	(3)	Principles of Cellular Control

EXMD 602	(3)	Techniques in Molecular Genetics
HGEN 661	(3)	Population Genetics
HGEN 692	(3)	Human Genetics
PHAR 503	(3)	Drug Discovery and Development 1
PHAR 505	(3)	Structural Pharmacology
QLSC 611	(3)	Directed Readings

Ecosystems Stream

Quantitative

ENVB 506	(3)	Quantitative Methods: Ecology
MATH 523	(4)	Generalized Linear Models
MATH 525	(4)	Sampling Theory and Applications
MATH 533	(4)	Honours Regression and Analysis of Variance
MATH 537	(4)	Honours Mathematical Models in Biology
MATH 547	(4)	Stochastic Processes
MATH 556	(4)	Mathematical Statistics 1
QLSC 611	(3)	Directed Readings

Life Sciences

BIOL 509	(3)	Methods in Molecular Ecology
BIOL 510	(3)	Advances in Community Ecology
BIOL 540*	(3)	Ecology of Species Invasions
BIOL 594	(3)	Advanced Evolutionary Ecology
ENVR 540*	(3)	Ecology of Species Invasions
QLSC 611	(3)	Directed Readings

* Students either choose BIOL 540 or ENVR 540 but not both.