McGill

Report of the
Academic Policy Committee D19-28

496th REPORT OF THE ACADEMIC POLICY COMMITTEE TO SENATE
on the APC meeting held on December 12, 2019

I. TO BE APPROVED BY SENATE

(A) NEW TEACHING PROGRAMS REQUIRING SENATE APPROVAL

Faculty of Medicine

M.Sc. (Applied) in Translational Biomedical Engineering: Non-Thesis (45cr.) – *Appendix A*

APC reviewed, at its meeting of December 12, 2019, and approved, by an electronic vote, a proposal from the Faculty of Medicine to create a new M.Sc. (Applied) in Translational Biomedical Engineering: Non-Thesis. There is a strong student interest and a demand in the industry for students with this expertise.

APC therefore recommends that Senate approve the following motion:

Be it resolved that Senate approve the proposed M.Sc. (Applied) in Translational Biomedical Engineering: Non-Thesis (45cr.).

Graduate Diploma in Oncology (30 cr.) – *Appendix B*

APC reviewed, at its meeting of December 12, 2019, and approved, by an electronic vote, a proposal from the Faculty of Medicine to create a new Graduate Diploma in Oncology. The program will focus on population and global cancer control, psychosocial oncology/palliative care, and clinical cancer research and cancer care services and quality.

APC therefore recommends that Senate approve the following motion:

Be it resolved that Senate approve the proposed Graduate Diploma in Oncology (30cr.).

(B) ACADEMIC PERFORMANCE ISSUES / POLICIES / GOVERNANCE/AWARDS

Teaching and Learning Services – *Appendix C*

Revised Teaching Award Guidelines

APC reviewed, at its meeting of December 12, 2019, and approved, by an electronic vote, a proposal from the Teaching and Learning Services to revise the Teaching Award Guidelines.

APC therefore recommends that Senate approve the following motion:

Be it resolved that Senate approve the proposed Revised Teaching Award Guidelines.

(C) CREATION OF NEW UNITS / NAME CHANGES / REPORTING CHANGES

Faculty of Medicine – *Appendix D*

McGill Cancer Institute

APC reviewed, at its meeting of December 12, 2019, and approved, by an electronic vote, a proposal from the Faculty of Medicine to create the McGill Cancer Institute. The establishment of this academic

Institute, which would include the Rosalind and Morris Goodman Cancer Research Centre, will provide an excellent structure for accomplishing McGill's cancer research and educational objectives.

APC therefore recommends that Senate approve the following resolution:

Be it resolved that Senate approve and recommend to the Board of Governors for approval the creation of the McGill Cancer Institute / Institut du cancer de McGill.

(D) CHANGES IN DEGREE DESIGNATION – *none*

(E) INTER-UNIVERSITY PARTNERSHIPS – *none*

(F) OTHER– *none*

II. TO BE ENDORSED BY SENATE / PRESENTED TO SENATE FOR DISCUSSION – *none*

III. APPROVED BY APC IN THE NAME OF SENATE

(A) DEFINITIONS – *none*

(B) STUDENT EXCHANGE PARTNERSHIPS / CONTRACTS / INTERUNIVERSITY PARTNERSHIPS

(C) OTHER – *none*

IV. FOR THE INFORMATION OF SENATE

A) ACADEMIC UNIT REVIEWS – *none*

B) APPROVAL OF COURSES AND TEACHING PROGRAMS

1. Programs

a) APC Approvals (new options/concentrations and major revisions to existing programs)

i. New Programs- *none*

ii. Major Revisions of Existing Programs
New Concentration:
Faculty of Science
Ph.D. in Atmospheric and Oceanic Sciences; Environment (0 cr.)

b) APC Subcommittee on Courses and Teaching Programs (SCTP) Approvals
(Summary Reports: http://www.mcgill.ca/sctp/documents/)

i. Moderate and Minor Program Revisions
Approved by SCTP on October 24th, 2019 and reported to APC on December12, 2019

Faculty of Arts
B.A.; Honours in Classics (54 cr.)
Faculty of Engineering
B.Eng. in Bioengineering (142-152)

Graduate and Postdoctoral Studies

Faculty of Agricultural and Environmental Sciences

Ph.D. in Bioresource Engineering: Environment (0 cr.)

Ph.D. in Entomology: Environment (0 cr.)

Ph.D. in Plant Science: Environment (0 cr.)

Ph.D. in Renewable Resources: Environment (0 cr.)

M.Sc.(Applied) in Bioresource Engineering; Non-Thesis - Environment (45 credits)

Faculty of Dentistry

M.Sc. in Dental Sciences; Non-Thesis (45 cr.)

Faculty of Law

LL.M. in Law; Environment (45 credits)

LL.M. in Law; Non-Thesis - Environment (45 credits)

Faculty of Medicine

M.Sc.(Applied) in Occupational Therapy; Non-Thesis (62 credits)

M.Sc.(Applied) in Physical Therapy; Non-Thesis (62 credits)

Faculty of Science

Ph.D. in Biology; Environment (0 cr.)

Ph.D. in Geography; Environment (0 cr.)

M.Sc. in Geography; Environment (45 credits)

Approved by SCTP on November 7th, 2019 and reported to APC on December12, 2019

Faculty of Arts

B.A.; Major Concentration in Russian (36 cr.)

B.A.; Minor Concentration in Russian Culture (18 cr.)

B.A.; Honours in Russian (60 cr.)

School of Continuing Studies

Certificate in Supply Chain Management and Logistics (30 cr.)

Faculty of Engineering

B.Eng. in Computer Engineering (133-139 cr.)

B.Eng. in Electrical Engineering (134-138 cr.)

B.Eng.; Honours in Electrical Engineering (138-142 cr.)

B.S.E. (136-143 cr.)

Graduate and Postdoctoral Studies

Faculty of Medicine

M.Sc. in Experimental Medicine; Environment (45 cr.)

Faculty of Science

B.Sc.; Major in Physics (60-63 cr.) [from September 5, 2019]

B.Sc.; Honours in Immunology (Interdepartmental) (76 cr.)

B.Sc.; Minor in Education for Science Students (18 cr.)

Approved by SCTP on November 21st, 2019 and reported to APC on December12, 2019

Faculty of Arts

B.A.; Honours in Sociology (51 cr.)

Graduate and Postdoctoral Studies

Faculty of Arts

M.A. in Economics; Non-Thesis - Development Studies (45 cr.)

M.A. in Economics; Non-Thesis – Population Dynamics (45 cr.)

ii. Program Retirements

Approved by SCTP on November 21st, 2019 and reported to APC on December12, 2019

Graduate and Postdoctoral Studies

Faculty of Dentistry

M.Sc. in Dental Sciences; Oral and Maxillofacial Surgery (46 cr.)

Faculty of Medicine

M.Sc. in Public Health; Non-Thesis – Global Health (60 cr.)

M.Sc. in Public Health; Non-Thesis – Population Dynamics (60 cr.)

Faculty of Science

M.Sc. in Atmospheric and Oceanic Sciences; Environment (45 cr.)

2. Courses

a) New Courses

Reported as having been approved by SCTP October 24th, 2019: 9

Faculty of Arts: 4

Faculty of Dentistry: 3

Faculty of Medicine: 2

Reported as having been approved by SCTP November 7th, 2019: 11

Faculty of Arts: 7

Faculty of Dentistry: 1

Faculty of Engineering: 2

Faculty of Medicine: 1

Reported as having been approved by SCTP November 21st, 2019:11

Faculty of Agricultural and Environmental Sciences: 3

Faculty of Arts: 2

Faculty of Medicine: 6

b) Course Revisions

Reported as having been approved by SCTP October 24th, 2019: 39

Faculty of Agricultural and Environmental Sciences: 1

Faculty of Arts: 26

Faculty of Education: 8

Faculty of Engineering: 1

Faculty of Medicine: 2

Faculty of Science: 1

Reported as having been approved by SCTP November 7th, 2019: 23

Faculty of Arts: 1

School of Continuing Studies: 2

Faculty of Education: 11

Faculty of Engineering: 7

Faculty of Medicine: 2

Reported as having been approved by SCTP November 21st, 2019:4

Faculty of Arts: 4

c) Course Retirements

Reported as having been approved by SCTP October 24th, 2019: 4

Faculty of Agricultural and Environmental Sciences: 1

Faculty of Arts: 2

Faculty of Science: 1

Reported as having been approved by SCTP November 7th, 2019:

Faculty of Education: 1

Faculty of Engineering: 2

3. Other

McGill

New Program/Major or Minor/Concentration Proposal Form

(2017)

1.0 Degree Title
Please specify the two degrees for concurrent degree programs

Master of Science, Applied (M.Sc.A.)

1.1 Major (Legacy = Subject) (30-char. max.)

Translational Biomedical Engineering

1.2 Concentration (Legacy = Concentration/Option) If applicable to Majors only (30 char. max)

Non-Thesis

1.3 Minor (with Concentration, if Applicable) (30char. max)

2.0 Administering Faculty/Unit

Graduate and Postdoctoral Studies (GPS)

Offering Faculty/Department

MD - Biomedical Engineering

3.0 Effective Term of Implementation
(Ex. Sept. 2004 = 200409)
Term

202009

4.0 Rationale and Admission Requirements for New Proposal

The focus of McGill's current graduate Thesis program in Biological and Biomedical Engineering is to prepare students for careers in research or academia. These research-intensive programs offer little training in the translational skills required to design, develop, manufacture, and commercialize biomedical devices and technologies. There is strong student interest in such training and a clear demand in industry for students with this expertise.

This professional Master's program expands on the existing Graduate Certificate in Translational Biomedical Engineering by increasing the range of technical and translational training, and by providing experiential training in the form of a 4-month Internship.

Admission Requirements: See last page. Entry allowed in Fall and Winter.

The departmental curriculum committee reviewed and approved this proposal in March 2019.

5.0 Program Information

Please check appropriate box(es)

5.1 Program Type

- ☐ Bachelor's Program
- ☐ Master's
- ☒ M.Sc.(Applied) Program
- ☐ Dual Degree/Concurrent Program
- ☐ Certificate
- ☐ Diploma
- ☐ Graduate Certificate
- ☐ Graduate Diploma
- ☐ Ph.D. Program
- ☐ Doctorate Program (Other than Ph.D.)
- ☐ Private Program
- ☐ Off-Campus Program
- ☐ Distance Education Program (By Correspondence)
- ☐ Other:

Please specify

5.2 Category

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

Please specify

5.3 Level

- ☐ Undergraduate
- ☐ Dentistry/Law/Medicine
- ☐ Continuing Studies (Non-Credits)
- ☒ Masters & Grad Dip & Certs
- ☐ Doctorate
- ☐ Post-Graduate Medicine/ Dentistry
- ☐ Graduate Qualifying
- ☐ Postdoctoral Fellows

5.4 FQRSC (Research) Indicator
(For GPS)

☐ Yes ☒ No

5.5 Requires Resources (financial, personnel, space)

☐ Yes ☒ No

6.0 Total Credits

45

7.0 Consultation with

Related Units ☒ Yes ☐ No

Financial Consult ☒ Yes ☐ No

Attach list of consultations.

8.0 Program Description (Maximum 150 words)

The M.Sc.(Applied) in Translational Biomedical Engineering; Non-Thesis program is a full-time specialized 13- to 16-month professional program in translational biomedical engineering. This is an intensive program that focuses on the biomedical engineering industry through a comprehensive curriculum covering essential skills and knowledge needed to translate biomedical engineering research into clinical and commercial solutions.

The program consists of three main components that are unique to the translational process in biomedical engineering, including: 1) translational courses on intellectual property, regulatory affairs, quality management systems, clinical trials, and reimbursement; 2) fundamental science courses in biomedical engineering; and 3) an experiential component, comprising of a closely supervised 4-month internship in the biomedical engineering industry.

None of the courses taken in the graduate certificate in Translational Biomedical Engineering can be credited towards the M.Sc.(Applied) program once the graduate certificate has been awarded.

9.0 List of proposed program for the New Program/Major or Minor/Concentration

If new concentration (option) of existing Major/Minor (program), please attach a program layout (list of courses) of existing Major/Minor.

Proposed program (list course as follow: Subj Code/Crse Num, Title, Credit weight, under the heading of: Required Courses, Complementary Courses, and Elective Courses).

M.Sc.(Applied) in Translational Biomedical Engineering; Non-Thesis (45 credits)

Required Courses (30 credits)
BMDE 653 Patents in Biomedical Engineering (3 cr)
BMDE 654 Biomedical Regulatory Affairs - Medical Devices (3 cr)
BMDE 655 Biomedical Clinical Trials – Medical Devices (3 cr)
BMDE 656 Medical Device Reimbursement (3 cr)
BMDE 657D1/D2 Biomedical Engineering Industry Internship (18 cr)

Complementary Courses (15 credits)
15 credits to be chosen from courses listed below, or other relevant 500-, 600- or 700-level courses chosen in consultation and with approval of the Program Director and the concerned offering unit/department.

General Biomedical Engineering
BMDE 501 Selected Topics in Biomedical Engineering (3 cr)
BMDE 600D1/D2 Seminars in Biomedical Engineering (3 cr)

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

Medical Imaging
BMDE 610 Functional Neuroimaging Fusion (3 cr)
BMDE 650 Advanced Medical Imaging (3 cr)
BMDE 660 Advanced MR Imaging and Spectroscopy of the Brain (3 cr)
MDPH 607 Medical Imaging (3 cr)

Biomaterials and Tissue Engineering
BMDE 504 Biomaterials and Bioperformance (3 cr)
BMDE 505 Cell and Tissue Engineering (3 cr)

Biosensors and Devices
BMDE 503 Biomedical Instrumentation (3 cr)
BMDE 508 Introduction to Micro and Nano-Bioengineering (3 cr)

Rehab Engineering
BMDE 525D1/D2 Design of Assistive Technologies: Principles and Praxis (6 cr)

EXISTING PROGRAMS:

Graduate Certificate (Gr. Cert.) Translational Biomedical Engineering (15 credits)
Offered by: Biomedical Engineering Degree: C-TBME

NEW PROGRAM

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

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

Required Courses (9 credits)
Three courses dealing with issues related specifically to the translation of biomedical engineering advances to clinical and commercial environments:
BMDE 653 Patents in Biomedical Engineering (3 credits)
BMDE 654 Biomedical Regulatory Affairs - Medical Devices (3 credits)
BMDE 655 Biomedical Clinical Trials - Medical Devices (3 credits)

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

General Biomedical Engineering
BMDE 501 Selected Topics in Biomedical Engineering (3 credits)

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

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

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

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

Master of Engineering (M.Eng.) Biological and Biomedical Engineering (Thesis) (45 credits)
Offered by: Biological & Biomedical Engr Degree: Master of Engineering

The Biological and Biomedical Engineering (BBME) Master's program focuses on the interdisciplinary application of methods, paradigms, technologies, and devices from engineering and the natural sciences to problems in biology, medicine, and the life sciences. With its unique multidisciplinary environment, and taking advantage of research collaborations between staff in the Faculties of Medicine, Science, and Engineering. BBME offers thesis-based graduate degrees (M.Eng.) that span broad themes in biomodelling, biosignal processing, medical imaging, nanotechnology, artificial cells and organs, probiotics, bioinformatics, bioengineering, biomaterials, and orthopaedics. BBME's internationally renowned staff provide frequent and stimulating interactions with physicians, scientists, and the biomedical industry. Through courses and thesis research, this program will prepare students for careers in industry, academia, hospitals and government and provide a solid basis for Ph.D. studies. Candidates should hold a bachelor's degree in engineering, science, or medicine with a strong emphasis on mathematics, physics, chemistry, and basic physiology or cell biology.

Thesis Courses (24 credits)
BBME 693 Thesis Research 1 (6 credits)
BBME 694 Thesis Research 2 (6 credits)
BBME 695 Thesis Submission (12 credits)

Required Courses (3 credits)
BBME 600D1 Seminars in Biological and Biomedical Engineering (1.5 credits)
BBME 600D2 Seminars in Biological and Biomedical Engineering (1.5 credits)

OR

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

Complementary Courses (18 credits)
3 credits from the following quantitative courses:
BIEN 510 Engineered Nanomaterials for Biomedical Applications (3 credits)
BIEN 520 High Throughput Bioanalytical Devices (3 credits)
BIEN 530 Imaging and Bioanalytical Instrumentation (3 credits)
BIEN 550 Biomolecular Devices (3 credits)
BIEN 560 Biosensors (3 credits)
BIEN 570 Active Mechanics in Biology (3 credits)
BIEN 590 Cell Culture Engineering (3 credits)
BMDE 502 BME Modelling and Identification (3 credits)
BMDE 503 Biomedical Instrumentation (3 credits)
BMDE 512 Finite-Element Modelling in Biomedical Engineering (3 credits)
BMDE 519 Biomedical Signals and Systems (3 credits)
BMDE 610 Functional Neuroimaging Fusion (3 credits)
BMDE 660 Advanced MR Imaging and Spectroscopy of the Brain (3 credits)

6 credits from the following:
BIEN 510 Engineered Nanomaterials for Biomedical Applications (3 credits)
BIEN 520 High Throughput Bioanalytical Devices (3 credits)
BIEN 530 Imaging and Bioanalytical Instrumentation (3 credits)
BIEN 540 Information Storage and Processing in Biological Systems (3 credits)
BIEN 550 Biomolecular Devices (3 credits)
BIEN 560 Biosensors (3 credits)
BIEN 570 Active Mechanics in Biology (3 credits)
BIEN 590 Cell Culture Engineering (3 credits)
BIEN 680 Bioprocessing of Vaccines (4 credits)

.../continued

Master of Engineering (M.Eng.) Biological and Biomedical Engineering (Thesis) (45 credits)
Complementary Courses (18 credits)
6 credits from the following: [continued]
BMDE 501 Selected Topics in Biomedical Engineering (3 credits)
BMDE 502 BME Modelling and Identification (3 credits)
BMDE 503 Biomedical Instrumentation (3 credits)
BMDE 504 Biomaterials and Bioperformance (3 credits)
BMDE 505 Cell and Tissue Engineering (3 credits)
BMDE 508 Introduction to Micro and Nano-Bioengineering (3 credits)
BMDE 512 Finite-Element Modelling in Biomedical Engineering (3 credits)
BMDE 519 Biomedical Signals and Systems (3 credits)
BMDE 525D1 Design of Assistive Technologies: Principles and Praxis (3 credits)
BMDE 525D2 Design of Assistive Technologies: Principles and Praxis (3 credits)
BMDE 610 Functional Neuroimaging Fusion (3 credits)
BMDE 650 Advanced Medical Imaging (3 credits)
BMDE 653 Patents in Biomedical Engineering (3 credits)
BMDE 654 Biomedical Regulatory Affairs - Medical Devices (3 credits)
BMDE 655 Biomedical Clinical Trials - Medical Devices (3 credits)
BMDE 660 Advanced MR Imaging and Spectroscopy of the Brain (3 credits)
MDPH 607 Medical Imaging (3 credits)

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

10.0 Approvals

Routing Sequence	Name	Signature	Date
Department	David Juncker		26.2.2019
Curric/Acad Committee	DAVID RAGSDALE		1 APRIL 2019
Faculty 1	AIMEE RYAN		8 APRIL, 2019
Faculty 2			
Faculty 3			
CGPS	SCTP APPROVED	CGPS APPROVAL	September 9, 2019
SCTP			Oct. 24, 2019
APC		Approved	Dec 16, 2019
Senate			

Submitted By

Name		To be completed by ARR:
Phone		CIP Code
Email		
Submission Date	Click here to enter a date.	

Admission requirements:

Students with an undergraduate engineering degree with a major or minor in biomedical engineering, or the equivalent, and an undergraduate GPA of at least 3.0 out of a possible 4.0, or a GPA of 3.2 out of 4.0 in the last two years of full-time studies.

Graduates from other areas of engineering may be admitted provided they have backgrounds in Physiology equivalent to both PHGY 209 and PHGY 210. Applicants lacking the required Physiology background may be admitted but must fulfill the prerequisites in the first year of the program. This may be achieved by taking PHGY 209 and/or PHGY 210, and/or other courses approved by the Program Director. Prerequisite courses will not count toward the program's 45 credits.

Graduates with other backgrounds may be admitted provided they have the Physiology prerequisites (PHGY 209 & PHGY 210), at least two university-level Math courses, four university-level physical science courses, and one university-level programming course. Applicants lacking the required background may be admitted but must fulfill the prerequisites in the first year of the program. This may be achieved by taking courses approved by the Program Director. Prerequisite courses will not count toward the program's 45 credits.

M.Sc.A Translational Biomedical Engineering, Non-Thesis

Potential Cannibalization of Students from Other Programs

Objective: this document is intended to address concerns of the proposed M.Sc.A Translational Biomedical Engineering (Non-Thesis) potentially cannibalizing students from 1) the existing M.Eng. Biological & Biomedical Engineering (Thesis), and 2) the existing Graduate Certificate in Translational Biomedical Engineering.

1) M.Eng. Biological & Biomedical Engineering (Thesis)

A) Target Students

M.Sc.A (Non-thesis)	M.Eng. (Thesis)
Recent graduates with a Bachelor of Engineering, Science, Economics, Arts or Commerce degree and with proven quantitative skills who aim to work in the medical technology industry after graduating.	Recent graduates with a Bachelor of Engineering who aim to proceed to a PhD program after graduating.

B) Program Structure

M.Sc.A (Non-thesis)	M.Eng. (Thesis)
Four required translational courses	Translational courses are optional (two are not even considered core)
Internship	Research (thesis)

C) Funding

M.Sc.A (Non-thesis)	M.Eng. (Thesis)
Students pay for their studies (no stipends available).	Students receive research stipends (strong financial incentive for students interested in research).

D) Competitiveness

M.Sc.A (Non-thesis)	M.Eng. (Thesis)
N/A	~10% acceptance rate (~30/300) There are currently many applications from students who are qualified for graduate work but for whom there is no space in labs.

In summary, the proposed M.Sc.A. program will not cannibalize students from BBME because:

a) the M.Sc.A targets a much larger and differentiated pool of students,
b) the M.Sc.A targets students who want to proceed to careers in industry following graduation (i.e. students who wish to pursue a PhD will choose BBME),

c) the M.Sc.A does not provide students with funding, so BBME is a more financially competitive program (since BBME students receive research stipends),
d) the BBME program is highly competitive, so qualified students for whom there is no space in BBME will likely apply to the M.Sc.A.

Furthermore:

a) All Canadian schools offering similar non-thesis translational programs also offer established thesis programs in biomedical engineering (see below "non-thesis and thesis" degrees, respectively):
    - Polytechnique (M.Ing. and M.Sc.A.)
    - University of Toronto (M.Eng. and M.A.Sc.)
    - University of British Columbia (M.Eng. and M.A.Sc.)
    - University of Calgary (MBT and MSc/MEng)

2) Graduate Certificate in Translational Biomedical Engineering:

A) Target Students

M.Sc.A (Non-thesis)	Gr.Cert. (Thesis)
Recent graduates with a Bachelor of Engineering, Science, Economics, Arts or Commerce degree and with proven quantitative skills who aim to work in the medical technology industry after graduating.	Graduates with substantive biomedical engineering industry experience desiring to expand their translational skillsets

In summary, the proposed M.Sc.A. program will not cannibalize students from the Graduate Certificate program because the M.Sc.A targets students who lack industry experience, while the Gr. Cert. targets students with substantive industry experience.

EXECUTIVE SUMMARY

MASTER of Science (Applied) in TRANSLATIONAL BIOMEDICAL ENGINEERING; Non-Thesis

Program Need/Rationale:

The focus of McGill's current graduate Thesis program in Biological and Biomedical Engineering is to prepare students for careers in research or academia. These research-intensive programs offer little training in the translational skills required to design, develop, manufacture, and commercialize biomedical devices and technologies. There is strong student interest in such training and a clear demand in industry for students with this expertise.

This professional Masters program complements existing thesis programs at McGill by increasing the range of technical and translational training, and by providing experiential training in the form of a 4-month (18-week) internship in the medical technology industry.

Proof of Program Need/Rationale:

In late 2016, the Department of Biomedical Engineering conducted an online survey with 70 **graduate students** enrolled in the Biological and Biomedical Engineering Masters/PhD program.

- 54% of respondents said they would be "interested" or "very interested" in enrolling in the proposed Masters program if it were available when students applied to their current programs (only 25% said they were "not interested"; the rest were "a little interested").
- 52% said they felt the proposed Masters program would better prepare them for the workforce compared to their current programs (only 10% said "no" it would not better prepare them; the rest were undecided).
- 79% said the duration of the proposed Masters program (13 months) was appropriate.
- 60% said they are planning for a career in industry.
- 79% said they were "interested" or "very interested" in taking translational courses (only 3% said they were "not interested"; the rest were "a little interested").

Survey data and other written responses can be made available upon request.

Earlier in 2016, the Department of Biomedical Engineering conducted phone interviews with 20 experienced professionals in the medical technology **industry**. One hundred percent (100%) of interviewees acknowledged the need for training in translational aspects of biomedical engineering.

Comments from interviewees include:

- **"Very supportive"**, Colin Brenan, Founder/CEO at 1CellBiO Inc.,
- **"Terrific and great program"**, Paul Di Perna, Chairman, CEO/CFO at Modular Medical, Inc.; CEO/CFO at Quasuras, Inc. (a subsidiary of Modular Medical, Inc.); CEO of Concert Innovators, Inc.; CEO & Director at National Cardiac, Inc; President, CEO & Director at Ambumed, Inc.,
- **"Regulatory stuff is very helpful"**, Roch Comeau, Owner, Rogue Research Inc.,
- **"[Students] will benefit a lot from training about IP"**, Jeffrey Astle, Director and IP Counsel, Pratt & Whitney Canada,
- **"Big demand for this"**, Bob Kirsch, Chairman, Department of Biomedical Engineering, Case Western Reserve University,

- **"This is a much needed program, people need to know design, how to do a clinical trial, European market, FDA, etc. IP, tech transfer, regulatory, clinical trial"**, Ramsés Galaz Mendez, CEO / Owner, GSE Biomedical; COO / Co-founder / shareholder, ZIPTEK LLC,
- **"I was not prepared to go to industry when I came to work, so I think this is a GREAT idea, and it is close to my heart"**, Devin Johns, Product Manager, CAE Healthcare.

Furthermore, 100% of interviewees showed interest in hosting Masters students for internships for 4-6 months, and the vast majority agreed to offer stipends (all but 1 respondent, whose startup has limited funding), citing strong Canadian/Quebec government incentives to hire interns.

Survey data and other written responses can be made available upon request.

Strategic Position within the Faculty of Medicine:

The M.Sc.A. in Translational Biomedical Engineering program will extend the research implementation strategies outlined by McGill's Faculty of Medicine which aim "to maximize research output, and to facilitate Knowledge Translation (KT) of research results into improved and better clinical care" (https://www.mcgill.ca/medicine/research/new-strategic-research-plan/implementation-strategies). The Faculty's research implementation strategies are defined by initiatives with key objectives; one initiative is "to develop innovative training programs for graduate, post-graduate students and health professionals" with the objective "to develop human capital and train the next generation of health researchers." The proposed Masters program will train future professionals in translational biomedical engineering with a curriculum that is co-developed and co-delivered by academia and industry. This will ensure the program remains relevant to the needs of the medical technology industry while advancing the implementation of research conducted at McGill's Department of Biomedical Engineering and throughout the Faculty of Medicine.

The proposed Masters program will further enhance the unique position of McGill's Department of Biomedical Engineering as a hub for medical technology translation, which stems from the Department's worldwide recognition for excellence in research, its broad network of interdisciplinary collaborations, and its privileged partnerships with clinical departments within the Faculty of Medicine, including the McGill University Health Centre Research Institute (RI-MUHC) and the Montreal Neurological Institute (Neuro).

Strategic Position within McGill University:

The proposed Masters program will advance the five priorities set by the Principal of McGill (https://www.mcgill.ca/principal/five-priorities). For example, the program will help honour the McGill Commitment (priority #1) which is "providing all students with a stimulating, innovative, and inquiry-based educational experience, [including] opportunities for developing career-enhancing professional skills". The M.Sc.A. in Translational Biomedical Engineering is a professional training program with a novel, integrative, and experiential curriculum. Furthermore, the proposed program will help to enhance the university's community partnerships (priority #4), through an industry internship focused on medical technology translation (see course outline for BMDE 657 Biomedical Engineering Industry Internship). By partnering with industry to co-develop and co-deliver the translational curriculum, and to co-supervise the industry internship, the proposed Masters program will enrich McGill's workplace culture (priority #5) and enhance the bilateral flow of ideas, networks, and resources between academia and industry.

Accessibility for Quebec Students:

Accessibility for Quebec students will be ensured through the following enrolment plan (minimum 50% of class size):

Student details	2020/21	2021/22	2022/23	2023/24	2024/25
New students from Quebec	3	4	5	6	7
New students from Canada (non-Quebec)	2	2	2	3	3
New international students	1	2	3	3	4
Annual total enrolled	6	8	10	12	14
Dropouts	1	1	1	2	2
Annual graduates	5	7	9	10	12

Furthermore, as a regulated program by the Ministry of Education, tuition rates for Quebec students will be substantially lower than for non-Quebec Canadians and international students.

Comparable Programs (North America):

16 comparable Masters programs in Translational Biomedical Engineering are ranked below:

Canada:

#2:	**Master of Engineering in Biomedical Engineering**			
University of Toronto (Toronto, Ontario)		Tuition:	$16,459.52 - $57,053.52 CAD	
Curriculum				
Intellectual Property	☐	Quality Management	☒	
Regulatory Affairs	☒	Clinical Trials	☒	
Reimbursement	☒	Business / Innovation & Design	☒	
Fundamental Science in BME	☒	Internship	☒	
***Note*:**	"Commercialization and entrepreneurship" courses (2) largely focus on quality management and clinical trials			
Link:	https://sgs.calendar.utoronto.ca/degree/Biomedical-Engineering			

#8:	**Master of Engineering in Biomedical Engineering**			
University of British Columbia (Vancouver, B.C.)		Tuition:	$6,072.21 - $20,246.85 CAD	
Curriculum				
Intellectual Property	☒	Quality Management	☐	
Regulatory Affairs	☒	Clinical Trials	☒	
Reimbursement	☐	Business / Innovation & Design	☒	
Fundamental Science in BME	☒	Internship	☒	
***Note*:**	- Intellectual Property is for general engineering (not focused on BME)			
Link:	https://www.bme.ubc.ca/graduate/current-students/courses/			

#15	Maîtrise Professionnelle en Génie Biomédical (M.In.g)			
Polytechnique Montreal (Montreal, Quebec)		Tuition:	$4,509.12 - $33,341.07 CAD	
Curriculum				
Intellectual Property	☐	Quality Management		☐
Regulatory Affairs	☐	Clinical Trials		☒
Reimbursement	☐	Business / Innovation & Design		☐
Fundamental Science in BME	☒	Internship		☒
***Note*:**	One required course in "Bases du génie biomédical" mainly focuses on clinical trials			
Link:	https://www.polymtl.ca/etudes/programmes/maitrise-professionnelle-ou-recherche-en-genie-biomedical-programme-conjoint			

#16:	Master of Biomedical Technology			
University of Calgary (Calgary, Alberta)		Tuition:	$5,593.50 - $12,695.88 CAD	
Curriculum				
Intellectual Property	☐	Quality Management		☐
Regulatory Affairs	☐	Clinical Trials		☒
Reimbursement	☒	Business / Innovation & Design		☒
Fundamental Science in BME	☒	Internship		☐
***Notes*:**	- Aspects of Reimbursement are covered in a course on "Biostatistics II: Models for Health Outcomes" - Fundamental Science in BME is covered in advanced courses in life sciences - Focus is on translational medicine & life sciences rather than biomedical engineering			
Link:	https://cumming.ucalgary.ca/gse/programs/master-biomedical-technology-mdbt-0			

United States:

#1	Master of Science Concentration in Translational Biomedical Engineering			
Northwestern University (Evanston, Illinois)		Tuition:	$53,724.00 USD	
Curriculum				
Intellectual Property	☒	Quality Management		☒
Regulatory Affairs	☒	Clinical Trials		☒
Reimbursement	☐	Business / Innovation & Design		☒
Fundamental Science in BME	☒	Internship (6 months, paid)		☒
***Note*:**	- Multiple courses offered on Regulatory Affairs, Quality Management, Clinical Trials, and Business / Innovation & Design			
Link:	https://www.mccormick.northwestern.edu/biomedical/graduate/special-programs/ms-concentration-translational-biomedical-engineering.html			

#3	Master's of Engineering in Biomedical Engineering			
Clemson University (Clemson, South Carolina)		Tuition:	$21,440.00 - $31,370.00 USD	
Curriculum				
Intellectual Property	☒	Quality Management		☒
Regulatory Affairs	☒	Clinical Trials		☒
Reimbursement	☐	Business / Innovation & Design		☒
Fundamental Science in BME	☒	Internship		☒
Notes:	- Internship is optional - Multiple courses on Business / Innovation & Design			
Link:	https://www.clemson.edu/cecas/departments/bioe/academics/masters/m-eng.html			

#4	Master of Science in Bioengineering Innovation and Design			
Johns Hopkins University (Baltimore, Maryland)		Tuition:	$53,740.00 USD	
Curriculum				
Intellectual Property	☒	Quality Management		☒
Regulatory Affairs	☒	Clinical Trials		☒
Reimbursement	☒	Business / Innovation & Design		☒
Fundamental Science in BME	☐	Internship		☐
Link:	https://cbid.bme.jhu.edu/academics/graduate-studies/curriculum/			

#5	Master of Biomedical Innovation and Development			
Georgia Tech & Emory University (Atlanta, Georgia)		Tuition:	$35,316.00 - $53,792.00 USD	
Curriculum				
Intellectual Property	☒	Quality Management		☒
Regulatory Affairs	☒	Clinical Trials		☒
Reimbursement	☒	Business / Innovation & Design		☒
Fundamental Science in BME	☐	Internship		☐
Link:	http://mbid.bme.gatech.edu/study			

#6	Master of Bioengineering, Global Medical Innovation Track			
Rice University (Houston, Texas)		Tuition:	$77,670.00 USD	
Curriculum				
Intellectual Property	☐	Quality Management		☒
Regulatory Affairs	☒	Clinical Trials		☒
Reimbursement	☒	Business / Innovation & Design		☒
Fundamental Science in BME	☐	Internship		☒
Note:	- Curriculum covers only 0-1 courses on Fundamental Science in BME			
Link:	https://bioengineering.rice.edu/graduate-program/professional-masters			

#7	Master of Science in Biomedical Engineering with a specialization in Translational Health Technology (Thesis)			
Case Western Reserve University (Cleveland, Ohio)			Tuition:	$55,367.00 USD
Curriculum				
Intellectual Property	☐		Quality Management	☐
Regulatory Affairs	☒		Clinical Trials	☒
Reimbursement	☒		Business / Innovation & Design	☒
Fundamental Science in BME	☒		Internship	☐
Notes:	- Regulatory Affairs is covered in a "mini-course" on the FDA - Reimbursement is touched upon in a course on "Models of Health Care system" - Curriculum covers only 1 course on Fundamental Science in BME; Thesis required			
Link:	http://engineering.case.edu/translational-health-technology/curriculum			

#9	Master's in Biomedical Engineering and Business			
Drexel University (Philadelphia, Pennsylvania)			Tuition:	$56,925.00 USD
Curriculum				
Intellectual Property	☐		Quality Management	☐
Regulatory Affairs	☒		Clinical Trials	☒
Reimbursement	☐		Business / Innovation & Design	☒
Fundamental Science in BME	☐		Internship	☒
Note:	- Regulatory Affairs and Clinical Trials are touched upon in a "Commercialization of Biomedical Technology" course - Fully online option available			
Link:	http://catalog.drexel.edu/graduate/schoolofbiomedicalsciences/biomedicinebusiness/#degreerequirementstext			

#10	Master of Engineering in Regulatory Biomedical Engineering			
George Washington University (Washington, D.C.)			Tuition:	$56,700.00 USD
Curriculum				
Intellectual Property	☒		Quality Management	☐
Regulatory Affairs	☒		Clinical Trials	☐
Reimbursement	☐		Business / Innovation & Design	☒
Fundamental Science in BME	☒		Internship (practicum)	☒
Notes:	- Multiple courses on Regulatory Affairs (practicum is focused on Regulatory) - Curriculum covers only 1-3 courses on Fundamental Science in BME			
Link:	https://www.programs.gwu.edu/graduate/regulatory-biomedical-engineering			

#11	Master of Translational Medicine			
University of California, Berkeley (Berkeley, CA) & University of California, San Francisco (San Francisco, CA)			Tuition:	$51,000.00 - $63,000.00 USD
Curriculum				
Intellectual Property	☐	Quality Management		☐
Regulatory Affairs	☐	Clinical Trials		☒
Reimbursement	☒	Business / Innovation & Design		☒
Fundamental Science in BME	☒	Internship		☐
Note:	- Reimbursement is touched upon in a "Health Care Finance & Economics" course			
Link:	http://uctranslationalmedicine.org/curriculum/			

#12	Master's in Translational Medicine		
City College of New York (New York, New York)		Tuition:	$14,205.00 - $27,600.00 USD
Curriculum			
Intellectual Property	☒	Quality Management	☒
Regulatory Affairs	☒	Clinical Trials	☒
Reimbursement	☒	Business / Innovation & Design	☒
Fundamental Science in BME	☐	Internship	☐
Note:	Intellectual Property, Regulatory Affairs, Quality Management, and Clinical Trails are covered in 1 course on "Intellectual Property, Regulation and Quality Assurance"		
Link:	https://translationalmedicine.ccny.cuny.edu/course/curriculum/		

#13	Master's Degree in Clinical & Translational Investigation		
Cornell University (Ithaca, New York)		Tuition:	$73,750.00 USD
Curriculum			
Intellectual Property	☐	Quality Management	☐
Regulatory Affairs	☐	Clinical Trials	☒
Reimbursement	☐	Business / Innovation & Design	☐
Fundamental Science in BME	☐	Internship	☐
Note:	- Focus is on translational medicine rather than biomedical engineering		
Link:	https://ctscweb.weill.cornell.edu/education-training/programs/masters-degree-clinical-translational-investigation		

#14	Masters In Translational Biomedical Informatics		
University of Southern California (Los Angeles, California)		Tuition:	$104,328.00 USD
Curriculum			
Intellectual Property	☐	Quality Management	☐
Regulatory Affairs	☒	Clinical Trials	☐
Reimbursement	☐	Business / Innovation & Design	☐
Fundamental Science in BME	☐	Internship	☐
Notes:	- Multiple courses on translational genomics and bioinformatics - Focus is on genomics and bioinformatics rather than biomedical engineering		

M.Sc.A Translational Biomedical Engineering, Non-Thesis

Potential Concerns at SCTP Meeting – October 24, 2019

Objective: this document is intended to address potential concerns for the proposed M.Sc.A Translational Biomedical Engineering (Non-Thesis) at the SCTP Meeting on October 24, 2019.

1) Potential cannbilization of students from existing M.Eng. Biological & Biomedical Engineering (Thesis)

A) Target Students

M.Sc.A (Non-thesis)	M.Eng. (Thesis)
Recent graduates with a Bachelor of Engineering, Science, Economics, Arts or Commerce degree and with proven quantitative skills who aim to work in the medical technology industry after graduating.	Recent graduates with a Bachelor of Engineering who aim to proceed to a PhD program after graduating.

B) Program Structure

M.Sc.A (Non-thesis)	M.Eng. (Thesis)
Four required translational courses	Translational courses are optional (two are not even considered core)
Internship	Research (thesis)

C) Funding

M.Sc.A (Non-thesis)	M.Eng. (Thesis)
Students pay for their studies (no stipends available).	Students receive research stipends (strong financial incentive for students interested in research).

D) Competitiveness

M.Sc.A (Non-thesis)	M.Eng. (Thesis)
N/A	~10% acceptance rate (~30/300) There are currently many applications from students who are qualified for graduate work but for whom there is no space in labs.

In summary, the proposed M.Sc.A. program will not cannibalize students from BBME because:

a) the M.Sc.A targets a much larger and differentiated pool of students,
b) the M.Sc.A targets students who want to proceed to careers in industry following graduation (i.e. students who wish to pursue a PhD will choose BBME),

c) the M.Sc.A does not provide students with funding, so BBME is a more financially competitive program (since BBME students receive research stipends),
d) the BBME program is highly competitive, so qualified students for whom there is no space in BBME will likely apply to the M.Sc.A.

Furthermore:

a) All Canadian schools offering similar non-thesis translational programs also offer established thesis programs in biomedical engineering (see below "non-thesis and thesis" degrees, respectively):
    - Polytechnique (M.Ing. and M.Sc.A.)
    - University of Toronto (M.Eng. and M.A.Sc.)
    - University of British Columbia (M.Eng. and M.A.Sc.)
    - University of Calgary (MBT and MSc/MEng)

2) Potential cannbilization of students from existing Graduate Certificate in Translational Biomedical Engineering (15 cr.):

A) Target Students

M.Sc.A (Non-thesis)	Gr.Cert.
Recent graduates with a Bachelor of Engineering, Science, Economics, Arts or Commerce degree and with proven quantitative skills who aim to work in the medical technology industry after graduating.	Graduates with substantive biomedical engineering industry experience desiring to expand their translational skillsets

In summary, the proposed M.Sc.A. program will not cannibalize students from the Graduate Certificate program because the M.Sc.A targets students who lack industry experience, while the Gr. Cert. targets students with substantive industry experience.

3) Concerns regarding consultations from Engineering (Faculty and BBME)

It is understood that the Biological & Biomedical Engineering (BBME) program will always remain a research-based thesis program. Therefore, there will always be a clear demarcation between BBME and the proposed M.Sc.A. program, thus mitigating any concerns about administrative confusion, program sustainability, or confusion on the part of applicants.

4) Concerns regarding consultation from Physiology

The goal of the program is indeed to improve on the status quo where students are currently forced to learn translational topics (e.g. clinical trials, regulatory affairs) "on the job". This is the exact situation employers are trying to avoid (survey data available) because it is an inefficient and expensive process to train new hires in these areas. Furthermore, incumbent medical technology companies do not necessarily have sufficient translational skills and knowledge to train these students appropriately. The proposed M.Sc.A. program mitigates this by preparing students to arrive at their first jobs with world-class translational training.

Course Outline: Biomedical Engineering Industry Internship

Course #: BMDE 657 (D1/D2)
Section #: 001
Terms: Summer, Fall
Year: 2020
Course pre-requisite(s): BMDE 653, BMDE 654, BMDE 655 and BMDE 656
Course co-requisite(s): None
Restriction(s): This course is restricted to graduate students registered in the M.Sc.(A.) in Translational Biomedical Engineering; Non-Thesis
Course schedule (day / time): Monday – Friday full-time (35 hr per week); daily schedule follows that of the host organization
Number of Credits: 18
Course Location: Off Campus (at host organization)

Instructor Information
Students will be mentored and evaluated by their assigned **Academic Supervisor** and **Field Supervisor**.

Students and supervisors will be supported by the *Course Instructor* and *Internship Coordinator*, located at the McGill department of biomedical engineering.

The **Academic Supervisor** will be a member of the department of biomedical Engineering, assigned by the Course Instructor.

The **Field Supervisor** will be an employee at the internship host organization, confirmed by the Course Instructor and Internship Coordinator.

Academic Supervisor – Department of BME Core Faculty or Associate Member

Name	*Assigned by the Course Instructor*
When/Why to Contact	The Academic Supervisor is a **first point of contact** for formal assessments

Field Supervisor – Host Organization

Name	*Confirmed by the Course Instructor and Internship Coordinator*
When/Why to Contact	The Field Supervisor is a **first point of contact** for questions about **host organization** policies/procedures and requests for assistance/support while at the host organization

Course Instructor

Name	Dr. Ahmad Haidar, Professor of Biomedical Engineering
Email	ahmad.haidar@mcgill.ca
Phone Number	514-398-4491
Office Location	Duff Medical Building (3775 University Street), Room #304

Internship Coordinator

Name	Jesse Ehrlick, Academic Associate
Email	jesse.ehrlick@mcgill.ca

Phone Number	514-444-5300
Office Location	Duff Medical Building (3775 University Street), Room #308
When/Why to Contact	The Internship Coordinator is a **first point of contact** for questions about the arrangement of a **placement**, and questions about the Internship policies and procedures; is a **second point of contact** for questions about **host organization** policies and procedures, and/or requests for assistance/support that cannot be satisfied by the Field Supervisor

Course Overview

This course will cover various aspects of translational biomedical engineering at an organization in the biomedical engineering industry (including private, public and non-governmental organizations), which includes applying engineering principles to design, develop, implement, or test biomedical engineering solutions as well as assume active roles in translational projects of biomedical engineering solutions at host organizations.

This course consists of supervised internship at a host organization, and is organized by McGill's department of biomedical engineering. Students will be expected to apprise themselves of internship policies/resources, internship dates/duration and general responsibilities as outlined in this document as well as on the department of biomedical engineering website.

Placement

While ample resources will be provided to students to secure internship placements, students will be ultimately responsible for securing their own placements. Students will be required to take an active role in seeking internships from the start of their studies. Students will be assigned an Academic Supervisor at the start of their program for guidance on internship placements and course selection. The Internship Coordinator will also be available for guidance.

Students should target host organizations where their career interests lie. Students may relay their career interests to the Internship Coordinator, who will then provide suggestions for potential host organizations. Students may reach out to target host organizations directly to inquire about potential internships, or they may ask the Internship Coordinator to reach out on their behalf. The Internship Coordinator is responsible for developing and nurturing a network of internship host organizations. Students who are unable to find suitable external internships (in exceptional circumstances) will conduct projects in translational biomedical engineering with their Academic Supervisor and with approval of the Course Instructor.

Internship Preparation

Once a potential host organization is identified, and there is mutual interest in an internship, the student prepares an Internship Proposal, outlining a lesson plan for the internship, including a clear plan of work with clear overall objectives.

The Internship Proposal is approved by the Course Instructor, Academic Supervisor, and Field Supervisor, all of whom record comments/suggestions and written feedback, as necessary. The Internship Proposal is appended to an Internship Contract which is agreed upon and signed by all parties (see ""Instructional Method" section below).

Vetting of Host Organizations

Before a placement is finalized, the department of biomedical engineering will vet the host organization to determine its suitability to host internships that conform to the requirements established in this document and by McGill University. The Course Instructor, supported by the Internship Coordinator, will be responsible for the vetting of host organizations. Once vetted, and before starting the internship, an Internship Contract will be agreed upon and signed by the Field Supervisor, the student, and a legal representative of McGill (see ""Instructional Method" section below).

Professional Competencies

Students will develop and be assessed on 12 Professional Competencies over the course of the internship. Evidence of development of the 12 Professional Competencies will be gathered via formal assessment, including observation and evaluation of students' work, as well as observation and evaluation of engagement, participation, and professional conduct.

The 12 Professional Competencies are adapted from the McGill University Faculty of Education Internship program (see the Faculty of Education's Professional Competency Guide), and are summarized in the table below:

Professional Competency	Description
#1	To act as a professional inheritor, critic, and interpreter of knowledge or culture when working with management and colleagues
#2	To communicate clearly within the host organization, both orally and in writing, using correct grammar, in various contexts related to the project
#3	To develop a schedule / work plan that is appropriate to the project and host organization, with a view to achieving milestones
#4	To implement a schedule / work plan that is appropriate to the project and organization, with a view to achieving milestones
#5	To evaluate progress in achieving project/organizational objectives
#6	To plan, organize and manage day-to-day activities in such a way as to promote project/organizational development
#7	To adapt project management to the particular needs and characteristics of the organization
#8	To integrate prior technical/academic knowledge in the planning and implementation of projects and for professional development purposes
#9	To cooperate with organization staff and partners in the community in pursuing organizational objectives
#10	To cooperate with members of the project team in achieving project milestones
#11	To engage in professional development individually and with others
#12	To demonstrate ethical and responsible professional behavior in the performance of their duties

Instructional Method

Students will be observed and assessed per the 12 Professional Competencies using the forms listed in the table below. Forms can be accessed on the department of biomedical engineering website:

Deliverable / Form	Description
Internship Proposal	Course Instructor, Academic Supervisor, and Field Supervisor agree on a lesson plan submitted in advance by the student; supervisors record comments/suggestions and written feedback, as necessary. Students should have a clear plan of work with clear overall objectives **before starting** the Internship. Students must adhere to submission deadlines established by the Course Instructor.
Internship Contract	Field Supervisor, student, and McGill agree upon and sign a contract **before starting** the internship. The final Internship Proposal will be appended to the Internship Contract. The Internship Contract details all relevant logistical, academic, legal and financial information, including the location and duration, as well as any rights to compensation and intellectual property. While student compensation for internships will be strongly encouraged, Internships may be paid or unpaid. Intellectual property rights are generally retained by the Internship hosting organization. The department of biomedical engineering includes confirmation that the host organization has been vetted (see "Vetting of Host Organizations" section above).
Internship Log	Students record/summarize their activities and reflections in Internship Logs, using a standardized form, submitted **bi-weekly** via myCourses (see "Evaluation" section for timeline). Students are encouraged to share, compare, and contrast their experiences on the myCourses discussion board (while respecting confidential matters).
Interim Report	Academic Supervisor and Field Supervisor each complete three global assessments of the development of the Professional Competencies **every 4-5 weeks** (see "Evaluation" section for timeline). 1-page Interim Reports will be shared in meetings with the Academic Supervisor, Field Supervisor, and the student. Feedback enables students to understand how to improve their practice and develop. The grades for Interim Reports (15% each) will also be discussed in these meetings.
Final Reflection	Students summarize their activities and final reflections (including content from all Internship Logs) in a 20-50 page report. The Final Reflection is graded by the Academic Supervisor (out of 30%) and must be submitted via myCourses **within two weeks of completing** the 18-week internship.
Summative Assessment	Academic Supervisor and Field Supervisor each evaluate the overall degree of accomplishment and development of Professional Competencies in a 1-page assessment **at the end** of the internship, including a grade (out of 10%).

Final Presentation	Students summarize their overall internship activities and final reflections in a 20 minute presentation at the end of the internship, including details about the host organization, tasks performed, lessons learned, and progress towards the Professional Competencies (while respecting confidential matters). All students present on the same day, scheduled **within 2 weeks of completing** the internship. Presentations may be recorded and/or live-streamed, and are graded by the Academic Supervisor (out of 15%).
Competency Improvement Plan (CIP)	Academic Supervisor and/or Field Supervisor completes this form when there are concerns about student performance, including but not limited to, pedagogical weaknesses, poor punctuality/reliability, not responding well to feedback/suggestions, not following rules/policies, not adhering to dress/grooming regulations, etc. Students may also request a CIP be issued by submitting a written request to the Internship Coordinator and/or Academic Supervisor. This allows students to lodge complaints regarding their internship. When a CIP is issued, the student will be asked to meet with the Field Supervisor and/or Academic Supervisor to discuss the issue(s) and the appropriate way forward, including a date for demonstrated improvement; all parties sign the CIP. A CIP carries a follow-up component in which all parties meet again on the specified date to determine if the issue(s) is (are) resolved or if the CIP requires an extension/further action. If CIPs remain unresolved beyond the initial designated follow-up date, or if multiple CIPs are outstanding, this will be reflected in grading of Interim Reports and/or the Final Reflection, or, in extenuating circumstances, may lead to dismissal (see "Early Dismissal" section below).

Course Content / Schedule

Internship Duration	18 weeks (90 days)
Workload	Full-time (35 hr per week, total 630 hr)
Content Overview	Throughout the internship, students will be expected to attain appropriate mastery and deployment of the 12 **Professional Competencies**. Students should utilize all 12 Professional Competencies in their work practices (planning and implementation) and should continue to document their progress through their bi-weekly **Internship Logs**.

Schedule	Tasks/Workload
BEFORE Week 1	• Identify a potential host organization and secure mutual interest • Prepare an Internship Proposal, outlining a lesson plan for the internship, including a clear plan of work with clear overall objectives • Gain approval from the Course Instructor, Academic Supervisor, and Field Supervisor, including comments/suggestions and written feedback, as necessary • Sign an Internship Contract with the Field Supervisor and McGill

Weeks 1-3	• Plan to achieve expectations for the internship with the Academic Supervisor and Field Supervisor • Shadow and teamwork with the Field Supervisor or other host organization employees • Become knowledgeable about host organization routines, policies programs and resources • Gradually take on project responsibility
Weeks 4-18	• Show satisfactory progress of professional development across the 12 Professional Competencies • Integrate Masters program coursework and apply techniques in the field • Implement suggestions and techniques based on the Academic Supervisor's and Field Supervisor's feedback (as given in Interim Reports) • Document progress in Internship Log and submit by the end of each week

Written Components

Students will be required to write an *Internship Log* for every two weeks (10 days) of work performed at the host organization. Internship Logs must be submitted to myCourses by the end of each week (i.e. by Sunday at 11:59pm).

An up-to-date file of all Internship Logs will be automatically maintained in myCourses, and will be readily available for consultation at any time.

Upon completion of the 18-week internship students write a 20-50 page Final Reflection to summarize their experience, and give a 20-minute Final Presentation to their peers.

Evaluation

All final grades will be remitted to students through myCourses.

Week	Grade	Academic Supervisor	Field Supervisor	Student (deliverables)
Week 4	15%	Interim Report #1	Interim Report #1	Internship Logs #1-2
Week 8	15%	Interim Report #2	Interim Report #2	Internship Logs #3-4
Week 12	15%	Interim Report #3	Interim Report #3	Internship Logs #5-6
Weeks 18-20*	30%	Final Reflection	*n/a*	Final Reflection
	15%	Final Presentation	*n/a*	Final Presentation
	10%	Summative Assessment	Summative Assessment	Internship Logs #7-8

**Students have 2 weeks following Week 18 to submit a Final Reflection and prepare a Final Presentation.*

Meetings

Four meetings must be must be held between the Academic Supervisor, Field Supervisor, and the student, per the following schedule

Week	Meeting	Topic
BEFORE Week 1	*1st Meeting*	*Introductions & Review of Internship Proposal*
Weeks 4-7	*2nd Meeting*	*Interim Report #1*
Weeks 8-12	*3rd Meeting*	*Interim Report #2*
Weeks 14-17	*4th Meeting*	*Interim Report #3*

Meetings may take place in-person or online, including communications via Skype or email, as appropriate (see the McGill Policy on E-Mail Communication with Students below).

Grading & Grade Point Average (GPA)
Students will be graded on their Interim Reports (3 x 15%), a Final Reflection (45%), a Final Presentation (15%), and a Summative Assessment (10%).

Interim Reports are graded by the Academic Supervisor and Field Supervisor (equally weighted), evaluating progress and development of the Professional Competencies. Academic Supervisors base their evaluations on student Internship Logs submitted bi-weekly through myCourses, while Field Supervisors base their evaluations on student activities throughout the internship. Field Supervisors may refer to Internship Logs on myCourses but are not required to review them.

The Final Reflection and Final Presentation are graded by the Academic Supervisor, evaluating quality and clarity (50%), and achievement of the Professional Competencies (50%).

The Summative Assessment is graded by the Academic Supervisor and Field Supervisor (equally weighted), evaluating overall development and accomplishment of the Professional Competencies. Academic Supervisors base their evaluations on all submitted Internship Logs, the Final Reflection, and Final Presentation, while Field Supervisors base their evaluations on student activities throughout the internship. Field Supervisors may refer to Internship Logs, the Final Reflection, or the Final Presentation on myCourses but are not required to review them.

The evaluation criteria for the Interim Reports, Final Reflection and Presentation, and the Summative Assessment are shown in the detailed Professional Competencies section below.

The Course Instructor and Internship Coordinator may review all student deliverables and all Academic Supervisor evaluations, and may request a consultation with supervisors with justification for a higher or lower grade. Final decisions fall to the Course Instructor. Students may appeal any final outcome of the course within 30 days of the posted grade by making a written application to the Course Instructor. If the decision of the Course Instructor, once made, is not accepted by the student, a formal application may be made to Graduate & Postdoctoral Studies (see the Graduate Studies Reread Policy).

Professional Competencies
Throughout the internship, students will be evaluated on the Professional Competencies below:

Professional Competency	Demonstrated Outcomes
#1: To act as a professional inheritor, critic, and interpreter of knowledge or culture when working with management and colleagues	• Demonstrate sound knowledge of the field in which the host organization operates • Understand the organizational mission, goals and culture • Make relevant and meaningful contributions to projects • Engage critically with projects, while demonstrating empathy and diplomacy
#2: To communicate clearly within the host organization, both orally and in writing, using correct grammar, in various contexts related to the project	• Demonstrate excellent oral and written language skill appropriate to the audience • Communicate effectively and professionally with ease, precision, clarity and accuracy

#3: To develop a schedule / work plan that is appropriate to the project and host organization, with a view to achieving milestones	• Create a clear and detailed project plan that fits logically within host organization objectives • Address potential risks and obstacles • Present reasonably challenging objectives that enable progress towards achieving milestones
#4: To implement a schedule / work plan that is appropriate to the project and organization, with a view to achieving milestones	• Manage projects with purposeful activities • Engage in teamwork • Detect and remedy realized risks and obstacles
#5: To evaluate progress in achieving project/organizational objectives	• Develop a framework to track and evaluate progress • Recognize, interpret and act upon progress evaluations • Recognize adjustment required in planning or execution • Share assessment results with management and colleagues (as appropriate) • Determine helpful remedies for realized risks and obstacles
#6: To plan, organize and manage day-to-day activities in such a way as to promote project/organizational development	• Establish and maintain routines that ensure the smooth progression of projects • Identify and correct organizational problems that hinder the smooth progression of projects • Establish and apply methods to solve problems that hinder project/organizational development • Model appropriately professional behaviour at all times
#7: To adapt project management to the particular needs and characteristics of the organization	• Adjust to challenges specific to the organization or project (e.g. lack of resources, emerging technology)
#8: To integrate prior technical/academic knowledge in the planning and implementation of projects and for professional development purposes	• Make strategic use of prior technical/academic knowledge to further project/organizational goals • Know how to integrate prior knowledge when appropriate into project/organizational activities • Employ prior knowledge to interact in professional and intellectual contexts • Model and employ critical judgement when using prior knowledge
#9: To cooperate with organization staff and partners in the community in pursuing organizational objectives	• Understand how to work as part of a professional team • Participate and add to the mission, life and community of the host organization • Understand how to establish and build trusting relationships
#10: To cooperate with members of the project team in achieving project milestones	• Contribute to the work of the project team in an effective manner • Take and give constructive criticism and make useful, innovative suggestions with respect to the furthering of project/organizational goals

#11: To engage in professional development individually and with others	• Identify their own level of achievement in professional competency development • Access and use available resources to improve professional skills • Be a critical, reflective practitioner • Undertake research projects related to specific aspects of their work and/or objectives of the host organization
#12: To demonstrate ethical and responsible professional behavior in the performance of their duties	• Be trusted, without reservation, as a colleague • Display diligence, responsibility, discretion, fairness, respect, acceptance and caring in all dealing with management, colleagues, and partners in the community • Support actions with well-founded reason • Be aware of, and abide by, the legal and regulatory obligations of the profession

Internship Policies - McGill Department of Biomedical Engineering

Internship placements are made through the department of biomedical engineering. Students are expected to conduct their internship at the host organization designated by the department and following the policies contained in this document and on the department website.

Required Course Materials

Students will be **required to read** the materials listed below in advance of their Internship (accessible at the BME Internship Resource Centre):

- Guide to Professional Behavior for Interns
- Code of Ethics for Interns
- Professional Competency Guides and Rubrics
- All BME Department / Masters program Internship policies and procedures

Optional Course Materials

Students have access to the Department's Internship Resource Centre which contains:

- Project planning and tracking guides and resources
- Organizational management and behaviour guides and resources
- Professional development guides and resources
- Ethics and responsibility guides and resources

McGill students also have access to the main library system, including access to course materials, both print and online, in its Course Reserves section. The Library puts course reserve materials on short-term loan at the branch libraries, while also linking to online materials (both e-books and e-journal articles.)

Attendance & Absences: Students are expected to attend their host organization all day and be on time every day of their Internship. Students follow their host organization's schedule, not their Field Supervisor's (if different from the host organization's). All requests for absence from the host organization must be approved by the Department of BME (the Internship Coordinator is the primary point of contact).

Activities & Travel: Students are strongly advised not to engage in activities (e.g. employment, etc.) which could interfere with the time and energy required to work effectively during the Internship. Students are required to be available for up to one week following the end of their Internship for any makeup days or extensions and, therefore, must not book any travel immediately following the Internship.

Family Members: Students will not be placed in host organizations where they have relatives working or attending (e.g., management, colleagues, staff, etc.) and are responsible for disclosing such conflicts in their Internship Contracts.

Excursions: Students must request permission from the Department of Biomedical Engineering to participate in overnight excursions with their host organization (the Internship Coordinator is the primary point of contact).

Illness: Days missed due to illness must be made up at the end of the Internship. Students must notify their host organization administrative office, their Academic Supervisor, their Field Supervisor and their Internship Coordinator as soon as they realize that they will be absent due to illness. The first two days of absence due to illness do not require a medical note, however, after the 2nd day, the student must provide a medical note to the Department of BME (the Internship Coordinator is the primary point of contact). In cases, where a Student has missed 2 or more days due to medical absence, the outcome of the Internship may be determined by the Course Instructor.

Pregnant Students: The Department of BME operates in accordance with McGill's Policy on Accommodation of Pregnant Students. Students who, because of pregnancy, may not be able to meet obligations to the field are responsible for informing their Internship Coordinator as soon as possible. The student must provide relevant medical and other supporting documentation, for example: proof of medical appointments or expected date of delivery or confirmation of birth. Depending on the circumstances, the student may be requested to meet with the Course Instructor to review their schedule for the period of their pregnancy, along with their plans during the pregnancy and following delivery. The student may be asked to have their doctor complete an Internship health risk assessment form. In cases where a Student is unable to complete the Internship for reasons related to their pregnancy, the outcome of the Internship will be determined by the Course Instructor.

Religious Observation: The Department of BME operates in accordance with McGill's Policy on Holy Days. Student who intend to be absent from their Internship for the purposes of religious observation must make these days up at the end of the Internship. Students must notify their Academic Supervisor, Field Supervisor and their Internship Coordinator at least two weeks before the planned absence. Students may consult a list of recognized holy days here.

Snow Days etc.: Students are expected to be at their host organization during inclement weather unless the host organization is closed for the day. In these cases, snow days do not need to be made up by the student provided they do not exceed 2 days. In the case of closures in excess of 2 days, the Department of BME will make a determination as to the number of days to be made up.

Varsity Sporting Event: Students who wish to be absent from their Internship for the purposes of participating in a McGill varsity sporting event must submit their request by e-mail to their Internship Coordinator at least two weeks before the event. Please attach a completed 'Participation in an Intercollegiate Sport Event' form to the e-mail, signed by McGill Athletics (copies of the form can be obtained from Lisen Moore, Manager, Varsity Sports). Request for absence for reason of participation in a varsity sporting event will be evaluated by the Course Instructor on a case-by-case basis.

EARLY DISMISSAL: Students may be removed from their Internship at any time, either at the request of the host organization or the Department of Biomedical Engineering. In this situation, the student will meet with the Course Instructor who will determine the final outcome of the placement. Circumstances that could lead to an early dismissal include, but are not limited to:

- Pre-requisite courses not successfully completed
- Failure to pass a judicial record check (if required by the host organization)
- Unprofessional behaviour that contravenes the Code of Ethics for Interns (link-TBD)
- Failure to make the improvements outlined in a Competency Improvement Plan (CIP) by the date indicated

When a student is dismissed from an Internship early, possible outcomes include:

- **Reassignment** in the same semester (subject to the decision of the Course Instructor and the availability of placements)
- **Withdrawal** from the Internship; a grade of 'W' is entered for the BMDE course with or without refund at the discretion of Graduate & Postdoctoral Studies; the student will repeat the Internship (BMDE) course when next regularly offered.
    - See the Graduate & Postdoctoral Studies Policy on University Withdrawal
- "F" for the BMDE course
    - See the Graduate & Postdoctoral Studies Failure Policy

For questions about any of the policies listed above, please contact the Internship Coordinator.

McGill University Policies/Statements

Academic Integrity: McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures.

Language of Assessment/Submission: In accordance with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or French any written work that is to be graded. This does not apply to courses in which acquiring proficiency in a language is one of the objectives.

BME Addendum: Given the mandate to develop Professional Competency #2 (To communicate clearly within the host organization, both orally and in writing, using correct grammar, in various contexts related to the project), all assignments for this course must be completed and submitted in the language of operation of the host organization.

Policy **on E-Mail Communication with Students**: E-mail is one of the official means of communication between McGill University and its students. As with all official University communications, it is the student's responsibility to ensure that time-critical e-mail is assessed, read, and acted upon in a timely fashion. If a student chooses to forward University e-mail to another e-mail mailbox, it is that student's responsibility to ensure that the alternate account is viable. Please note that to protect the privacy of students, the University will only reply to students on their McGill e-mail account. It is a violation for any user of official McGill e-mail address to impersonate a University officer, a member of the faculty, staff or student body, in line with the McGill University "Code of Computer User Conduct" and relevant federal and provincial legislation.

University Student Assessment Policy**:** This document exists to ensure fair and equitable academic assessment for all students and to protect students from excessive workloads. All students are encouraged to review this Policy, which addresses multiple aspects and methods of student assessment, e.g. the timing of evaluation due dates and weighting of final examinations.

First Nations Land Acknowledgement: McGill University is on land, which has long served as a site of meeting and exchange amongst Indigenous peoples, including the Haudenosaunee and Anishinabeg nations. We acknowledge and thank the diverse Indigenous people whose footsteps have marked this territory on which peoples of the world now gather.

Additional Resources

- Charter of Students' Rights
- Student Rights & Responsibilities
- Code of Student Conduct & Disciplinary Procedures
- Office for Students with Disabilities
- Office of the Dean of Students
- Counselling Services

Course Outline
BMDE-653 Patents in Biomedical Engineering

Course Coordinator: Ahmad Haidar, Assistant Professor, Department of Biomedical Engineering

Course Instructor: Pierre Nguyen, Patent Agent, Norton Rose Fulbright

Location: Norton Rose Fulbright
Place Ville Marie
1 Place Ville Marie #2500
Montreal, Québec H3B 1R1

Time: January 8 – April 16, 2018
Tuesdays and Thursdays: 3:00 – 4:30 pm

Calendar Course Description: This is a practical course on patents with emphasis on biomedical engineering applications. The course offers an overview of intellectual property, patents, and the patenting process. The course also provides insights into the strategies relating to commercialization and exploiting of patents, as well as enforcing patents. This course is designed to help biomedical engineers who will encounter patents in their work and need to understand the nature and the scope of patents, how patents are obtained, and how to commercially exploit a patent.

Learning Outcomes By the end of this course, students should be able to:

1. Differentiate the various forms of intellectual property, including copyright, patents, trademarks, industrial designs and trade secrets.
2. Understand the patent system, including the process of obtaining and maintaining a patent, in Canada, US, and Europe.
3. Understand a patent document, with emphasis on patent claims.
4. Have a preliminary experience in drafting patent applications, with emphasis on biomedical engineering subject matter.
5. Conduct a prior art research, and understand different prior art databases.
6. Know basic concepts of patent portfolio management, including the enforcement of a patent, and extraction of value from patents.

Course Material: Course material, prepared by the Lecturer, will be available to registered students via MyCourses.

Reference Text: The Canadian Patent Act.

Course Content/Outline

Week 1 - Forms of Intellectual Property

- Discussion of forms of IP, including copyright, trademark, designs, secrets
- Origins of the patent and distinction over other forms of IP
- Social implications of IP, patent trolls, counter movements to IP

Week 2 - Patent: criteria for patentability

- Novelty
- Non-obviousness or inventiveness
- Utility

Week 3 : Structure of a Patent

- Description
- Drawings
- Claims

Week 4 - The Patent Description

- Notions of validity and infringement
- Construction of a claim
- Independent claims and dependent claims

Week 5 - Understanding a Patent – Practical Workshop

- Reading and understanding a patent description
- A study of the scope of claims

Week 6 - Drafting Claims – Practical Workshop

- Interactive exercises in drafting claims

Weeks 7 and 8 - The Patenting Process

- Filing timeline
- Concept of priority
- United States application
- PCT applications
- European patent

Week 9 – Examination of a Patent Application

- Filing timeline

- Concept of priority
- PCT applications
- European patent

Week 10 - Examination – Practical Workshop

- Interactive exercises in responding to Examination rejection

Week 11 - Prior Art as Scientific Literature

- What constitutes prior art
- How to read prior art
- Prior art searching
- Prior art databases

Week 12 - Commercialization and Exploitation of Patents

- Ownership
- Licensing
- Right to exclude

Week 13 - Patent Enforcement

- Further look at infringement and validity
- Steps to trial and trial

Assessment/Evaluation:

Midterm (30%): closed book format, in which objective-type questions will be asked, as well as an opinion-type question: find weaknesses in a claim

Project (30%): drafting a patent application based on prior art given by the course instructor.

Final Exam (40%): closed book format, in which objective-type questions will be asked, a claim drafting question, and an opinion-type question on claim scope

McGill Policy Statements: McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures.

In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

Course Outline BMDE-654
Biomed Reg Affairs–Med Devices

General Information

Course #: 654

Section #: 001

Term: Fall

Year: 2017

Course Schedule: Monday
4:05 – 6:55 pm

Number of credits: 3

Location: Room 321, Duff Medical Building
3775 University Street
Montreal, Quebec, H3A 2B4

Instructor Information

Name and Title: Danny Kroo, Quality Management and Regulatory Affairs Consultant
Email danny.kroo@mcgill.ca
Telephone number: 514-574-9733
Office Location: Room 304, Duff Medical Building
3775 University Street
Montreal, Quebec, H3A 2B4

Course Information

Calendar Course Description:

Regulatory strategies and quality management systems are critical for medical device development. This course provides an overview of regulatory requirements, and familiarize students with the important ISO and IEC standards pertaining to medical device development. This course will provide biomedical engineers with an understanding of the regulatory and quality requirements to translate a medical device idea into a commercial product, and will draw upon the expertise of invited speakers currently working in the medical devices industry.

Learning Outcomes By the end of this course, students will:

1. Understand the FDA's, European (CE Marking) and Health Canada's requirements for medical devices.
2. Gain insight into the best practices required for timely regulatory clearance and entry of medical devices into USA, European and Canadian markets.
3. Appreciate the critical role of quality systems and effective process management in the innovation process.
4. Understand quality management definitions, concepts, and guidelines.
5. Understand the requirements of the ISO 13485:2016, ISO 14971:2007, and IEC 62304:2006 standards, and FDA's Quality System Regulations (21CFR820).

Course Material: Course material, prepared by the Lecturers, will be available to registered students via MyCourses. The students will have to obtain a copy of ISO 13485:2016 standard.

Reference Text:

None.

Course Structure: There are five weeks of this course that will be conducted entirely online using myCourses. This means that you do not have to be on campus to complete any portion of it. You will be required to participate in these online weeks by viewing the online lectures, completing the quizzes and any other online assessments, and accessing the readings.

Course Content/Outline

Part I: Regulatory Affairs

- **Week 1: In class (September 11)**
    - Overview of regulatory requirements for medical devices
    - US Regulatory Requirements under the US Food, Drug and Cosmetic Act
    - Health Canada Requirements under the Medical Device Regulations
        - Medical device classification in US and Canada
        - Discussion about projects
        - FDA 510 (k)- speaker
- **Week 2: Online (September 18)**
        - FDA Premarket Notification 510(k)
    - Exemptions from Premarket notification
        - FDA Premarket Approval PMA
    - PMA review process, application method, application content, quality system, clinical studies, and post-approval requirements

- **Week 3: Online (September 25)**
    - DeNovo
    - Investigational Device Exemption (IDE)
    - 510(k) Changes
- **Week 4: In class and Online (October 2)**
    - Online - Health Canada Medical Device Licence and MDEL
    - Online - CE Marking requirements
        - In class- Regulatory pathways, clinical strategies, biomaterials- *speaker*
- **Week 5: Online (October 16)**
    - Post marketing requirements for Canada, US and Europe
    - Complaints management

Part 2: Quality Assurance

- **Week 6: In class (October 23)**
    - Overview of recognized consensus standards and QMS
    - Requirements for quality systems in different jurisdictions- CMDCAS, MDSAP, FDA, EU
    - Design control-*speaker*
    - IEC 60601- *speaker*
    - CE Marking process-*speaker*
- **Week 7: In class (October 30)**
    - ISO 13485:2016– Medical Devices – Quality risk management systems – Requirements for regulatory purposes- detailed review
    - IEC 60601-*speaker*
    - Medical device licensing for implants in Canada USA and Europe-*speaker*

  Week 8: Online (November 6)
    - 21 CFR820 requirements
- **Week 9: In class (November 13)**
    - IEC 62304:2006 – Medical device software – Software life cycle processes
    - ISO 14971:2007 – Medical Devices – Application of risk management to medical devices
    - Changes in regulatory requirements for Canada, USA and Europe- *speaker*
    - Usability Testing- *speaker*
- **Week 10: In class (November 20)**
    - Labeling
    - Process validation, complaints, CAPA, sampling- *speaker*
- **Week 11: In class (November 27)**
    - Internal audit
    - Corrective Action
    - Process validation- *speaker*
- **Week 12: Online (December 4)**
    - MDSAP
- **Week 13: In class (December 7)**
    - Review and summary

Assessment/Evaluation:

Online activities, assignments and quizzes: 30%

Project (10-20 pages long): 40%

There will be a list of projects that can be selected that have been submitted by medical device companies.

Final Exam: 30%

McGill Policy Statements: McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures.

In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

Biography of instructor: Danny Kroo is the President of Docusys Corporation, a quality management and regulatory affairs consulting company. Since 1994, Mr. Kroo has provided consulting services to clients in Canada, USA, and Europe. Additionally he is a lead assessor for medical devices for a leading certification body and notified body and is qualified to audit Health Canada and CE Marking requirements.

Danny Kroo graduated with degree in Mechanical Engineering, Industrial Engineering option from Concordia University and has a Diploma in Management from McGill University.

Course Outline BMDE-655
Biomed Clin Trials-Med Devices

General Information

Course #: 655

Section #: 001

Term: Winter

Year: 2018

Course Schedule: Tuesdays
9:05 – 11:55 a.m.

Number of credits: 3

Location: Room 321, Duff Medical Building
3775 University Street
Montreal, Quebec, H3A 2B4

Instructor Information

Name and Title: Ahmad Haidar, Assistant Professor, Department of Biomedical Engineering
Email Ahmad.haidar@mcgill.ca
Telephone number: 514-398-4491
Office Location: Room 304, Duff Medical Building
3775 University Street
Montreal, Quebec, H3A 2B4

Calendar Course Description:

This course will train biomedical engineers to understand the clinical and business aspects of transferring a medical device idea into a commercial product. This course provides an overview of the pre-clinical and clinical testing of medical devices, clinical trials, reimbursement systems, market analysis, sales models, and business models, as pertaining to medical devices. This course will also cover the design of randomized trials, including statistical principles, hypothesis postulating, bias minimization, and randomization methods.

Learning Outcomes By the end of this course, students will:

1. Understand different types of clinical trials based on their design, stage, and purpose.
2. Determine how to design a clinical trial based on the unique characteristics of the technology, the targeted patient populations, and the purpose of the trial.
3. Understand basic statistical principles and methods for clinical trial design, analysis, and reporting.

4. Understand the importance of good clinical practice, good laboratory practice, and quality systems in pre-clinical and clinical evaluations of medical technologies.
5. Appreciate the impact business models, reimbursement strategies, sales model on the commercial success and the adoption of medical technologies.

Course Material: Course material, prepared by the Lecturer, will be available to registered students via MyCourses.

Reference Text: Yock, P.G., Zenios, S., Makower, J., Brinton, T.J., Kumar, U.N., Kurihara, C.Q., Denend, L., Krummel, T.M. and Watkins, F.J., 2015. **Biodesign: The Process of Innovating Medical Technologies**. Cambridge University Press.

Course Content/Outline

- **Week 1:**
  - Pre-clinical (animal and bench) and clinical phases of evaluation
  - Overview of pre-clinical evaluation, *in vitro* and *in vivo*
- **Week 2:**
  - Research ethics approval for animal testing
  - Good laboratory practice
- **Week 3:**
  - Human trials purposes: regulatory (safety and effectiveness), reimbursement, and marketing purposes
  - Overview of safety and effectiveness requirements for medical devices
    - US safety and effectiveness requirements under the US Food, Drug and Cosmetic Act
    - Health Canada safety and effectiveness requirements under the Medical Device Regulations
- **Week 4:**
  - Good clinical practice
  - IRB requirements, patient protection, Investigator requirements and potential conflicts
  - Quality systems in clinical trials
- **Week 5:**
  - Classification of clinical trials by design:
    - Observational studies
    - Case control studies
    - Prospective, randomized, controlled trials
  - Classification of clinical trials by stage:
    - Pilot studies (Phase I and II)
    - Pivotal trials (Phase III)
    - Post-marketing trials (Phase IV)

Prospective, randomized, controlled trials (Weeks 6 to 9)

- **Week 6:**
    - The null hypothesis and the alternative hypothesis
    - Crossover and parallel designs, pros and cons
    - Efficacy and effectiveness studies. Superiority, non-inferiority, and equivalence studies.
- **Week 7:**
    - Randomization, bias, masking, allocation concealment, and trial registration
    - Study population, inclusion and exclusion criteria
    - Primary and secondary endpoints, efficacy and safety endpoints
- **Week 8:**
    - Statistical power and sample size
    - Statistical analysis, p values, Type I/Type II error
- **Week 9:**
    - Consolidated Standards of Reporting Trials (CONSORT) Statement
    - Data safety and monitoring board

- **Week 10:**
    - FDA Investigational Device Exemption (IDE)
        - IDE approval process, responsibilities, application, reporting, labelling, and IRB
    - Health Canada Investigational Testing Authorization (ITA)
        - ITA approval process, responsibilities, application, reporting, labelling, and REB
- **Week 11:**
    - Human factors considerations
    - Post-marketing trials
    - Post-marketing safety surveillance
- **Week 12:**
    - Reimbursement systems in US and Canada
    - Developing reimbursement strategy
    - Market and stakeholder analysis and strategy
    - Sales and distribution models
        - Indirect, direct, and hybrid sales and distribution models
- **Week 13:**
    - Business models in medical devices
        - Types of business models (disposable, reusable, implantable, capital equipment, service, etc.)
        - How to choose an appropriate business model
    - Competitive advantage and business strategy
        - First to market, IP management, capability-based advantages, distribution play, etc
        - Developing a statement of competitive advantage

Assessment/Evaluation:

Class Quizzes: 30%

Assignments: 40%

There will be four assignments each worth 10%.

Final Exam: 30%

McGill Policy Statements: McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures.

In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

Course Outline: Medical Device Reimbursement

Course #: BMDE 656
Term: Summer
Year: 2020
Course pre-requisite(s): None
Course co-requisite(s): None
Course schedule (day and time of class): TBD
Number of Credits: 3
Course Location: Duff Medical Building

Course Coordinator: Dr. Ahmad Haidar, Assistant Professor, Department of Biomedical Engineering
Email: ahmad.haidar@mcgill.ca
Telephone number for office appointments: 514-398-4491
Office location: Duff Medical Building, Room 304
Course Instructor: Dr. Vincent Jaeger, Medical Device Reimbursement Consultant, MDI Consultants
Office hours for students: TBD

Course Overview

Reimbursement is critical for healthcare systems to adopt new medical devices. This course gives an overview of the medical device reimbursement process, and familiarizes students with the public and private institutions that control reimbursement in the United States, Europe and Canada. This course will provide students with an understanding of reimbursement strategies required to translate a medical device idea into a commercial product, and will draw upon the expertise of invited speakers currently working in the medical device industry.

Learning Outcomes

By the end of this course students will:
1) Understand reimbursement definitions, concepts, and guidelines.
2) Understand how medical devices are used and paid for in the United States, Europe and Canada, including the requirements of public and private reimbursement institutions.
3) Gain insight into the best practices required to secure reimbursement for medical devices with regulatory clearance in the United States, Europe and Canada.
4) Appreciate how reimbursement strategies can significantly impact the innovation process.

Instructional Method

Lectures and case studies

Required Course Materials

Course material, prepared by the Lecturer, will be available to registered students via MyCourses.

Course Content / Outline

Week 1: Global Spending on Medical Technology

- Trends and forecasts by country and region
    - Spending by application and function
    - Revenues and market shares of major corporations
    - Mechanisms of payment/reimbursement: public and private payers
- Introduction to the "3 Pillars of Reimbursement": 1) Coding, 2) Coverage, and 3) Payment
- ***Reading: "Chapter 4.3, Reimbursement Basics." Biodesign: the Process of Innovating Medical Technologies, by Paul G. Yock, Cambridge University Press, 2015.***

Week 2: Coding

- The various coding systems for medical services and procedures
    - Diagnostic-Related Group (DRG) codes
    - Healthcare Common Procedure Coding System (HCPCS) Level I and II
    - Ambulatory Surgical Center (ASC) Payment System codes
    - Hospital Outpatient Prospective Payment System (HOPPS; APC) codes
    - International Classification of Diseases, 10th edition (ICD-10) codes
- Coding agencies
    - Center for Medicare and Medicare Services (CMS), American Medical Association (AMA)
- Creating new or add-on codes
- ***Reading: Innovators' Guide to Navigating Medicare, Center for Medicare & Medicaid Services, 2015.***

Week 3: Coverage

- Local and national decisions made by public and private payers
- How coverage decisions are made: real-world evidence, clinical trials, comparative reviews
- Introduction to Health Technology Assessments (HTA)
- ***Reading: Guide to the processes of technology appraisal, National Institute for Health and Care Excellence, 2018.***

Weeks 4 & 5: Health Technology Assessments (HTA)

- Systematic reviews
- Quantitative synthesis
- ***Reading: Methods Guide for Effectiveness and Comparative Effectiveness Reviews, Agency for Healthcare Research and Quality, 2018.***

Week 6: Clinical Evaluation Reporting (CER)

- Clinical Evaluation Reporting requirements and guidelines for the European Union
- ***Reading: Clinical Evaluation: A Guide for Manufacturers and Notified Bodies, MEDDEV 2.7/1 rev4, European Commission, 2016.***
- *Student Presentations: Project Proposals*

Week 7: Health Technology Assessment - Workshop

- Reading, understanding and analyzing a Health Technology Assessment
- ***Reading: Cardiac Stents, Final Evidence Report (Re-Review). Washington State Health Care Authority , 2015.***

Weeks 8 & 9: Payment

- Value analysis committees
- Healthcare value analysis
    - Qualitative analysis (e.g. needs validation, savings, sustainability, education, logistics)
    - Quantitative analysis (e.g. usage data, cost effectiveness, pricing/contract strategies)
- Maintaining payment/reimbursement
    - Supporting patients, providers, and payers (e.g. white papers, websites, hotlines)
- ***Reading: Buzachero, Victor. Measuring ROI in Healthcare: Tools and Techniques to Measure the Impact and ROI in Healthcare Improvement Projects and Programs. McGraw-Hill Education, 2013.***

Week 10: Reimbursement in Canada

- Requirements of various decision-makers in different provinces
- Example of a national reimbursement strategy: photovaporization of the prostate
- ***Reading: Medical device and diagnostic pricing and reimbursement in Canada, Institute of Health Economics, 2015.***

Weeks 11 & 12: Case Studies - United States, United Kingdom, Germany, France

- Critical analysis of real-life medical device reimbursement cases
- Cases: In-vitro diagnostic testing for HER2, negative pressure wound therapy, photovaporization of the prostate, stereotactic radiosurgery, vagus nerve stimulation
- ***Videos: Medtech Reimbursement Intensive, MaRS Discovery District, 2019.***

Week 13: Project Presentations

- *Student Presentations: Mock Pitches to a Value Analysis Committee*

Assignments and Evaluations

Midterm: 20%

Closed book format, in which objective-type questions will be asked, as well as an opinion-type question: find weaknesses in a reimbursement strategy (themes: coding and coverage)

Project: 40%

The project will consist of a comprehensive reimbursement plan and value analysis of a potential medical device (e.g. found in a recent patent but not yet commercially available)

- *10%* Proposal: 5% Presentation, 5% Evaluation of Peer Proposal(s)
- *20%* Final Written Report
- *10%* Final Presentation: Mock Pitch to Value Analysis Committee

Final Exam: 40%

Closed book format, including objective-type questions, a Health Technology Assessment proposal-drafting question, and an opinion-type question on a reimbursement strategy (themes: coding, coverage and payment)

McGill Policy Statements

In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

Conformément à la Charte des droits de l'étudiant de l'Université McGill, chaque étudiant a le droit de soumettre en français ou en anglais tout travail écrit devant être noté.

McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures" (see www.mcgill.ca/students/srr/honest/ for more information).

L'université McGill attache une haute importance à l'honnêteté académique. Il incombe par conséquent à tous les étudiants de comprendre ce que l'on entend par tricherie, plagiat et autres infractions académiques, ainsi que les conséquences que peuvent avoir de telles actions, selon le Code de conduite de l'étudiant et des procédures disciplinaires (pour de plus amples renseignements, veuillez consulter le site www.mcgill.ca/students/srr/honest/).

Responses to Recommendations from prior CGPS Meeting

Introduction:

On Monday, April 15, 2019, a new graduate program, the Master of Science, Applied (M.Sc.A.) Translational Biomedical Engineering (Non-Thesis)(45 credits), was submitted to CGPS for approval.

CGPS provided commentary and requests, and decided the new program be re-visited once its recommendations were addressed.

The requests of CGPS have been addressed as explained below:

CGPS requests:

1) "Council recommended that the internship be modified to take into account the impact of the heavy credit weight (18 credits, 1/3 of the degree) on the feasibility of finding hosts, the workload, and particularly, the replacement of academic training with corporate training."

- *Feasibility of finding hosts*:
    - The feasibility of finding hosts is recognized as a potential issue, however we have a growing list of companies which have agreed to take on students for internships (see Table 1). There are currently more host companies available than the forecasted student enrolment (see Table 2).
    - A full-time Program Coordinator will work continuously to secure commitments from host companies, and will work closely with students from the beginning of their studies to secure placement.

Table 1: Current internship hosts for Masters in Translational Biomedical Engineering

NeuroRx Research Inc.
1CellBiO Inc.
Rogue Research Inc.
Modular Medical Inc.
Quasuras Inc.
Concert Innovators Inc.
National Cardiac Inc.
Ambumed Inc.
CAE Healthcare
True Positive MD
Ziptek LLC
Medtronic
MangoGen Pharma

Table 2: Expected program enrollment during the program's first five years

Student details	2020/21	2021/22	2022/23	2023/24	2024/25
New students from Quebec	1	2	2	3	3
New students from Canada	2	2	3	3	4
New international students	2	3	4	5	6
Annual total enrolled	5	7	9	11	13
Dropouts	1	1	2	2	2
Annual graduates	4	6	7	9	11

- *Workload:*
  - The credit weight for the internship course (18 credits) is justified by one week of full-time work (35 hr) per credit (i.e. 18 weeks = 18 credits). This is reflected in similar graduate-level internship courses at McGill (e.g. EXSU 501/502, BREE 600/601).
  - The course outline for BMDE 657 Biomedical Engineering Industry Internship (see attached in "MScA in Trans Biomed Eng NT Core Course Outlines") specifies comprehensive educational objectives (p.3, p.7-9, Professional Competencies sections), student and supervisor deliverables (p.4-5, Instructional Method section), schedules for meetings/evaluations/follow-ups (p.5-6), and a mechanism for improvement/disciplinary action (p.5, Competency Improvement Plan sub-section).
- *Replacement of academic training with corporate training:*
  - While the educational setting is corporate, every student is assigned an academic supervisor in biomedical engineering who is responsible for the educational integrity of the internship.
  - The internship course outline mandates extensive responsibilities for the academic supervisor (see course outline for BMDE 657 Biomedical Engineering Industry Internship, on previous pages in this program proposal), including curriculum planning, feedback, and evaluation (see supervisor deliverables, p.4-5, Instructional Method section; and see schedules for meetings/evaluations/follow-ups, p.5-6),
  - The internship course outline also mandates a substantial educational workload (see previous section, Workload).
  - The department of biomedical engineering will have a sufficient number of staff and associates available to be academic supervisors (see Table 3; see forecasted class size in Table 2 above).

Table 3: Staff and Associates in Biomedical Engineering available as Academic Supervisors

Full-Time Staff	Associate Members
David Juncker, Professor, Department Chair	Marco Amabili
Thomas Ming Swi Chang, Professor	Sylvain Baillet
Louis Collins, Professor	Curtis L. Baker
W Robert J Funnell, Associate Professor	François Barthelat
Ahmad Haidar, Assistant Professor	Stefanie Blain-Moraes
Robert E Kearney, Professor	Maurice J. Chacron
Satya Prakash, Professor	Mallar Chakravarty
David Rudko, Assistant Professor	Mark Driscoll
Maryam Tabrizian, Professor	Allen J. Ehrlicher
Christine Tardif, Assistant Professor	Shirin A.N. Enger
Ross Wagner, Faculty Lecturer	Alan C. Evans
	Jean Gotman
	Daniel Guitton
	Adam G. Hendricks
	Corinne Hoesli
	Richard (Rick) Hoge
	Yasser Iturria-Medina
	Amine A. Kamen
	Athanasios Katsarkas
	John Kildea
	Joseph (Matt) Kinsella
	Svetlana Komarova
	Anne-Marie Lauzon
	Richard Leask
	Ives Levesque
	Jianyu Li
	Nicole Li-Jessen
	Georgios Mitsis
	Luc Mongeau
	Rosaire Mongrain
	Christopher Moraes
	Jamie Near
	Dan Nicolau
	Christopher Pack
	Damiano Pasini
	Walter Reisner
	Amir Shmuel
	Bettina Willie
	Yu (Brandon) Xia

2) "Council asked to be provided with course outlines and a typical timeline to completion for students."

- Please see the following course outlines on previous pages in this program proposal:
  - BMDE 657 Biomedical Engineering Industry Internship,
  - BMDE 653 Patents in Biomedical Engineering,
  - BMDE 654 Biomedical Regulatory Affairs - Medical Devices,
  - BMDE 655 Biomedical Clinical Trials – Medical Devices, and,
  - BMDE 656 Medical Device Reimbursement
- The Masters in Translational Biomedical Engineering is a professional training program and is expected to last 12-16 months, similar to other Masters programs at McGill (see Table 4)

Table 4: Overview of the typical timeline for a student enrolled in the Masters program in Translational BME.

	Year 1 Fall	**Year 1 Winter**	**Year 1 Summer**	**Year 2 Fall**
Translational Courses	1) Biomedical Regulatory Affairs – Medical Devices	2) Patents in Biomedical Engineering 3) Biomedical Clinical Trials – Medical Devices	4) Medical Device Reimbursement (May/June)	
Complementary Courses	3 complementary courses	2 complementary courses		
Internship			Internship begins (July/August)	Internship ends

3) "Council requested that the department be informed that international students would not qualify for full-time status should they be required to register for the internship in the Summer semester. Furthermore, international students require a 16-month program in order to be eligible for a 3-year work permit at graduation."

- The full-time registration of international students in the Summer is recognized as a potential issue, however upon consultation with International Student Services, international students will be able to secure a "co-op work permit", allowing them to work full-time while enrolled in the program (see details at https://www.mcgill.ca/internationalstudents/work/co-op-internship-work-permit)
- The official program length will be stated as 16 months, therefore students will be eligible to be employed under a post-graduate work permit following completion of the program.

4) "Council requested clarification on the internship being listed as a D1/D2 course."

- The internship course requires D1/D2 status because it spans two consecutive terms (see Table 4 above), thus allowing students to register for the course in Summer and Fall.

McGill

New Program/Major or Minor/Concentration Proposal Form

(2017)

1.0 Degree Title
Please specify the two degrees for concurrent degree programs

Graduate Diploma

1.1 Major (Legacy= Subject)(30-char. max.)

Oncology

1.2 Concentration (Legacy = Concentration/Option)
If applicable to Majors only (30 char. max.)

1.3 Minor (with Concentration, if Applicable) (30 char. max.)

2.0 Administering Faculty/Unit

Graduate and Postdoctoral Studies

Offering Faculty/Department

Medicine/Gerald Bronfman Department of Oncology

3.0 Effective Term of Implementation
(Ex. Sept. 2004 = 200409)
Term

202009

4.0 Rationale and Admission Requirements for New Proposal

This program will cater to students who are interested in obtaining broad knowledge of the field of cancer research/cancer care to enhance their credentials and further their professional goals. Clientele will come from a range of professional and training backgrounds including health care professionals, health care managers and biomedical research. Admission requirements: Bachelor's degree in fields related to health, biomedical disciplines, health management/economics. Minimum cumulative GPA 3.3/4.0 McGill scale. It is highly recommended that all applicants will have taken at least one course in cell and molecular biology or equivalent and one statistics course.

5.0 Program Information
Please check appropriate box(es)

5.1 Program Type
- ☐ Bachelor's Program
- ☐ Master's
- ☐ M.Sc.(Applied) Program
- ☐ Dual Degree/Concurrent Program
- ☐ Certificate
- ☐ Diploma
- ☐ Graduate Certificate
- ☒ Graduate Diploma
- ☐ Ph.D. Program
- ☐ Doctorate Program (Other than Ph.D.)
- ☐ Self-Funded/Private Program
- ☐ Off-Campus Program
- ☐ Distance Education Program (By Correspondence)
- ☐ Other (Please specify)

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

Please specify

5.3 Level
- ☐ Undergraduate
- ☐ Dentistry/Law/Medicine
- ☐ Continuing Ed (Non-Credit)
- ☐ Collegial
- ☒ Masters & Grad Dips & Certs
- ☐ Doctorate
- ☐ Post-Graduate Medicine/Dentistry
- ☐ Graduate Qualifying
- ☐ Postdoctoral Fellows

5.4 FQRSC (Research) Indicator
(for GPS) Yes __ No __

5.5 Requires Resources Yes __ No X

6.0 Total Credits

30

7.0 Consultation with
Related Units Yes ☒ No ☐
Financial Consult Yes ☒ No ☐
Attach list of consultations.

8.0 Program Description (Maximum 150 words)

The Graduate Diploma in Oncology provides exposure to the entire spectrum of principles and practice in all fields of oncology as well as its research domains while allowing exploration in more detail of a specific area of focus through courses and a practicum. The areas of focus are: population and global cancer control, psychosocial oncology/palliative care, clinical cancer research or cancer care services and quality.

9.0 List of proposed program for the New Program/Major or Minor/Concentration.

If new concentration (option) of existing Major/Minor (program), please attach a program layout (list of all courses) of existing Major/Minor.

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

Graduate Diploma in Oncology (30 credits)

Required courses (12 credits)
ONCO 610D1/D2 Fundamentals of Oncology and Cancer Research (6 credits)
ONCO 620 Best Practices in Biomedical Research (3 credits)
ONCO 630 Oncology Practicum (3 credits)

Complementary Courses (12 credits)
6 credits from:
EPIB 671 Cancer Epidemiology and Prevention (3 credits)
PPHS 612 D1/D2 Principles of Public Health Practice (3 credits)

OR

NUR2 783 Psychosocial Oncology Research (3 credits)
ONCO 635 Qualitative and Psychosocial Health Research (3 credits)

OR

EXMD 617 Workshop in Clinical Trials 1 (1 credit)
EXMD 618 Workshop in Clinical Trials 2 (1 credit)
EXMD 619 Workshop: Clinical Trials 3 (1 credit)
ONCO 615 Principles and Practice of Clinical Trials (3 credits)

OR
ONCO 625 Quality Improvement Principles and Methods (3 credits)
PPHS 528 Economic Evaluation of Health Programs (3 credits)

3 credits from:

EPIB 507 Biostats for Health Sciences (3 credits)
EPIB 521 Regression Analysis for Health Sciences (3 credits)
EXMD 634 Quantitative Research Methods (3 credits)
FMED 505 Basic Analysis for Health Data (3 credits)
OR 3 credits of a research design or statistics course at the 500 level or higher chosen in consultation with the student's mentor and approved by the Program Committee and the Graduate Program Director. Students who already have a very strong background in statistics may be exempt from taking a statistics course and would choose another 3-credit course. This must be approved by the Program Committee and the Graduate Program Director.

Attach extra page(s) as needed

Graduate Diploma in Oncology (30 credits)

3 credits from:
EPIB 671 Cancer Epidemiology and Prevention (3 credits)
EXMD 614 Environmental Carcinogenesis (3 credits)
EXMD 620 Clinical Trials and Research 1 (1 credit)
EXMD 625 Clinical Trials and Research 2 (1 credit)
EXMD 626 Clinical Trials and Research 3 (1 credit)
EXMD 640 Experimental Medicine Topic 1 (3 credits)
EXSU 505 Trends in Precision Oncology (3 credits)
FMED 619 Program Management in Global Health & Primary Health Care (3 credits)
HGEN 690 Inherited Cancer Syndromes (3 credits)
NUR2 705 Palliative Care (3 credits)
ONCO 615 Principles and Practice of Clinical Trials (3 credits)
ONCO 625 Quality Improvement Principles and Methods (3 credits)
POTH 637 Cancer Rehabilitation (3 credits)
PPHS 528 Economic Evaluation of Health Programs (3 credits)
PSYC 507 Emotions, Stress and Illness (3 credits)
SWRK 668 Living with Illness, Loss and Bereavement (3 credits)

The course will be chosen in consultation with the student's mentor and must be approved by the Program Committee and the Graduate Program Director.

Elective courses (6 credits)
6 credits at the 500 level or higher can be chosen from the course list above or can be other courses. The courses do not necessarily have to include cancer-related content but must have relevance to the field. The courses will be chosen in consultation with the student's mentor and must be approved by the Program Committee and the Graduate Program Director.

10.0 Approvals

Routing Sequence	Name	Signature	Date
Department	Eduardo L. Franco	eduardo.franco@mcgill.ca Digitally signed by eduardo.franco@mcgill.ca DN: cn=eduardo.franco@mcgill.ca	August 19, 2019
Curric/Acad Committee	David RAGSDALE		10 Oct. 2019
Faculty 1		Aimee Ryan Digitally signed by Aimee Ryan Date: 2019.10.11 12:11:05 -04'00'	11 Oct. 2019
Faculty 2			
Faculty 3			
CGPS	SCTP APPROVED	CGPS APPROVAL	November 4, 2019
SCTP			Nov. 21, 2019
APC		Approved	DEC 16,2019
Senate			

Submitted by

Name	
Phone	
Email	
Submission Date	

To be completed by ARR:

CIP Code

Graduate Diploma in Oncology (30 credits)

3 credits from:
EPIB 671 Cancer Epidemiology and Prevention (3 credits)
EXMD 614 Environmental Carcinogenesis (3 credits)
EXMD 620 Clinical Trials and Research 1 (1 credit)
EXMD 625 Clinical Trials and Research 2 (1 credit)
EXMD 626 Clinical Trials and Research 3 (1 credit)
EXMD 640 Experimental Medicine Topic 1 (3 credits)
EXSU 505 Trends in Precision Oncology (3 credits)
FMED 619 Program Management in Global Health & Primary Health Care (3 credits)
HGEN 690 Inherited Cancer Syndromes (3 credits)
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POTH 637 Cancer Rehabilitation (3 credits)
PPHS 528 Economic Evaluation of Health Programs (3 credits)
PSYC 507 Emotions, Stress and Illness (3 credits)
SWRK 668 Living with Illness, Loss and Bereavement (3 credits)

The course will be chosen in consultation with the student's mentor and must be approved by the Program Committee and the Graduate Program Director.

Elective courses (6 credits)
6 credits at the 500 level or higher can be chosen from the course list above or can be other courses with approval from the course instructor. The courses do not necessarily have to include cancer-related content but must have relevance to the field. The courses will be chosen in consultation with the student's mentor and must be approved by the Program Committee and the Graduate Program Director.

Graduate Diploma in Oncology (30 credits)

EXECUTIVE SUMMARY

The proposed Graduate Diploma in Oncology will provide students the opportunity to gain exposure to the principles and practice of oncology as well as its research domains while exploring in more detail one of four areas of focus: population and global cancer control; psychosocial oncology/palliative care; clinical cancer research; or cancer care services and quality.

The target clientele will be health care and health management professionals and those with a background in biomedical sciences who want to gain knowledge and practical experience in cancer research and organization of clinical care. Potential applicants include: (i) professionals from the life sciences or information technology industry seeking to enhance their cancer-specific skills/knowledge base to increase their competency profile; (ii) clinical health care professionals seeking career advancement in oncology management, clinical trial leadership or health services assessment; or (iii) broad-themed graduate degree holders wanting to specialize further in oncology (e.g. an Epidemiology MSc who wants to focus future work on cancer). Since there is currently no equivalent to the proposed program offered in Quebec and Canada, we expect to attract students from across the country. Moreover, we anticipate that the broad scope of this program with respect to cancer, the short commitment (one year) and the opportunity to customize learning to one's specific interests, will also appeal to an international clientele. It is expected that most students will enroll full-time and complete the program in one year, however the possibility to complete training on a part-time basis will be available for eligible students.

The Graduate Diploma in Oncology includes three newly created courses common to the four areas of focus:

- ONCO 610 D1/D2 Fundamentals of Oncology and Cancer Research (6 credits)
- ONCO 620 Best Practices in Biomedical Research (3 credits)
- ONCO 630 Oncology Practicum (3 credits)

In addition, students will choose one of four 6-credit course groupings, which will define the area of focus of their practicum project. Three key courses for particular areas of focus were created specifically for this program:

- ONCO 615 Principles and Practice of Clinical Trials (3 credits)
- ONCO 625 Quality Improvement Principles and Methods (3 credits)
- ONCO 635 Qualitative and Psychosocial Health Research (3 credits)

Students will also choose a 3-credit research design or statistics course, 3 credits from a list of complementary courses as well as 6 credits of elective courses which may not necessarily have cancer-related content but must have relevance to the field.

The proposed program is in line with the McGill Strategic Plan, which supports health research and improved delivery of care in key areas such as cancer. Furthermore, the Faculty of Medicine's most recent Strategic Plan identifies cancer as a high priority disease area, with a particular focus on the themes of patient experience, population health and health services, genetic and environmental determinants of health and disease, and personalized medicine, customized approaches to patient care. The proposed program with its four areas of focus ensures that these themes receive broad coverage. This intensive curriculum focusing on all key aspects of cancer will build much needed human capital in applied oncology.

OVERVIEW OF THE PROGRAM

Required courses (12 credits)
ONCO 610 D1/D2 Fundamentals of Oncology and Cancer Research (6 credits)
ONCO 620 Best Practices in Biomedical Research (3 credits)
ONCO 630 Oncology Practicum (3 credits)

Complementary Courses (12 credits)
6 credits from:
EPIB 671 Cancer Epidemiology and Prevention (3 credits)
PPHS 612 Principles of Public Health Practice (3 credits)

OR

NUR2 783 Psychosocial Oncology Research (3 credits)
ONCO 635 Qualitative and Psychosocial Health Research (3 credits)

OR

EXMD 617 Workshop in Clinical Trials 1 (1 credit)
EXMD 618 Workshop in Clinical Trials 2 (1 credit)
EXMD 619 Workshop: Clinical Trials 3 (1 credit)
ONCO 615 Principles and Practice of Clinical Trials (3 credits)

OR
ONCO 625 Quality Improvement Principles and Methods (3 credits)
PPHS 528 Economic Evaluation of Health Programs (3 credits)

3 credits from:

EPIB 507 Biostats for Health Sciences (3 credits)
EPIB 521 Regression Analysis for Health Sciences (3 credits)
EXMD 634 Quantitative Research Methods (3 credits)
FMED 505 Basic Analysis for Health Data (3 credits)
OR 3 credits of a research design or statistics course at the 500 level or higher chosen in consultation with the student's mentor and approved by the Program Committee and the Graduate Program Director. Students who already have a very strong background in statistics may be exempt from taking a statistics course and would choose another 3-credit course. This must be approved by the Program Committee and the Graduate Program Director.

3 credits from:
EPIB 671 Cancer Epidemiology and Prevention (3 credits)
EXMD 614 Environmental Carcinogenesis (3 credits)
EXMD 620 Clinical Trials and Research 1 (1 credit)
EXMD 625 Clinical Trials and Research 2 (1 credit)
EXMD 626 Clinical Trials and Research 3 (1 credit)
EXMD 640 Experimental Medicine Topic 1 (3 credits)
EXSU 505 Trends in Precision Oncology (3 credits)

FMED 619 Program Management in Global Health & Primary Health Care (3 credits)
HGEN 690 Inherited Cancer Syndromes (3 credits)
NUR2 705 Palliative Care (3 credits)
ONCO 615 Principles and Practice of Clinical Trials (3 credits)
ONCO 625 Quality Improvement Principles and Methods (3 credits)
POTH 637 Cancer Rehabilitation (3 credits)
PPHS 528 Economic Evaluation of Health Programs (3 credits)
PSYC 507 Emotions, Stress and Illness (3 credits)
SWRK 668 Living with Illness, Loss and Bereavement (3 credits)

The course will be chosen in consultation with the student's mentor and must be approved by the Program Committee and the Graduate Program Director.

Elective courses (6 credits)
6 credits at the 500 level or higher can be chosen from the course list above or can be other courses. The courses do not necessarily have to include cancer-related content but must have relevance to the field. The courses will be chosen in consultation with the student's mentor and must be approved by the Program Committee and the Graduate Program Director.

All students will take ONCO 610 D1/D2 Fundamentals of Oncology and Cancer Research, ONCO 620 Best Practices in Biomedical Research and ONCO 630 Oncology Practicum. The balance of the courses they take will depend on their specific interest in oncology.

First, they will choose 6 credits from one of four course groupings and this will define their area of focus for their practicum as follows:

i. Students taking EPIB 671 Cancer Epidemiology and Prevention and PPHS 612 Principles of Public Health Practice will conduct their practicum in the area of population and global cancer control;
ii. Students taking NUR2 783 Psychosocial Oncology Research and ONCO 635 Qualitative and Psychosocial Health Research will conduct their practicum in the area of psychosocial oncology/palliative care;
iii. Students taking EXMD 617, EXMD 618 and EXMD 619 Workshop in Clinical Trials 1, 2, 3 respectively and ONCO 615 Principles and Practice of Clinical Trials will conduct their practicum in the area of clinical cancer research;
iv. Students taking ONCO 625 Quality Improvement Principles and Methods and PPHS 528 Economic Evaluation of Health Programs will conduct their practicum in the area of cancer care services and quality.

Second, in consultation with their mentor (see Program Committee section below), students will choose a research design or statistics course.

Third, in consultation with their mentor, students will choose 3 credits from a list of courses, based on their interests and career goals. Below are just some examples of possible course choices:

- A student interested in population and global cancer control may choose EXMD 614 Environmental Carcinogenesis

- A student interested in psychosocial oncology/palliative care may choose NUR2 705 Palliative Care, PSYC 507 Emotions Stress and Illness, SWRK 668 Living with Illness, Loss and Bereavement or POTH 637 Cancer Rehabilitation
- A student interested in clinical cancer research may choose EXMD 640 Experimental Medicine Topic 1
- A student interested in cancer care services and quality may choose FMED 619 Program Management in Global Health & Primary Health Care.

Fourth, in consultation with their mentor, students will choose 6 credits of elective courses that do not necessarily include cancer-related material but have relevance to the field. This could also be chosen from one of the courses in the list above.

The Program Committee (see section below) will review the planned courses for each student to ensure that they are in sync with the student's interests and career goals. The Graduate Program Director will give the final approval for each student's course plan. **The Program Director will ensure that the number of students enrolled in a course offered by another McGill unit does not exceed the expectations of the course instructor.**

Four examples of a full-time or part-time student's course schedule are shown in the two tables below. Full-time students must complete the program in one year. Any student who wishes to do the program part-time and is eligible to do so (international students are not eligible), must complete the program within two and a half years. Appendix 1 shows the possible scheduling of ONCO courses taking into account the historical scheduling of the relevant courses from other McGill units.

Summary of table showing full-time enrollment
In the fall semester all students will take ONCO 610D1 (3 credits). In the winter semester all students will take ONCO 610D2 (3 credits), ONCO 620 (3 credits) and ONCO 630 (3 credits).

Example 1 (first column)
In the fall semester the student would take a statistics course of 3 credits (for example, FMED 505 or EPIB 507), EPIB 671 (3 credits) and either one complementary course choice from the list (3 credits) plus one elective (3 credits) or two electives (2 x 3 credits).

In the winter semester the student would take PPHS 612 (3 credits) and 3 credits of either a complementary course choice from the list or an elective (if they took two electives in the fall semester then they will take a complementary course choice from the list in the winter semester). Since EPIB 671 and PPHS 612 are defining courses for the population and global cancer control area of focus, this will be the area of focus of the student's ONCO 630 practicum project.

Example 2 (second column)
In the fall semester the student would take EXMD 634 (3 credits), ONCO 635 (3 credits) and either one complementary course choice from the list (3 credits) plus one elective (3 credits) or two electives (2 x 3 credits).

In the winter semester the student would take NUR2 783 (3 credits) and 3 credits of either a complementary course choice from the list or an elective (if they took two electives in the fall semester then they will take a complementary course choice from the list in the winter semester).

Since ONCO 635 and NUR2 783 are defining courses for the psychosocial oncology/palliative care area of focus, this will be the area of focus of the student's ONCO 630 practicum project.

Example 3 (third column)
In the fall semester the student would take a statistics course of 3 credits (for example, FMED 505 or EPIB 507), ONCO 615 (3 credits), EXMD 618 (1 credit), EXMD 619 (1 credit) and either a complementary course choice from the list or an elective (3 credits).

In the winter semester the student would take EXMD 617 (1 credit) and either complementary course choice(s) from the list (3 credits) plus one elective (3 credits), or two electives (2 x 3 credits) if the complementary course choice from the list was taken in the fall semester. Since ONCO 615, EXMD 617, EXMD 618 and EXMD 619 are defining courses for the clinical cancer research area of focus, this will be the area of focus of the student's ONCO 630 practicum.

Example 4 (fourth column)
In the fall semester the student would take a statistics course of 3 credits (for example, FMED 505 or EPIB 507), ONCO 625 (3 credits), PPHS 528 (3 credits) and either a complementary course choice from the list or an elective (3 credits).

In the winter semester the student would take either one complementary course choice from the list (3 credits) plus one elective (3 credits), or two electives (2 x 3 credits) if the complementary course choice was taken in the fall semester. Since ONCO 625 and PPHS 528 are defining courses for the cancer care services and quality area of focus, this will be the area of focus of the student's ONCO 630 practicum.

Summary of table showing part-time enrollment
Part-time students would be required to take ONCO 610 D1 in the fall semester of the first year and ONCO 610 D2 in the winter semester of the first year. In addition, they would be required to take ONCO 620 in the winter semester of the first year. ONCO 630 would be taken in the winter semester of the second year.

In the fall semester of the first year students would take one of the courses that defines their area of focus, as follows: EPIB 671 (population and global cancer control – column 1), ONCO 635 (psychosocial oncology/palliative care – column 2), ONCO 615 (clinical cancer research – column 3) or ONCO 625 (cancer care services and quality – column 4). The second course that defines the area of focus would be taken in the fall semester of the second year, EXMD 618, EXMD 619 in column 3 (note that EXMD 617 would be taken in the winter semester of the second year) and PPHS 528 in column 4, or the winter semester of the second year PPHS 612 in column 1 and NUR2 783 in column 2.

In the fall semester of the second year students would take a statistics or quantitative research methods course. The complementary course choice from the list and two electives would be taken in the fall semester of the second year and fall semester of the third year (columns 1 and 2) or the winter semester of the second year and fall semester of the third year (columns 3 and 4).

Four examples of a full-time student's course schedule

Fall Semester			
Fundamentals of Oncology and Cancer Research (ONCO 610D1) **3 credits**			
Statistics course (FMED 505 or EPIB 507) **3 credits**	Quantitative Research Methods (EXMD 634) **3 credits**	Statistics course (FMED 505 or EPIB 507) **3 credits**	Statistics course (FMED 505 or EPIB 507) **3 credits**
Cancer Epidemiology and Prevention (EPIB 671) **3 credits**	Qualitative and Psychosocial Health Research (ONCO 635) **3 credits**	Principles and Practice of Clinical Trials (ONCO 615) **3 credits**	Quality Improvement Principles and Methods (ONCO 625) **3 credits**
Complementary Course Choice /Elective **3 credits**	Complementary Course Choice /Elective **3 credits**	Two Workshops in Clinical Trials (EXMD 618, 619)* **2 credits**	Economic Evaluation of Health Programs (PPHS 528) **3 credits**
Complementary Course Choice /Elective **3 credits**	Complementary Course Choice /Elective **3 credits**	Complementary Course Choice /Elective **3 credits**	Complementary Course Choice /Elective **3 credits**
Winter Semester			
Fundamentals of Oncology and Cancer Research (ONCO 610D2) **3 credits**			
Best Practices in Biomedical Research (ONCO 620) **3 credits**			
Oncology Practicum (ONCO 630) **3 credits**			
Practicum Project population and global cancer control	Practicum Project psychosocial oncology/palliative care	Practicum Project clinical cancer research	Practicum Project cancer care services and quality
Principles of Public Health Practice (PPHS 612) **3 credits**	Psychosocial Oncology Research (NUR2 783) **3 credits**	One Workshop in Clinical Trials (EXMD 617)* **1 credit**	Complementary Course Choice /Elective **3 credits**
Complementary Course Choice /Elective **3 credits**	Complementary Course Choice /Elective **3 credits**	Complementary Course Choice /Elective **3 credits**	Complementary Course Choice /Elective **3 credits**
		Complementary Course Choice /Elective **3 credits**	

***According to the course calendar, EXMD 617 is offered in the winter semester while EXMD 618 and EXMD 619 are offered in the fall semester**

Four examples of a part-time student's course schedule

Fall Semester – First Year			
Fundamentals of Oncology and Cancer Research (ONCO 610D1) **3 credits**			
Cancer Epidemiology and Prevention (EPIB 671) **3 credits**	Qualitative and Psychosocial Health Research (ONCO 635) **3 credits**	Principles and Practice of Clinical Trials (ONCO 615) **3 credits**	Quality Improvement Principles and Methods (ONOC 625) **3 credits**
Winter Semester – First Year			
Fundamentals of Oncology and Cancer Research (ONCO 610D2) **3 credits**			
Best Practices in Biomedical Research (ONCO 620) **3 credits**			
Fall Semester – Second Year			
Statistics course (FMED 505 or EPIB 507) **3 credits**	Quantitative Research Methods (EXMD 634) **3 credits**	Statistics course (FMED 505 or EPIB 507) **3 credits**	Statistics course (FMED 505 or EPIB 507) **3 credits**
Complementary Course Choice /Elective **3 credits**	Complementary Course Choice /Elective **3 credits**	Two Workshops in Clinical Trials (EXMD 618, 619)* **2 credits**	Economic Evaluation of Health Programs (PPHS 528) **3 credits**
Winter Semester – Second Year			
Oncology Practicum (ONCO 630) **3 credits**			
Practicum Project population and global cancer control	Practicum Project psychosocial oncology/palliative care	Practicum Project clinical cancer research	Practicum Project cancer care services and quality
Principles of Public Health Practice (PPHS 612) **3 credits**	Psychosocial Oncology Research (NUR2 783) **3 credits**	One Workshop in Clinical Trials (EXMD 617)* **1 credit**	Complementary Course/Elective **3 credits**
		Complementary Course Choice /Elective **3 credits**	
Fall Semester – Third Year			
Complementary Course Choice /Elective **3 credits**	Complementary Course Choice /Elective **3 credits**	Complementary Course Choice /Elective **3 credits**	Complementary Course Choice /Elective **3 credits**
Complementary Course Choice /Elective **3 credits**	Complementary Course Choice /Elective **3 credits**	Complementary Course Choice /Elective **3 credits**	Complementary Course Choice /Elective **3 credits**

***According to the course calendar, EXMD 617 is offered in the winter semester while EXMD 618 and EXMD 619 are offered in the fall semester**

ONCO 610 Fundamentals of Oncology and Cancer Research

The core course, Fundamentals of Oncology and Cancer Research, will provide students with an overview of the entire spectrum of clinical and research activities in oncology, exposing students to the multidisciplinary/interdisciplinary nature of cancer research and clinical care. This course was designed specifically to provide a knowledge-equalizing platform for all students, regardless of background.

Mechanisms have been put in place to help students who may be struggling with some of the material:

- In the summer, the two course instructors will provide a list of background reading material and online resources that will help students boost their knowledge on particular topics to be addressed during the course. Students will be strongly encouraged to review this material, particularly the topics that may not be as familiar to them, prior to the start of the course;
- Students will be provided with a required reading list for each lecture and they will be expected to have read the required material at least a week prior to the lecture. This will give them the opportunity to submit questions a week in advance so that the lecturer can identify areas that might be problematic for some students and can address these issues during the lecture;
- During the course, an online tutorial board will be provided for students to post questions which will be answered by the two course instructors. This will enable the entire class to benefit from the questions asked by individuals;
- Both course instructors will be available by appointment face-to-face, via telephone or skype for questions or guidance;
- If additional help is required by some students, the course instructors may choose to pair students together according to their different areas of focus so that they can consult each other if needed. Alternatively they may choose to facilitate and monitor extracurricular meetings between several students to discuss course material.

In addition, the course instructor(s) will be given all lecture slides in advance and will be responsible for ensuring that the content of all lectures align with the course objectives and the goals of this Graduate Diploma in Oncology program and will be delivered in straightforward jargon-free language. Course instructors will be present at all lectures to ascertain in real-time whether the lectures are easy to absorb or if the lecturer should be providing additional explanation of the subject matter. While course lecturers will provide questions to be used on exams, this will be vetted by the course instructors who will ultimately be responsible for evaluating the students based on the evaluation methods presented in the course outline. All lectures will be audiotaped and placed online so that students will be able re-visit subject matter discussed in class.

ONCO 630 Oncology Practicum

The Oncology Practicum will allow students to gain practical and real-world research or quality improvement experience in the area of focus defined by their chosen 6-credit course grouping. The practicum will involve both a real-world project and facilitated group activities. The practicum project will be tailored for each student and based on learning opportunities that can be provided by the student's supervisor.

A list of Project Supervisors and a short description of each project will be available to students prior to the beginning of the semester. Projects and supervisors will have been approved by the Course Instructor and officialized by the Program Committee through a submission procedure

outlined in the document *Oncology Practicum- Project Guidelines for Supervisors* (Appendix 2). Students will contact supervisors by email to express their interest in their project(s). As outlined in the *Oncology Practicum-Project Guidelines for Supervisors* and *Oncology Practicum-Project Guidelines for Students* documents (Appendices 2 and 3 respectively), following an in-person meeting and by mutual agreement to work together, students and supervisors will complete and sign the *Project Proposal Form for Supervisors and Students* (Appendix 4) and submit it to the Course Instructor for approval.

Using the *Oncology Practicum- Grading Rubric* (Appendix 5), the project supervisor will be responsible for completing an assessment of the student's practical activities during the project and the final written report prepared by the student. The supervisor will submit the assessment to the Course Instructor who will provide the overall assessment by incorporating in an assessment of the student's participation in the group activities portion of the practicum, again following the *Oncology Practicum - Grading Rubric.* The 30 hours of group activities portion of the practicum will be coordinated and led by the Course Instructor in the form of scheduled classroom activities during the semester. This could potentially be scheduled on Thursdays from 3:00-5:30 pm as that time slot appears to be free in the winter semester (see Appendix 1).

The following are examples of possible practicum projects:

Population and Global Cancer Control
Students whose area of focus is population and global cancer control will be able to get involved with supervisors across the Faculty of Medicine who are experts in this domain. During the project, students will be exposed to various aspects of the research process to gain experience and learn from scientists who are active in the field. McGill experts in this domain are concerned with research on etiology, prevention, screening and diagnosis, health economics, and survivorship of many different types of cancer.

Typical practicum projects in their supervisor's lab can include, but are not limited to, conducting in-depth literature reviews on specific topics, assisting with the preparation of preliminary data for grant applications, involvement in the experimental design of new studies, overseeing data collection and data analysis. Literature reviews may be complemented by meta-analyses or syntheses. Also relevant for practicum projects are assessments of policies in cancer control and their impact in different jurisdictions. These include screening interventions, tobacco and alcohol control, hepatitis B and human papillomavirus vaccinations.

Psychosocial Oncology/Palliative Care
Students whose area of focus is psychosocial oncology/palliative care will have the opportunity to be involved in various aspects of the research process in this domain. Examples can include:

1. A scoping literature review which could be publishable or which could be used to support a grant application or a manuscript.
2. A systematic review which could be publishable.
3. Secondary analysis of a qualitative or quantitative dataset.
4. Activities in support of subject recruitment, contributing to qualitative analysis, helping with the preparation of a manuscript for publication.
5. Carrying out of a questionnaire study in oncology/supportive care clinics (tasks could include all or some of the following: write up the study, submit to the research ethics board, recruit, collect data, analyze, draft manuscript).

6. Participation in a pilot study (tasks could include all or some of the following: protocol development, ethics submission, recruitment, data collection, data analysis, draft of manuscript).
7. Analysis of provincial or national policies regarding a specific area.

The practicum project will be conducted at the location of the student's supervisor.

Clinical Cancer Research

Students whose area of focus is clinical cancer research will be involved in various aspects of a clinical trial such as protocol development, participant screening, data collection or data analysis. Observational studies of prognostic effects of treatments and patient characteristics will also be acceptable projects. The latter will take advantage of the wealth of clinical data across all McGill teaching hospitals. Their practicum project can be conducted in any oncology-related discipline for example: medical oncology, radiation oncology, surgical oncology, hematologic oncology, gynecologic oncology, head and neck oncology, pediatric oncology, supportive and palliative care, etc. at one of the McGill-affiliated hospitals. Examples of ongoing oncology clinical trials can be found at the following link: mcgill.ca/rcr-rcn/clinical-trials. Students will benefit from interactions with the cancer-specific clinical trial coordinating offices at the hospitals.

Cancer Care Services and Quality

Students whose area of focus is cancer care services and quality will participate in projects involving various aspects of cancer care quality improvement including the design, implementation or assessment of a real-world quality improvement initiative. Their practicum will be conducted in any oncology-related discipline, for example: medical oncology, radiation oncology, surgical oncology, hematologic oncology, gynecologic oncology, head and neck oncology, pediatric oncology, supportive and palliative care, medical physics, etc. at one of the McGill-affiliated hospitals. Possible projects can target high-value themes such as optimizing access to care, streamlining trajectories of care, standardizing documentation/nomenclature, review and/or development of policies and procedures, applying quality metrics and related project management interventions.

Concrete examples of possible projects may include but are not limited to the following: identification of the barriers to and facilitators of the use of distress screening tools in routine medical oncology practice; development of strategies to improve the coordination of appointment scheduling for patients receiving concomitant chemotherapy and radiotherapy; development of a prospective database to monitor the process of care for patients undergoing extensive lymphatic surgeries with diagnostic intent. All projects will involve defining the quality improvement problem, assessing possible solutions through literature reviews, surveys of clinicians and patients, etc, implementation of chosen solution(s), and assessment of impact. The focus of the student's project will vary according to the lifetime and existing progress of the quality improvement initiative at the time the student becomes involved. Students will be involved in an "embedded" fashion, where they will be placed in direct contact with daily clinical realities that will ensure that the output of their work has real-world relevance.

Quality improvement projects will leverage the experience of the Rossy Cancer Network and on the Quality Improvement committees at each of the McGill-affiliated hospitals for rapid implementation.

The Course Instructor will check in (by email) with both supervisor and student early in the term in order to monitor progress and resolve any issues. If issues are identified, the Course Instructor will

meet with the student and supervisor to come up with a plan of action to address and resolve the issues. There will be a brief grace period very early in the term for assessment and reassignment to another supervisor only if there is a clearly demonstrated mismatch between the supervisor and student.

The Table below shows the evaluation criteria and the differences between the assessments done by the Project Supervisor and the Course Instructor. The Project Supervisor will evaluate the performance and progress of the student he/she is supervising, representing 80% of the overall course evaluation. Supervisors and the Course Instructor will follow the *Oncology Practicum - Grading Rubric* (Appendix 5) in order to ensure harmonized assessments from each supervisor. This rubric will be provided to students and supervisors prior to the start of the practicum. In addition to the grading rubric, the *Oncology Practicum – Project Guidelines for Supervisors* (Appendix 2) and *Oncology Practicum - Project Guidelines for Students* (Appendix 3) documents as well as the structured *Oncology Practicum – Project Proposal Form for Supervisors and Students* (Appendix 4) will help ensure that standards and expectations are clearly documented and harmonized. The Course Instructor will be responsible for ensuring that each student functions well in their practicum and will address any issues that may prevent the optimum performance of the student.

Evaluation Criteria	**Practicum Supervisor**	**Course Instructor**
Practicum project-specific activities (80%)		
Active participation	X	
Agreed-upon meetings and milestones	X	
Grading the practicum report	X	
Non-project-specific classroom-related activities (20%)		
Grading the practicum presentation		X
Grading the journal club presentation		X
Grading discussion participation		X
Overall Performance		
Keeping track of students' progress and performance throughout the practicum and ensuring the student is on the right track		X
Addressing problems a student may be having with the practicum that are impacting his/her ability to perform well. This also may include the involvement of the student's mentor and the Graduate Program Director	X	X

Potential Practicum Supervisors

Population and Global Cancer Control	Psychosocial Oncology/Palliative Care	Clinical Cancer Research	Cancer Care Services and Quality
Eduardo Franco Belinda Nicolau Celia Greenwood Laurent Azoulay	Carmen Loiselle Robin Cohen Melissa Henry Zeev Rosberger Christine Maheu Argerie Tsimicalis Antonio Vigano Annett Körner Sylvie Lambert Mary Ellen Macdonald Antonia Arnaert Patricia Dobkin	Clinicians – Medical Oncology, Radiation Oncology/Medical Physics, Surgical Oncology, Gynecologic Oncology, Head and Neck Oncology. https://www.mcgill.ca/rcr-rcn/clinical-trials	Carolyn Freeman Tarek Hijal Sonia Skamene Joanne Alfieri Jamil Asselah Ari Meguerditchian John Kildea Gabriella Stroian William Parker Marija Popovic

Eduardo Franco – Professor, Gerald Bronfman Department of Oncology and Department of Epidemiology, Biostatistics and Occupational Health. Specialty – cancer epidemiology

Belinda Nicolau – Associate Professor, Faculty of Dentistry. Associate Member, Gerald Bronfman Department of Oncology. Specialty- Oral Epidemiology

Celia Greenwood – Professor, Gerald Bronfman Department of Oncology and Department of Epidemiology, Biostatistics and Occupational Health. Specialties include – Non-communicable disease epidemiology

Laurent Azoulay – Associate Professor, Gerald Bronfman Department of Oncology and Department of Epidemiology, Biostatistics and Occupational Health. Specialty – cancer pharmacoepidemiology

Carmen Loiselle – Professor, Gerald Bronfman Department of Oncology and Ingram School of Nursing. Specialty – psychosocial oncology, research on supporting patients with cancer

Robin Cohen – Professor, Gerald Bronfman Department of Oncology and Department of Medicine. Specialty – palliative care research

Melissa Henry – Associate Professor, Gerald Bronfman Department of Oncology. Specialty – psychosocial oncology- head and neck cancers

Zeev Rosberger – Associate Professor, Gerald Bronfman Department of Oncology and Departments of Psychology and Psychiatry. Specialty – psychosocial oncology, distress screening, quality of life

Christine Maheu - Associate Professor, Ingram School of Nursing. Associate Member, Gerald Bronfman Department of Oncology. Specialty – psychosocial oncology, cancer survivorship

Argerie Tsimicalis – Assistant Professor, Ingram School of Nursing. Associate Member, Gerald Bronfman Department of Oncology. Specialty – psychosocial oncology, quality of life

Antonio Vigano – Associate Professor, Gerald Bronfman Department of Oncology. Specialty – palliative and supportive care research

Annett Körner – Associate Professor, Department of Education and Counselling Psychology.

Associate Member, Gerald Bronfman Department of Oncology. Specialty – psychosocial oncology - melanoma

Sylvie Lambert – Assistant Professor, Ingram School of Nursing. Specialty – psychosocial oncology, impact of cancer on patients and family caregivers

Mary Ellen Macdonald – Assistant Professor, Faculty of Dentistry. Specialties include pediatric palliative care and bereavement

Antonia Arnaert – Associate Professor, Ingram School of Nursing. Specialty – psychosocial oncology, quality of life, whole person care

Patricia Dobkin – Associate Professor, Department of Medicine. Specialty – mind-body medicine, whole person care

Carolyn Freeman – Professor, Gerald Bronfman Department of Oncology. Specialty – radiation oncology

Tarek Hijal – Associate Professor, Gerald Bronfman Department of Oncology. Specialty – radiation oncology

Sonia Skamene- Assistant Professor, Gerald Bronfman Department of Oncology. Specialty – radiation oncology

Joanne Alfieri – Assistant Professor, Gerald Bronfman Department of Oncology. Specialty – radiation oncology

Jamil Asselah – Associate Professor, Gerald Bronfman Department of Oncology. Specialty – medical oncology

Ari Meguerditchian – Associate Professor, Department of Surgery and Gerald Bronfman Department of Oncology. Specialty – surgical oncology

John Kildea- Assistant Professor, Gerald Bronfman Department of Oncology. Specialty – medical physics

Gabriella Stroian – Assistant Professor, Gerald Bronfman Department of Oncology. Specialty – medical physics.

William Parker – Assistant Professor, Gerald Bronfman Department of Oncology. Specialty – medical physics

Marija Popovic - Assistant Professor, Gerald Bronfman Department of Oncology. Specialty – medical physics

PROGRAM COMMITTEE

1. Graduate Program Director (Committee Chair)
2. The two course instructors for ONCO 610 – Fundamentals of Oncology and Cancer Research
3. Course instructor for ONCO 630 – Oncology Practicum
4. Faculty member with expertise in the area of population and global cancer control (will also serve as mentor to students choosing this area of focus)
5. Faculty member with expertise in the area of psychosocial oncology/ palliative care (will also serve as mentor to students choosing this area of focus)
6. Faculty member with expertise in clinical cancer research (will also serve as mentor to students choosing this area of focus)
7. Faculty member with expertise in cancer care services and quality (will also serve as mentor to students choosing this area of focus)
8. Department Chair or Chair's Senior Advisor for Academic Affairs
9. Graduate Program Coordinator (non-voting)

The Faculty members will be appointed by the Graduate Program Director, after consultation with the Department Chair.

The Program Committee will be responsible for:

1. Admissions
2. Assessing suitability of practicum projects
3. Mentorship

1. Admissions

The Program Committee will review all application dossiers and determine which applicants will be admitted into the program as outlined in the Selection Process section below.

2. Practicum Placement

The committee will review all proposed practicum projects to ensure that they will be rigorous enough to provide students with a solid grounding in the process of research/quality improvement while also allowing the students to have achieved specific milestones in the 120 hour time frame.

3. Mentorship

Faculty members on the Program Committee will be assigned as mentors to students in the area of focus relevant to their area of expertise. The role of the mentor is to offer personalized follow up of the student's progress for the duration of the program and to provide guidance to students who are struggling academically. The student's mentor will also provide guidance in choosing the research design or statistics course and the 9 credits of course choices. As the program grows additional faculty members outside of the Program Committee may be asked to serve as mentors.

Students' progress will be monitored to ensure (i) registration of required courses prior to the start of each semester, (ii) all courses have been passed at the end of each semester, (iii) satisfaction with and productivity in the practicum. The Graduate Program Director will monitor the progress of all students and will be available to meet with and guide students as necessary for their successful completion of the program.

In cases where the student is struggling academically, the mentor will seek guidance from the Program Committee in developing a remediation plan. If the student is struggling in courses offered by the Department (ONCO courses) the Graduate Program Director will liaise with the course instructor(s) to ensure mechanisms are in place to help the student who is struggling with the material. See above for details on mechanisms to help students struggling in ONCO 610, and ONCO 630. McGill's Graduate Tracking System which will be monitored by the Graduate Program Coordinator, will track the progress of the student to ensure course registration and course completion. A course failure will be flagged and the Graduate Program Director will be notified so that action can be taken to guide the student in getting back on track.

APPLICATION TO THE PROGRAM

General and Specific Requirements

Applicants are expected to have a minimum of a Bachelor's degree in fields related to biomedical science (examples include but are not limited to anatomy, biology, biochemistry, genetics, microbiology and immunology, molecular biology, pharmacology, physiology) healthcare administration/management, kinesiology, medicine, nursing, physical and occupational therapy, psychology, public health and social work with a minimum cumulative GPA of 3.3/4.0 on the McGill scale. Although in some of these cases students will have a Bachelor's degree in an area other than science, it is highly recommended that applicants will have taken at least one course in cell and molecular biology or equivalent and one statistics course.

Selection Criteria

The Graduate Diploma in Oncology program will follow the admissions and application procedures outlined on the McGill website at the following link:
https://mcgill.ca/study/2018-2019/university_regulations_and_resources/graduate/gps_gi_grad_admissions_application_procedures
In addition, applicants will be required to submit their most recent curriculum vitae, a 500-1000 word personal statement describing their educational background, professional background (if applicable) and reasons for wishing to take the program. They will also indicate which of the four 6-credit course groupings they would prefer and why, as well as a second choice. The personal statement should clearly indicate the relevance of their educational/professional background to their choice(s) of course groupings and how this program ties in with their career goals. Two letters of reference will be required from professional or educational acquaintances of the candidate.

Selection Process

Each applicant's dossier will be reviewed by the Program Committee. Applicants who do not meet the general requirements or who are missing components of the application will not be considered further. The remaining applicants will be considered based on their educational background and performance, curriculum vitae, personal statement and letters of reference. Specifically, each member of the Program Committee will review the applications, ranking each one based on (i) suitability of the educational background (and, if applicable, professional background) with the program's content (transcripts and CV); (ii) strength of the candidate's academic performance (transcripts); (iii) Clear, concise and convincing personal statement; (iv) Strong letters of support (references). The higher ranking candidates will be invited for an interview with the Program Committee (the cut-off will depend on the number of applicants and the number of positions available in a given year). Ideally all interviews will be conducted on the same day with the Program Committee finalizing their choices on that day. The interview will serve to further assess the candidate's suitability for, interest in and commitment to the content of this program and the chosen area of focus.

The Program Committee will evaluate whether the candidate's choice(s) of the 6-credit course grouping is a reasonable fit with their academic background and/or professional experience. This will be facilitated by the fact that the Program Committee will have each area of focus represented by a faculty member with that area of expertise.

Applicants interested in population and global cancer control should have a background in biomedical science, biostatistics, epidemiology, medicine or public health.

Applicants interested in psychosocial oncology/palliative care should have a background in biomedical science, kinesiology, medicine, nursing, physical and occupational therapy, psychiatry, psychology or social work. It will be made clear that the practicum will be based on research rather than clinical work.

Applicants interested in clinical cancer research should have a background in biomedical science, biostatistics, epidemiology, kinesiology, medicine, nursing, psychiatry, psychology, physical and occupational therapy, psychiatry or public health.

Applicants interested in cancer care services and quality should have a background in biomedical science, biostatistics, epidemiology, healthcare administration/management, medicine, nursing, physical and occupational therapy, psychiatry, psychology or social work.

As an example, someone with a background in healthcare administration/management may choose the 6 credit course grouping relevant to cancer care services and quality which would be a viable option. Another viable option would be the courses relevant to population and global cancer control. However, that person would likely not be considered for the courses relevant to psychosocial oncology/palliative care or clinical cancer research as their background would not be a suitable fit.

ENROLLMENT

	Enrollment				
	2020-21	2021-22	2022-23	2023-24	2024-25
New Enrollment (full-time)	12	12	15	18	22
New Enrollment (part-time)	2	3	3	3	3
Total New Enrollment	14	15	18	21	25
Enrolled in second year (part-time)	0	2	3	3	3
Enrolled fall semester third year (part-time)	0	0	2	3	3
Attrition (full-time)	-1	-1	-2	-2	-2
Total in the program	13	16	21	25	29

BUDGET

Budget: Cost projections and justification

The table below describes the expenses to be incurred by the proposed Graduate Diploma in Oncology for the first five years, which include the initial process for establishing a modus operandi, teaching obligations, and responsibilities. With the goal of launching a graduate program in oncology, the departmental chair began in 2014 to make the budgetary adjustments in departmental operation to permit releasing some discretionary and donor endowment funds to be earmarked exclusively for graduate and postgraduate teaching activities. Therefore, the department will be able to cover the entire Graduate Diploma budget during the foreseeable future.

Expense category	Item	Year 1 (2020-21)		Year 2 (2021-22)		Year 3 (2022-23)		Year 4 (2023-24)		Year 5 (2024-25)	
		No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost
Stipends	Graduate Program Director	1	$30,000.00	1	$30,000.00	1	$30,000.00	1	$30,000.00	1	$30,000.00
	Instructors for ONCO 610: Fundamentals of Oncology and Cancer Research ($15,000)	2	$30,000.00	2	$30,000.00	2	$30,000.00	2	$30,000.00	2	$30,000.00
	Instructor for ONCO 630: Oncology Practicum	1	$5,000.00	1	$5,000.00	1	$5,000.00	1	$5,000.00	1	$5,000.00
	Instructor for ONCO 615: Principles and Practice of Clinical Trials	1	$5,000.00	1	$5,000.00	1	$5,000.00	1	$5,000.00	1	$5,000.00

	Instructor for ONCO 625: Quality Improvement Course	1	$5,000.00	1	$5,000.00	1	$5,000.00	1	$5,000.00	1	$5,000.00
	Instructor for ONCO 635: Qualitative and Psychosocial Health Research	1	$5,000.00	1	$5,000.00	1	$5,000.00	1	$5,000.00	1	$5,000.00
	Instructor for ONCO 620: Best Practices in Biomedical Research	1	$0.00	1	$0.00	1	$0.00	1	$5,000.00	1	$5,000.00
Salaries	Student Affairs Coordinator (Full-time)	1	$55,000.00	1	$56,100.00	1	$57,222.00	1	$58,366.44	1	$59,533.77
	Teaching Assistants (29.33/hr, 180 hs)	2	$10,558.80	2	$10,558.80	2	$10,558.80	2	$10,558.80	2	$10,558.80
Other	Computer and Software	1	$1,000.00								
	Advertising and Office Supplies	NA	$25,000.00	NA	$25,000.00	NA	$25,000.00	NA	$25,000.00	NA	$25,000.00
	Contribution towards EXMD involvement	NA	$3,000.00	NA	$3,000.00	NA	$3,000.00	NA	$3,000.00	NA	$3,000.00
Total		**$174,558.80**		**$174,658.80**		**$175,780.80**		**$181,925.24**		**$183,092.57**	
Amount secured via discretionary funding		**$174,558.80**		**$174,658.80**		**$175,780.80**		**$181,925.24**		**$183,092.57**	

Stipends and Salaries: The Graduate Program Director is the appointment with the greatest authority in the program. He has already been appointed and will direct all the activities of the program working closely with the Student Affairs Coordinator. Given the magnitude of the program and its complexity, this position will require a substantial amount of time and is thus budgeted at $30K/year. . He reports directly to the Chair and will provide bimonthly updates to the Departmental Leadership Council.

Two instructors have already been secured for the core course (ONCO 610), a 6-credit offering that will be the most important learning environment for students during the first year. Given the complexity of this course and the breadth of topics we have selected a faculty member with expertise in basic cancer research and the other on behavioural sciences applied to oncology. They have been offered $15K each.

Five stipends of $5K annually have been reserved for instructors of ONCO 615, ONCO 625, ONCO 635 and ONCO 630. ONCO 620 will be taught by Dr. Franco himself. No stipend is required for the first three years. Beginning in the fourth year he will pass on this responsibility to another professor, coinciding with his departure from the chairmanship of the department.

One full-time position is budgeted for a Student Affairs Coordinator, the person who will manage the day-to-day administrative aspects of the Graduate Diploma and oversee the students' academic needs. The Student Affairs Coordinator will also provide assistance as we develop Master's thesis and PhD programs in oncology. In addition, the person will provide secretarial support to the Chair

and assist with the PGME activities of the department. The budget includes $55K for the first year (24% fringe benefits already included) and for subsequent years a 2% rate of increase is considered to allow for merit and across-the-board annual increments.

We will need two teaching assistants (TA) (budgeted at $29.33 hourly rate for 180 hours annually). One TA will assist with the teaching of EXMD 634 (as per the Chair's promise to Dr Anne-Marie Lauzon). One TA will assist as required for ONCO 620, 615 and 625. These activities include grading assignments, helping in rating presentations, and correcting exam papers.

Desktop computers and software: At the start of the program we will need one computer workstation for the student affairs coordinator.

Advertising and office supplies: A key component of the planning process is promotion. We have budgeted $25K/year to cover the costs of advertising and office supplies. Once the program is approved by the university and we are authorized to launch the program we will rely on a vigorous campaign to advertise the program using the traditional academic channels such as specialty journals, as well as social media. We will print brochures for mail-out distribution to a list of university departments that cater to potential clienteles for the program. E-mail and social media announcements will also be used. The geographical scope of the distribution will be broad. Although we will primarily target Canadian and American institutions and networks, we will also dedicate a significant portion of our advertisement budget to promoting the program outside of North America.

Financial commitment to EXMD: The Chair agreed with the Program Director of Experimental Medicine (Dr Anne-Marie Lauzon) to provide her financial assistance to compensate for the demands that our oncology program will impose on the teaching loads of the EXMD courses that are part of our curricular grid. EXMD was the only unit that imposed this requirement. All other units graciously accepted to share their course environments with our upcoming students. We have reserved $3K annually to assist EXMD in offsetting some of these costs, such as increased TA hours and administrative workload. This financial assistance is in addition to that already indicated above for the TAs, one of which will assist an EXMD course, as per the chair's agreement with Dr Lauzon.

Tuition Fees (2019-2020)

	Quebec Students	**Non-Quebec Canadian Students**	**International Students** (must complete program in 1 year)
Total Fees for Full-Time (completion in one year)	$4438.09	$9834.19	$20868.99
Tuition portion of fees for 30 credits	**$2544**	**$7940.10**	**$18110.40**

APPENDICES

Appendix 1: Potential placement of ONCO courses taking into account historic scheduling of courses included in the Graduate Diploma in Oncology
Appendix 2: Oncology Practicum- Project Guidelines for Supervisors
Appendix 3: Oncology Practicum – Project Guidelines for Students
Appendix 4: Oncology Practicum – Project Proposal Form for Supervisors and Students
Appendix 5 – Oncology Practicum – Grading Rubric

Appendix 1 - Potential placement of ONCO Courses taking into account historic scheduling of courses included in the Graduate Diploma in Oncology

CGPS-NP-Gr.Dip.Oncology-NT_R00A

	8:00 AM	8:30 AM	9:00 AM	9:30 AM	10:00 AM	10:30 AM	11:00 AM	11:30 AM	12:00 PM	12:30 PM	1:00 PM	1:30 PM	2:00 PM	2:30 PM	3:00 PM	3:30 PM	4:00 PM	4:30 PM	5:00 PM	5:30 PM
FALL SEMESTER																				
Population and Global Cancer Control																				
Monday				ONCO 610: Mon 9:30 - 12:30											POTH 637: Mon 2:30 5:30 *						
Tuesday		EPIB 507: Tues & Thurs 8:30 -10:00										FMED 505: Tues 1:30 - 4:30								
Wednesday			EXSU 505: Tues 9:00-12:00																	
Thursday											EPIB 671: Wed 1:00-4:00									
Friday		EPIB 507: Tues & Thurs 8:30 -10:00																		
				EXMD 640: Thurs 9:35-11:25											SWRK 668: Thurs 2:30 - 5:30					
										PSYC 507: Fri 11:30-2:30										
Psychosocial Oncology & Palliative Care																				
Monday				ONCO 610: Mon 9:30 - 12:30											POTH 637: Mon 2:30 5:30 *					
Tuesday				ONCO 635: Tues 9:30 - 12:30																
Wednesday			EXSU 505: Tues 9:00-12:00																	
Thursday			EXMD 634: Wed 8:45 -11:45									EPIB 671: Wed 1:00-4:00								
Friday				EXMD 640: Thurs 9:35-11:25											SWRK 668: Thurs 2:30 - 5:30					
										PSYC 507: Fri 11:30-2:30										
Clinical Cancer Research																				
Monday				ONCO 610: Mon 9:30 - 12:30											POTH 637: Mon 2:30 5:30 *					
Tuesday		EPIB 507: Tues & Thurs 8:30 -10:00										FMED 505: Tues 1:30 - 4:30								
Wednesday			EXSU 505: Tues 9:00-12:00																	
Thursday				ONCO 615: Wed 9:30 - 12:30								EPIB 671: Wed 1:00-4:00								
Friday		EPIB 507: Tues & Thurs 8:30 -10:00																		
				EXMD 640: Thurs 9:35-11:25											SWRK 668: Thurs 2:30 - 5:30					
		EXMD 618: One Friday, Full Day					EXMD 619: One Friday, Full Day													
										PSYC 507: Fri 11:30-2:30										
Cancer Care Services and Quality																				
Monday				ONCO 610: Mon 9:30 - 12:30											POTH 637: Mon 2:30 5:30 *					
Tuesday		EPIB 507: Tues & Thurs 8:30 -10:00			PPHS 528: Tues & Thurs 10:00 - 11:30							FMED 505: Tues 1:30 - 4:30								
Wednesday			EXSU 505: Tues 9:00-12:00																	
Thursday		EPIB 507: Tues & Thurs 8:30 -10:00			PPHS 528: Tues & Thurs 10:00 - 11:30						EPIB 671: Wed 1:00-4:00									
Friday													ONCO 625: Thurs 2:00 - 5:00							
										PSYC 507: Fri 11:30-2:30										
Complementary Course Choices																				
Statistics Course Choices																				
ONCO 630 - Variable depending on student																				
*POTH 637 - One lecture held on Tuesday 2:30 - 5:30 to replace Thanksgiving Monday																				
Thanksgiving Monday - ONCO 610 will have to be re-scheduled																				

Appendix 1 - Potential placement of ONCO Courses taking into account historic scheduling of courses included in the Graduate Diploma in Oncology CGPS-NP-Gr.Dip.Oncology-NT_R00A

	8:00 AM	8:30 AM	9:00 AM	9:30 AM	10:00 AM	10:30 AM	11:00 AM	11:30 AM	12:00 PM	12:30 PM	1:00 PM	1:30 PM	2:00 PM	2:30 PM	3:00 PM	3:30 PM	4:00 PM	4:30 PM	5:00 PM
WINTER SEMESTER																			
Population and Global Cancer Control																			
Monday				ONCO 610: Mon 9:30 - 12:30								ONCO 620: Mon 1:30 - 4:30							
Tuesday								EPIB 521: Tues & Thurs 11:30 - 1:00				EXMD 614: Tues 1:35 - 4:55							
Wednesday																			
Thursday								EPIB 521: Tues & Thurs 11:30 - 1:00											
Friday								PPHS 612: Fri 11:30 - 2:30							HGEN 690: Fri 3:00 - 5:00 *				
Psychosocial Oncology & Palliative Care																			
Monday				ONCO 610: Mon 9:30 - 12:30								ONCO 620: Mon 1:30 - 4:30							
Tuesday												EXMD 614: Tues 1:35 - 4:55							
Wednesday					NUR2 783: Wed 10:00 - 1:00														
Thursday					NUR2 705: Thurs 10:00 - 1:00														
Friday												FMED 619: Fri 2:00 - 5:00							
Clinical Cancer Research																			
Monday				ONCO 610: Mon 9:30 - 12:30								ONCO 620: Mon 1:30 - 4:30							
Tuesday								EPIB 521: Tues & Thurs 11:30 - 1:00				EXMD 614: Tues 1:35 - 4:55							
Wednesday																			
Thursday								EPIB 521: Tues & Thurs 11:30 - 1:00											
Friday			EXMD 617: One Friday, Full Day																
			EXMD 620: One Friday, Full Day		EXMD 625: One Friday, Full Day			EXMD 626: One Friday, Full Day											
Cancer Care Services and Quality																			
Monday				ONCO 610: Mon 9:30 - 12:30								ONCO 620: Mon 1:30 - 4:30							
Tuesday								EPIB 521: Tues & Thurs 11:30 - 1:00				EXMD 614: Tues 1:35 - 4:55							
Wednesday																			
Thursday								EPIB 521: Tues & Thurs 11:30 - 1:00											
Friday															FMED 619: Fri 2:00 - 5:00				
															HGEN 690: Fri 3:00 - 5:00*				
Complementary Course Choices																			
Statistics Course Choices																			

*Course choice HGEN 690 may or may not be offered

Course choice BUSA 698 may or may not be offered as instructor left McGill

Easter Monday - classes will have to be re-scheduled

Oncology Practicum - Project Guidelines for Supervisors

This practicum project will involve students in a real-world research or quality improvement project with relevance to their chosen area of focus (population and global cancer control, psychosocial oncology/palliative care, clinical cancer research, and cancer care services and quality). Students will be matched with a supervisor who has an appointment in the Faculty of Medicine and an ongoing research or quality improvement project related to oncology to which the student can contribute. Real-world experience may include participating in the development of grant applications, experimental design, protocol development, participant screening, data collection, data analysis, literature reviews, quality improvement design, implementation or assessment.

Learning Outcomes

By the end of the project, students will:

1) Understand how to develop, carry out, and analyze or assess the success of a research project or quality improvement initiative.
2) Have the ability to provide critical analysis of published literature.
3) Have learned about research activities and quality improvement initiatives in various cancer-related disciplines.
4) Be able to describe a research or quality improvement project to their peers in an oral presentation and in a written report.

Project Posting Process

Interested supervisors should submit the *Oncology Practicum Project Proposal* Form (sections A and B) seven weeks (deadline to be advertised) before the beginning of the semester in which the project will be carried out. Completed forms, which describe the projects including expectations such as tasks and milestones, should be submitted to the Course Instructor at john.kildea@mcgill.ca. All project proposals will be reviewed by the Course Instructor who will follow-up individually with each supervisor if there are any parts of the proposal that require clarification. The Program Committee of the Graduate Diploma in Oncology will select which projects will be posted online to the students.

Project approval will be based on the relevance of the project to the program, the diversity of projects proposed, and the range of skills that the project will help engender in the student. It is expected that the selected research and QI projects should provide students with actual experience working on a real-world research or QI project in which the student is provided with the opportunity to make an original and creative contribution. Projects should not involve simplistic work such as data entry, repetitive tasks, or following basic instructions without need for critical thinking. Projects must not have been undertaken previously by other students although new projects may build on the results of previous projects.

Student-Supervisor Matching

Posted projects will be released and advertised to all students simultaneously one month before the beginning of the semester. Students will be expected to contact the supervisors who have posted projects that they are interested in and provide them with a copy of their CV and list of interests. Supervisors are expected to follow up with all students who contact them.

It is at the supervisor's discretion to accept a student or not. The acceptance process should include an in-person meeting and should take into account the CV and experience of the student. Supervisors may consult with the Course Instructor during the acceptance process if they feel the need. On acceptance of a student, both the student and supervisor should complete and sign the *Oncology Practicum Project Proposal Form* for the given project. The form should then be submitted to the Course Instructor by either the student or the supervisor in advance of the add/drop date for courses at McGill.

It is expected that students should only submit one form with one supervisor. Supervisors may accept more than one student per semester if they have more than one approved project. However, no more than one student should be working on a particular project.

Project Supervision

At the outset of the project, the supervisor and student should meet and review/confirm the project-specific tasks and milestones as already set forth and agreed upon in the *Oncology Practicum Project Proposal Form.*

Supervisors are expected to meet with their students at least once per month in a one-on-one meeting. More frequent meetings are encouraged and these may take the form of inviting the student to participate in routine group meetings or smaller dedicated group meetings with other students.

Students should maintain an online lab book and share it with both the supervisor and the Course Instructor. All project-related activities and data should be recorded in the lab book. Supervisors should monitor the lab book frequently and discuss its contents with the student at the prescribed monthly meetings.

Supervisors and students should agree in writing (email acceptable) on the due date of the final report, which will be corrected by the supervisor according to the *Oncology Practicum – Grading Rubric*. The due date should allow the supervisor sufficient time to complete to correct the report and provide it to the student in advance of the final due date for its submission to the Course Instructor. Following correction of the report, students should have at least two days (student-supervisor arrangement) to implement corrections. In this way, the student will experience a mini-peer review process and the supervisor will be left with a corrected version of the report that may be provided to future students who may undertake follow-on projects.

For more details regarding the Oncology Practicum project, please refer to the following three documents:

- **Oncology Practicum – Course Outline**
- **Oncology Practicum - Project Proposal Form for Supervisors and Students**
- **Oncology Practicum - Grading Rubric**

Oncology Practicum – Project Guidelines for Students

This practicum project will involve students in a real-world research or quality improvement project with relevance to their chosen area of focus (population and global cancer control, psychosocial oncology/palliative care, clinical cancer research, and cancer care services and quality). Students will be matched with a supervisor who has an appointment in the Faculty of Medicine and an ongoing research or quality improvement project related to oncology to which the student can contribute. Real-world experience may include participating in the development of grant applications, experimental design, protocol development, participant screening, data collection, data analysis, literature reviews, quality improvement design, implementation or assessment.

Learning Outcomes

By the end of the project, students will:

1) Understand how to develop, carry out, and analyze or assess the success of a research project or quality improvement initiative.
2) Have the ability to provide critical analysis of published literature.
3) Have learned about research activities and quality improvement initiatives in various cancer-related disciplines.
4) Be able to describe a research or quality improvement project to their peers in an oral presentation and in a written report.

Project Listing

Posted projects will be released and advertised to all students simultaneously one month before the beginning of the semester. Students will be expected to contact the supervisors who have posted projects that they are interested in and provide them with a copy of their CV and list of interests.

Student Supervisor Matching

It is at the supervisor's discretion to accept a student or not. If supervisors feel that a particular student is suited to their project, they will provide their availability for an in-person meeting to discuss. On acceptance of a student, both the student and supervisor should complete and sign the *Oncology Practicum Project Proposal Form* for the given project. The form should then be submitted to the Course Instructor (john.kildea@mcgill.ca) by either the student or the supervisor in advance of the add/drop date for courses at McGill.

It is expected that students should only submit one form with the one supervisor with whom they have mutually agreed to conduct the project.

For more details regarding the Oncology Practicum project, please refer to the following three documents:

- **Oncology Practicum – Course Outline**
- **Oncology Practicum – Project Proposal Form for Supervisors and Students**
- **Oncology Practicum – Grading Rubric**

Oncology Practicum ONCO 630 – Project Proposal Form for Supervisors and Students

Instructions

This form should be completed by both supervisor and student. Sections A and B should be completed by the supervisor 7 weeks before the beginning of the semester. Sections A and B will then be posted online and available to students one month before the start of the semester. Students should directly email the supervisors of research projects that they are interested and include a copy of their CV listing all relevant skills and unofficial copies of all transcripts (undergraduate, graduate to date, etc).

Section C should be completed by the student after speaking with the supervisor about the project and receiving the supervisor's approval to proceed. Both student and supervisor should sign the form and either should submit an electronic copy of the form to the Course Instructor at john.kildea@mcgill.ca before the add/drop period at the beginning of the semester.

Section A: Supervisor Information

Name:
Email:
Phone:
Department:
Office Address:
Office hours for this project: (if appropriate)

Section B: Project Information

Research/QI project title:
Location where project will be carried out:

Is this project?

☐ Completely new

☐ Building upon the results of a previous similar project

Which previous project (give project title)?

Brief description of supervisor's research program or QI initiative and team (50-100 words)

Brief description of proposed Oncology Practicum research/QI project including project-specific objectives (50-100 words)

Brief description of what exactly the student will do in the project (50-100 words)

What, if any, meetings should the student attend and when?
What are the anticipated milestones of this project?
List of needed skills that the student should possess in order to successfully participate in this research project
List of experiences or skills that the student would find useful
On a weekly basis, will the student work directly with the supervisor or with a clinical fellow, research assistant, postdoc or senior graduate students?

Useful background reading material for the student
Any other project information (e.g. involves out-of-hours use of clinical equipment)

Ethics, safety, and training

Supervisors are responsible for the ethics and safety compliance of their students as per the policies of McGill University and their specific institute.

This project involves:

- ☐ Animal subjects
- ☐ Human subjects
- ☐ Biohazardous substances
- ☐ Radioactives substances
- ☐ Handling chemicals
- ☐ Using lasers
- ☐ None of the above

Is Research Ethics Board (REB) approval required for this project?

- ☐ Yes - If yes, has REB approval been secured already?
- ☐ No
- ☐ Unsure

It is the responsibility of the supervisor to have secured REB approval before the project begins. Projects that need REB approval but which have not yet received it are not eligible.

Section C: Student Information

Students should complete this section only after they have contacted and met with the supervisor of the listed project and received approval from the supervisor to proceed.
Student's name:
Student's McGill ID:
Student's McGill email:
Student's phone:

Section D: Student Declaration

I certify that this is the only Oncology practicum project that I am applying for*.

_____ _____

Student's signature Date (yyyy/mm/dd)

*It is understood that students may examine and express interest in several projects but they should only submit this form for the one project that they and the corresponding supervisor have agreed on.

Section E: Supervisor's Approval

I give my permission for the student identified above to register for this project under my supervision.

_____ _____

Supervisor's signature Date (yyyy/mm/dd)

Oncology Practicum - Grading Rubric

Project-specific activities (80% of final mark, 120 hours)

- Overview
  - The supervisor is responsible for grading the project activities as listed below
  - All projects should have a grading scheme of:
    - 25% active participation in project [Appendix 5A]
    - 25% meetings and milestones [Appendix 5B]
    - 45% final report corrected by supervisor [Appendix 5C]
    - 5% final report with corrections implemented by student [Appendix 5C]
- Active Participation (25% of project mark) [Appendix 5A]
  - The expected tasks that the student will perform as an active participant in the project. At least two tasks should be listed in the *Oncology Practicum Project Proposal Form* under the "Brief description of what exactly the student will do in the project" section. It is expected that listing these will help focus the student.
- Meetings and Milestones (25% of project mark) [Appendix 5B]
  - Supervisor and student should agree on the frequency of in-person meetings during the duration of the project. A minimum frequency of once per month with the supervisor is required.
  - Supervisor and student should agree on whether meetings (at a frequency greater than the minimum) should be one-on-one, part of the supervisor's regular group meetings or part of a group of comprising other undergraduate research students.
  - Supervisor and student should agree on the anticipated milestones of the project in addition to the four required milestones listed below (at least two additional are required as these will help focus the student)
    - Literature review
    - Flowchart and half a page of bullet points outlining project plan
    - Shared online lab book detailing work done as it is done (amount of detail up to the student)
    - Skeleton of the final report to be agreed with the supervisor
- Final report (45% of project mark) [Appendix 5C]
  - The final report should use the IMRAD format
    - Introduction - The Introduction should draw on the early part of the research project, including discussions with the supervisor, any provided reading material and the literature review milestone. It should incorporate brief background information about the research question or QI initiative, a description of the supervisor's research/QI program and up to date references regarding similar studies/efforts reported in the literature.
    - Methods - The Methods section should include sufficient information for a new student to take on the research project where the current student has finished off. It should provide enough details for the new student to know what the current student has done without being overly specific. It should include at least one flowchart or an equivalent explanatory diagram or table, which should be worked on in advance with the supervisor as a milestone.

        - Results - The Results should detail what the student achieved during the project. A single term is usually not enough to complete a whole research or QI project. However, the student should be able to make a useful contribution to the overall program and should be able to concretely describe what that contribution is. Their description should include some narrative text accompanied by tables, figures, photos or other material as appropriate.
        - Discussion - The student should briefly describe how their work/findings contribute to the overall research/QI program and they should outline what the next steps. This should be written with the next student in mind, who may take on a new project where the current project has left off.
- Final report correction (5% of project mark) [Appendix 5C]
    - The student should implement the corrections of the supervisor prior to the supervisor submitting the report to the course instructor.

Non-project-specific activities (20% of final mark, 30 hours) [Appendix 5D]

- Journal club (30% of non-project-specific activities mark)
    - A journal club meeting will be held once every two weeks during the semester starting at week 2. Each student is expected to read and discuss one published article related to their project during the semester
- Presentation (40% of non-project-specific activities mark)
    - Final presentation - Each student will make one presentation about their project results at the end of the semester
- Discussions (30% of non-project-specific activities mark)
    - Participation in discussions during Journal clubs and presentations

Oncology Practicum ONCO 630 - Grading Rubric
Active Participation in Project (25% of project mark)
(Project work is 80% of the final mark)

Student Name: _____ **Date:** _____

Supervisor: _____

Component of Mark	Rationale for mark	Mark
Expected tasks (as per project proposal and agreed upon by student and supervisor at the start of term) (4 points)	• The student worked diligently to complete the expected tasks and the tasks were completed as planned OR the student worked diligently to complete the expected tasks but they were not completed due to circumstances beyond the student's control (e.g. unexpected findings caused a change in direction of the project). (4 points) • The student completed the majority but not all of the expected tasks. If only two tasks were identified then the student completed one and partially completed the other. (3 points) • The student completed less than half of the expected tasks (2 points) • The student worked on the expected tasks but was unable to complete any of them (1 point or less)	/4
Ability to work independently (4 points)	• The student was consistently prepared to participate in the project, having discussed the expected tasks and associated research with the supervisor and other relevant experts and read the literature. Demonstrated initiative in finding answers to questions and solutions to problems. Asked pertinent questions. (4 points) • The student was usually but not always prepared as per the above but needed supervisor to check-in to keep the project progressing. (3 points) • Several times the student came unprepared to work on the project and needed repeated check-in by the supervisor to keep the project progressing (2 points) • The student worked on the project but was frequently unprepared, did not actively engage in discussions regarding expected tasks and did not do background reading (1 point)	/4

Appendix 5A: Oncology Practicum - Grading Rubric - Active Participation in Project

	• The student was unprepared and the supervisor had to keep the project moving. (less than 1 point)	
Ability to make effective use of feedback (4 points)	• The student took on board all supervisor feedback and used it to advance the project (4 points) • The student used most supervisor feedback (3 points) • The student only used some of the supervisor feedback (2 points) • The student disregarded or did not use supervisor feedback (1 point or less)	**/4**
Teamwork (4 points)	• The student engaged actively and respectfully with other members of the research/quality improvement team, shared information with the team and incorporated team feedback into the research/quality improvement project (4 points) • The student was usually able to engage with the other members of the team but sometimes needed encouragement or prompting to do so (3 points) • Most of the time, the student did not engage with the other members of the team (2 points) • The student did not engage in teamwork and did not attempt to integrate into the research/quality improvement team (1 point or less)	**/4**
	Total mark	**/16**
	Mark as % of final grade - multiply by 1.3	**%**

Oncology Practicum ONCO 630 - Grading Rubric

Meetings and Milestones (25% of project mark)

(Project work is 80% of the final mark)

Student Name: _____ **Date:** _____

Supervisor: _____

Component of Mark	Rationale for mark	Mark
Attendance at one-on-one meetings (4 points)	• Student attended all agreed-upon one-on-one meetings (4 points) • Student attended most but not all one-on-one meetings (3 points) • Student attended less than half of all one-on-one meetings (2 points) • Student didn't see the value in one-on-one meetings and did not participate meaningfully (1 point or less)	/4
Attendance at additional agreed-upon meetings (4 points)	• Student attended all additional meetings (4 points) • Student attended most but not all additional meetings (3 points) • Student attended less than half of all additional meetings (2 points) • Student didn't see the value of the additional meetings and did not participate meaningfully (1 point or less)	/4
Literature review (5 points)	• Student extensively reviewed the literature and summarized findings in a clear manner that indicated broad comprehension of the problematic and indicated the ability to discern quality in published reports (5 points) • Student broadly reviewed the literature and produced a good summary of findings that indicated broad comprehension of the problematic (4 points) • Student read some literature and produced a summary that indicated comprehension of the problematic (3 points) • Student read some literature and produced a basic summary (2 points) • Student either did not read the literature or did not comprehend the problematic involved (1 point or less)	/5

Appendix 5B: Oncology Practicum - Grading Rubric - Meetings and Milestones

Project flow chart (2 points)	• Student produced a flowchart of the project that reflected what was agreed upon with the supervisor (2 points) • Student either did not produce a flow chart or produced one that did not reflect what was discussed and agreed-upon with the supervisor (1 point or less)	/2
Shared online lab book (2 points)	• Student prepared an online document at the start of the semester, shared it with the supervisor and used it to keep track of project progress (2 points) • Student either did not prepare and share an online lab book with the supervisor or prepared and shared one but did not keep it up to date (1 point or less)	/2
Final report skeleton (2 points)	• Student produced a final report skeleton and shared it with the the supervisor before using it to draft the final report (2 points) • Student did not produce a final report skeleton or drafted report without using it (1 point)	/2
	Total mark	/19
	Mark as % of final grade - multiply by 1.1	%

Oncology Practicum ONCO 630 - Grading Rubric

Final Report (45% of project mark)

(Project work is 80% of the final mark)

Student Name: _____ **Date:** _____

Supervisor: _____

Component of Mark	Rationale for mark	Mark
Format (2 points)	• The student used the IMRAD format unless another format was agreed upon with the supervisor (2 points) • The student did not use either the IMRAD format or another format that had been agreed upon with the supervisor (1 point)	/2
Quality of writing (3 points)	• The student's writing is well-structured and has clearly been re-read by the student and possibly by a peer and is free of typos, spelling mistakes and grammatical errors (3 points) • The student's writing is free of errors as above but has some structural issues that diminish its readability (2 points) • The student's writing has a number of errors and structural problems that make it difficult to read (1 point)	/3
Contextualization and summary of the literature (10 points)	• The student summarized in a clear and concise manner the current context of the research/quality improvement problem and provided adequate justification for the project with a clear review of the relevant literature (10 points) • The student summarized the research/quality improvement problem but did not provide adequate justification for the project and missed some key components of the literature (8 points) • The literature review and/or the justification for the project were provided but were incomplete or inadequate (5 points) • The project contextualization was limited or poorly described with limited or no literature review (2 points or less)	/10

Appendix 5C: Oncology Practicum - Grading Rubric - Final Report

Methods and approach (10 points)	• The methods and approach used by the student to carry out the research/quality improvement project were clearly, comprehensively, and concisely described such that another researcher could repeat the work (10 points) • The methods and approach used by the student to carry out the research/quality improvement project were clearly and concisely described but the supervisor had to add some details in order to ensure that there was sufficient description for another researcher to use the information to repeat the work (7-9 points) • The methods and approach were described but with insufficient detail to really comprehend what the student did during the project (5-6 points) • The method and approach were poorly or inadequately described (less than 4 points)	**/10**
Results (10 points)	• The findings of the research/quality improvement project were clearly, comprehensively and concisely detailed such that the value of the student's contribution can be ascertained and understood (10 points) • The findings of the research/quality improvement project were detailed but the clarity and the presentation approach were not sufficiently clear (8 points) • The findings of the research/quality improvement project were all present but were difficult to comprehend due to presentation issues (6-8 points) • The findings of the research/quality improvement project were not fully provided (5 points or less)	**/10**
Discussion, limitations, conclusion and future work (10 points)	• The findings of the student's project are contextualized in light of the current knowledge in the field, limitations are described adequately, the conclusion is concise and accurate and potential future work is concretely described (10 points) • The findings of the student's project are contextualized as above but certain information is missing or not adequately described (8 points)	**/10**
	Total mark	**/45**
	Mark as % of final grade - multiply by 0.8	**%**

Note: Having received the corrected report from the supervisor, the student should implement or refute the corrections and provide a freshly-updated report to the supervisor with the corrections made or listing the detailed refutations. On receipt of the final corrected report, the student should receive the 5% mark for the corrected report. If the student does not provide the corrected report within the agreed-upon timeline, the 5% mark will not be awarded.

Mark for the corrected report as % of final grade = 4%, if awarded	**%**

Oncology Practicum ONCO 630 - Grading Rubric

Non-project specific activities (20% of final mark)

Student Name: _____ **Date:** _____

Supervisor: _____

Component of Mark	Rationale for mark	Mark
Journal club (3 points)	• Presentation ○ Student led a well-prepared discussion about a journal article pertaining to his/her project (3 points) ○ Student led a discussion about a journal club article pertinent to his/her project (2 points) ○ Studnet did not lead a discussion about an article pertinent to his/her project or was poorly prepared (1 point or less)	/3
Presentation (7 points)	• Preparation of slides (independent of how presented) ○ Student's presentation was well-prepared, providing sufficient background information about his/her project, a clear outline of the methodology followed and the results obtained (4 points) ○ Student's presentation was well-prepared but lacked some information pertaining to background, methods or results (3 points) ○ Student's presentation was not very well prepared, although all pertinent information may have been present (2 points) ○ Student's presentation was poorly prepared, lacking significant information or was confusing (1 point or less) • Delivery of 20-minute presentation ○ Student presented clearly, maintained good eye contact with the audience, stayed within time and maintained a reasonable pace. Expected of a practiced presentation (3 points) ○ Student presented clearly but was either a	/4 /3

	little rushed or a little overtime (2 points) ○ Student had difficulty presentation (much too fast, difficult to understand or significnatly overtime) and gave the impression that the presentation was not practiced in advaance (1 point or less)	
Discussions (3 points)	• Student attended and positively participated in all journal clubs and student presentations by engaging in discussion and by asking questions (3 points) • Student attended and positively participated in some journal clubs and student presentations (2 points) • Student attended and positively participated in less than 75% of the journal clubs and presentations (1 point or less)	**/3**
	Total mark	**/13**
	Mark as % of final grade - multiply by 1.54	**%**

McGill

Teaching and Learning Services
Telephone: 398-6648
Fax: 398-8465
tls@mcgill.ca

Approved by APC, Dec 16th, 2019

To:	Academic Policy Committee
From:	Laura Winer, Chair, Subcommittee on Teaching and Learning
Subject:	Revised guidelines – University-wide teaching awards
Date:	25 November 2019
Document #:	
For:	☐ **Information** ☐ **Feedback/Discussion** **x Decision**

Issue:	Recommendations for the 2020 teaching awards cycle 1) *Principal's Prize for Excellence in Teaching*: recommendations are geared towards clarifying both the eligibility criteria and submission requirements: a. Eligibility: clarify that instructors must have taught in the academic year in which they are nominated (rather than for which the award is given); b. Teaching responsibilities: remind nominees that student grades are confidential and should not be included in the dossier; c. Evidence of teaching excellence: clarify the minimum data required for the summary of course evaluations. 2) *Lifetime Achievement Award for Leadership in Learning*: removal of the sentence "recipients may also be invited to deliver a public lecture on a topic related to teaching, and/or be invited to speak at convocation."
Background:	1) The proposed revisions are based on errors found in a number of dossiers submitted for the 2019 call; 2) While past recipients have been offered the opportunity to facilitate a lecture on teaching, they have all declined. No recipient has been invited to speak at convocation.
Motion or Resolution for approval:	That the proposed revisions be approved by APC.
Prior consultations & approvals:	STL approved the revisions at its meeting of 19 November 2019
Next steps:	APC approval Senate as part of the APC report to Senate

Principal's Prize for Excellence in Teaching

Guidelines

The Principal's Prize for Excellence in Teaching recognizes excellence and commitment to teaching and the importance of these qualities in the academic experience of students at McGill. One award is granted annually at Fall Convocation in each of the following categories:

- the four categories of ranked academic staff: Faculty Lecturer, Assistant Professor, Associate Professor, and Full Professor in any Faculty[1] at McGill. Ranked tenure track (or tenured) staff and ranked Contract Academic Staff are eligible.
- a Course Lecturer in any Faculty at McGill.

To highlight the importance McGill places on individuals' commitment to the link between teaching and research (in the academic and clinical settings), the award will recognize great teachers who also enhance their students' understanding of research. While desirable, this is not imperative for Faculty Lecturers, Contract Academic Staff or Course Lecturers. Each award brings with it a $5,000 monetary award.

Eligibility

- Ranked academic staff: Candidates, from any Faculty or School, must be ranked academic staff (Faculty Lecturer, Associate Professor, Assistant Professor, Full Professor) who carry a full-time teaching load as defined by their Faculty. Candidates must have taught in the academic year in which they are nominated~~for which the award is given~~.
- Course Lecturers: Candidates, from any Faculty or School, must have been teaching at McGill for a minimum of three years and a total of 12 credits. Candidates must have taught in the academic year for which the award is given.

Nomination Procedure

Teaching Faculties are asked to submit their nominations by the first week of June. Faculties should submit only one nomination per category. While candidates are eligible at all levels, previous recipients may not be nominated again in the same category in which they were previously awarded the Prize. Faculties may choose not to submit nominations in every category.

Submission requirements

Dossiers are expected to be a concise compilation of selected information, and must not exceed 25 pages **exclusive** of the nomination form, table of contents, student course evaluation comments, curriculum vitae, and page dividers (if used). As evidence for a great nominee will quickly push past the 25-page limit, dossiers should not include course syllabi or course materials. Dossiers in excess of the page limit will be returned to the Faculty for revision and resubmission.

[1] The term *Faculty* is used to represent all teaching faculties including the School of Continuing Studies

Using the following numbering system, the nomination package must include:

1.0	**Completed nomination form**	
2.0	**Table of Contents**	
3.0	**A nomination letter from the Dean** in support of the nominee. The Dean's letter should speak to the contributions that the nominee has made to enhancing teaching in the Faculty, and the academic experience of students at McGill.	
4.0	**Letters of support** should discuss the nominee's dedication to teaching, ability to engage students in the learning process, the impact their teaching has had on former students' academic achievements or other successes, educational leadership (such as involvement with program or curriculum development), and the integration of research and teaching. Dossiers should include a maximum of four (4) letters from colleagues, former students or other persons in a position to comment on the abilities of the nominee. At least two (2) of the letters must be from former students. It should be noted that: o a student should not write a letter for a professor who is supervising or teaching in the program in which he or she is currently enrolled, except in the case of a student association President as described below. o one letter may be from the President of a departmental or Faculty undergraduate or graduate student association, even if the President is currently a student in the same department as the nominee. Only one (1) letter from a student association will be accepted. Letters of support must have been written within the last three (3) years and for this award only.	
	4.1	**Letter from the Departmental Chair or Director** (where applicable)
	4.2	**Letters from former students** (minimum of two) A former student is defined as: • a student who has graduated from McGill or; • a current McGill student (or in the case of continuing education or faculty development, this could be a faculty member) who writes a letter in support of a former professor while enrolled in a different department or division; • in the case of a Course Lecturer, a former student is defined as a student who is not currently enrolled in a course with the nominee.
	4.3	**Letters from colleagues or other persons** in a position to comment on the abilities of the nominee.
5.0	**Statement of teaching approach** (two-page limit)**:** Nominees should provide a brief description of their teaching approach, with an explanation of why they have chosen this approach.	

	The statement should also include a description of how the nominee's thinking about teaching and learning has changed over time, and how they work to improve their teaching. This statement can facilitate the Committee's interpretation of the rest of the dossier. N.B. Please ensure that nominees are given adequate time to prepare the statement. It can be drawn from the nominee's Teaching Portfolio which is required for reappointment, tenure and promotion.
6.0	**Teaching responsibilities** for at least the past three (3) years for Assistant Professors, Faculty Lecturers, and Course Lecturers, and at least five (5) years for Senior Faculty Lecturers, Associate Professors and Full Professors. The suggested format is a table or, where appropriate, a narrative that presents the nominee's teaching responsibilities. This must include one or more of the following, depending upon Faculty expectations: • courses taught, course level, enrollment and format, required or elective, new courses developed (including fieldwork and course coordination); • undergraduates supervised (e.g., projects, theses); • graduate students and postdoctoral scholars supervised (e.g., projects, theses, internships); • teaching in a clinical, professional, or practice setting (e.g., supervision of clinical interns); teaching in continuing education or faculty development; • Note that individual student's grades are confidential and should not be included in any of the materials.
7.0	**Evidence of teaching excellence** should demonstrate consistent excellence over time. Dossiers must include: • a summary (in a table or graph format where appropriate) of teaching evaluations for ~~over~~ at least the last three (3) academic years for Assistant Professors, Faculty Lecturers, and Course Lecturers; and the last ~~at least~~ five (5) academic years for Senior Faculty Lecturers, Associate Professors and Full Professors. Data should be presented for the four core questions[2]; instructions on how best to present the data as well as sample reporting tables can be found below[3]. Raw data or computer printouts should not be included; • a complete set of comments from students in a specific course for one term from the courses reported on should be presented as an appendix. Instructions on how to download course evaluation results including student comments can be found below[4]. In addition, nominees are encouraged to include the following:

[2] The four core questions are: 1) Overall, this is an excellent course; 2) Overall, I learned a great deal from this course; 3) Overall, this instructor is an excellent teacher; 4) Overall, I learned a great deal from this instructor.

[3] Sample tables for reporting of results, taken from *Interpreting End-of-Course Evaluation Results* can be found here: http://www.mcgill.ca/mercury/instructors/interpretation

[4] Instructions on how to download course evaluation results from Mercury, including student comments, can be found here: http://www.mcgill.ca/mercury/instructors/manuals

	• a report of peer assessment of teaching, if appropriate; • a list of teaching awards received; • a list of invitations received, either locally or globally, recognizing their expertise as a teacher.
8.0	**Evidence of integrating research with teaching and using inquiry-based techniques:** nominees are asked to summarize their use of strategies both in and out of class, such as: • discussing their research with students; • discussing the research of others and/or relevant evidence with students; • discussing ways in which their teaching is informed by research; • providing students with opportunities to read scholarly writing and/or discuss research with peers; • providing students with opportunities to address authentic problems, either individually or in groups.
9.0	**Evidence of educational leadership:** nominees are asked to summarize their involvement in activities such as: • curriculum or program (re)design and development; • work with teaching and learning centers/committees, educational associations, advising and mentoring colleagues; • efforts made to enhance teaching in a unit or at the University (e.g., organizing seminars, workshops, conferences or other teaching-related events); • contributions to policy development
10.	**Curriculum vitae of the nominee**

Faculties are asked to submit the complete nomination dossier to tls@mcgill.ca.

Adjudication Committee:
Principal
Provost and Vice-Principal (Academic)
Director, Teaching and Learning Services
Representative from SSMU
Representative from PGSS
Representative from MACES
Representative from MCSS
*Previous recipient from the level of Course Lecturer, or representative from MCLIU
*Previous recipient from the rank of Faculty Lecturer
*Previous recipient from the rank of Assistant Professor
*Previous recipient from the rank of Associate Professor
*Previous recipient from the rank of Full Professor

*In the case when a previous recipient from a given category is not available, a representative from that category will be selected by the Provost, in consultation with the Deans.

McGill University Lifetime Achievement Award for Leadership in Learning

Guidelines

The McGill University Lifetime Achievement Award for Leadership in Learning recognizes sustained excellence in leadership and innovation, as well as the active integration of teaching and learning with inquiry, scholarship and research. Nominations for this award must come from Faculty Deans, but all faculty members, students, former students, and others are encouraged to bring forward names of colleagues and professors whose long-term achievements and contributions to learning at McGill are truly outstanding.

This unique form of recognition brings with it a monetary award. ~~Recipients may also be invited to deliver a public lecture on a topic related to teaching, and/or be invited to speak at convocation.~~

Teaching Faculties are asked to submit their nominations by the first week of July.

Attributes and Criteria

Competition for this Award is open to all current McGill instructional and academic staff, of any rank, inclusive of non tenure-track instructors and all others who teach in traditional or non-traditional programs at McGill. Nominees will normally have **an overall total of 25 years university teaching experience comprising a significant commitment to McGill.** Faculty members are also eligible for nomination within 36-months following their retirement. **Faculty members can be awarded this prize only once**. Nominees will:

- demonstrate exceptional leadership and vision in the advancement of teaching and learning;
- demonstrate extraordinary commitment and enthusiasm for students and their learning;
- personify excellence and serve as role models for others teaching at the University;
- promote students' active engagement in learning by bringing the findings, methods and/or processes of research/scholarship into their classes and coursework;
- have made a career-long contribution to the University community resulting in a significant and lasting impact on the learning environment.

Only one Lifetime Achievement Award for Leadership in Learning will be granted per year. This award will not necessarily be conferred annually.

<u>Each nomination package should be a concise compilation of selected information that includes:</u>

1. **Completed nomination form**

2. **Table of contents**

3. **A nomination letter from the Dean** in support of the nominee. The Dean's letter should highlight the leadership role that the nominee has played in the Faculty, the University, and the broader field of higher education. If there is more than a single nominee from a Faculty, the Dean should provide a discussion of the relative merits of each nominee.

4. **Curriculum vitae of the candidate**

5. **A statement** provided by the candidate, summarizing their approach to teaching and learning and the leadership role they have played in the Faculty, the University, and their field. The statement should include reflections on their approach to learning and teaching, and identify measures they have taken to develop, motivate and empower students in the learning process. This statement should facilitate the Committee's interpretation of the rest of the dossier.

6. **Evidence of leadership in learning** might include a combination of some of the following:
   a) leadership in projects aimed at enhancing learning environments, programs and curricula, within or across disciplines;
   b) innovation in curriculum design and the use of technology to facilitate students' learning during and beyond lectures;
   c) organizing or facilitating seminars, workshops or conferences on teaching and learning.

7. **Letters of support** should address the following: leadership in support of inquiry based learning, development and enhancement of academic learning environments, and contributions to the teaching and learning community.
   a) up to four (4) letters from students, colleagues, Department Chairs, Program Directors or other persons in a position to comment on the attributes of the nominee;
   b) at least two (2) of the letters of support must be from former students. A former student is defined as a student who has graduated from McGill or a current student who writes a letter in support of a former professor while enrolled in a different department and/or program. A student should not write a letter for a professor who is supervising or teaching in the program in which he or she is currently enrolled.

Faculties are asked to submit the complete nomination dossiers in the first week of July to tls@mcgill.ca.

Selection Committee
Provost, Chair
Director, Teaching and Learning Services
Representative from the Faculty of Agricultural and Environmental Sciences
Representative from the Faculty of Arts
Representative from the School of Continuing Studies
Representative from the Faculty of Dentistry
Representative from the Faculty of Education
Representative from the Faculty of Engineering
Representative from the Faculty of Law
Representative from the Desautels Faculty of Management
Representative from the Faculty of Medicine
Representative from the Schulich School of Music
Representative from the Faculty of Science

McGill | Faculty of Medicine

Approved by APC- DEC 16th, 2019

3605 de la Montagne
Montreal, QC H3G 2M1

Tel.: 514- 398-3524
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MEMORANDUM

TO: Professor Christopher Manfredi
Provost and Vice-Principal Academic
Chair of Academic Policy Committee (APC)

FROM: David Eidelman, M.D., CM
Vice-Principal (Health Affairs)
Dean of Medicine

DATE: November 29, 2019

SUBJECT: **Request to establish the McGill Cancer Institute**

For: information discussion decision

Dear Professor Manfredi:

The purpose of this memo is to put forward a request to the Academic Policy Committee (APC) to consider and approve the establishment of the *McGill Cancer Institute.*

Background
Established in 1978 as the McGill Cancer Centre, it was renamed the Rosalind and Morris Goodman Cancer Research Centre in 2008, in recognition of major benefactors Rosalind and Morris Goodman. The GCRC now boasts some 40 principal investigators, with five endowed Chairs and a combined staff of nearly 300 permanent and affiliated members.

The GCRC has become established as a hub of major collaborative networks and cancer research consortia that are poised to be transformative for fundamental, translational and clinical cancer research in Montreal, across the province of Quebec and Canada-wide. The "collaborate to cure" approach includes, in the last few years, the Lung Cancer Network as well as a Melanoma Network which bring together laboratory-based and clinical investigators from many institutions across Quebec and beyond to energize and empower research at every level, with the common goal of developing effective strategies for precision medicine that will impact on cancer care.

.../3

It has become evident that the current structure as a Centre is no longer the platform from which to continue this expanded vision. Along with other catalysts for change, it is felt the Goodman Cancer Research Centre is not adequate to accomplish McGill's cancer research and educational objectives. It is suggested that the establishment of an academic Institute, which would include the GCRC and other partners, is the correct course of action. The following four key pillars constitute the main rationale for becoming a Cancer Research Institute:

Provide an Academic Home for Researchers. Becoming an Institute will allow the appointment of new Institute members thus creating a well-defined career path for aspiring researchers making this new Institute more appealing for up and comers. Further, it will better foster a unity of purpose within the organization, with less distraction by the demands of what is often perceived as being outside the home Departments of its members. This change would enhance the Institute's ability to recruit more researchers (double the current number) and grow the organization's ability to leverage resources and enhance its role as a basic science incubator for ground-breaking cancer research.

Enhancing Clinical Partnerships. Unlike a Centre, Institutes can enroll clinicians as Faculty members. This will greatly enhance the vision of becoming a full-spectrum research nucleus that links basic science and clinical innovation. This will eliminate the 2-degrees of separation between PI and patient, which is currently the case, and allow researchers more opportunities to seek partnerships with clinicians to accelerate, integrate and improve research outcomes.

Research Focal Point. The McGill Cancer Institute will enhance and project its reach and brand to take a leadership role as an aggregator of Cancer Research within McGill, Quebec, Canada and potentially beyond. Initiatives like MC^2 will be further enhanced to create a broad virtual network with global reach with the new Institute as its hub. This virtual basic science network could expand beyond Medicine, recruiting leading researchers in fields whose discoveries have and continue to shape the future such as artificial intelligence and biomedical engineering, all for the benefit of the patients.

Greater Visibility and Perceived Reputation. The establishment of an Institute will provide the organization with more visibility through a title that promotes a greater perceived reputation within the academic, clinical, corporate and most importantly philanthropic communities. This will in turn assist the Cancer Research Institute in attracting a larger and more diverse donor base in addition to giving it a more prestigious image within the media and other public and professional spheres.

Alignment with mission and strategic priorities

With a renewed focus on Cancer research by influential political leaders as well as the Faculty's vision for the future, manifested through *Project Renaissance*, there is no better time than now to establish the McGill Cancer Institute. This Institute will not only enhance local, national and international exposure of McGill's ground breaking cancer research but also more importantly, fully seize this rare moment in time to cement McGill's Faculty of Medicine as a research leader in fighting one of the greatest health threats of the 21st Century.

Consultations

Deliberate, frequent and in-depth consultations have been recurring themes underscoring the process of establishing the McGill Cancer Institute. The beginnings of this journey go back to December 2017 when the Director of the Goodman Cancer Research Centre, Dr. Morag Park, presented the 'Cancer Centre Vision' at the Dean's retreat. This presentation included several elements that introduced the idea of a Cancer Institute. It explored the Institute as the fundamental element of a broad and ambitious vision for cancer research at the University - a vision that would extend well into the 21st Century, integrating research, learning, infrastructure, virtual research networks, community engagement and cross-cutting innovation.

Over the next months, Dr. Park continued to discuss and develop the idea of the Cancer Institute through both formal and informal discussions with stakeholders throughout the Centre, Faculty and University at large. Specific details of the Institute were next presented at the Dean's Town hall in December 2018 and followed thereafter in February 2019 by my direction to begin a formal exploration examining the feasibility of establishing the McGill Cancer Institute.

Subsequently, Dr. Park engaged in more formal exchanges with members at the Centre as well as key stakeholders throughout the University and current and prospective local, national and international partners. In Appendix A of the proposal, you will find many letters of support for the creation of the Institute, from internal, local, national and international partners. These affirmations are further evidence of the timeliness and need for the McGill Cancer Institute.

Next steps

Following approval by APC, then Senate and the Board of Governors, the Director of the McGill Cancer Institute will immediately adjust all internal and external communication media (including website and Faculty letterhead, etc.) to reflect the new institute status. We will ensure communication of a succinct but impactful supporting statement as to the purpose and intent of this change.

Formal and final approval of this institute will be announced at the first Faculty of Medicine Faculty Council meeting scheduled for 2020 and communicated via med-E news and other news media within the Faculty of Medicine.

On behalf of the Faculty of Medicine, I hope that the APC will be favorable to our request.

Sincerely,

David Eidelman, M.D., C.M.

Proposal for the Creation of

The McGill Cancer Institute

Research, Scholarship and Community in Cancer Research

Submitted by

Morag Park, Ph.D.

Director

Goodman Cancer Research Centre

Diane and Sal Guerrera Chair in Cancer Genetics

Professor, Departments of Oncology, Biochemistry and Medicine

Faculty of Medicine, McGill University

November 21, 2019

I – Introduction

The goal of this proposal is to request the establishment of an Academic Institute named the **McGill Cancer Institute (MCI)**. A description of the process leading to this proposal, a rationale for the establishment of an Institute, a detailed listing of the proposed academic staff, budgetary implications and implementation plan and supporting documentation follow.

In recent years, the Rosalind and Morris Goodman Cancer Research Centre has grown and developed at a remarkable pace, attaining a position of leadership in cancer research locally, within McGill and the Montreal area, as well as nationally and internationally. Through continually recruiting and training the brightest and most capable scientists, investing in state-of-the-art technology and cultivating a dynamic, multidisciplinary network of collaborations, we have developed a high-impact, cutting edge scientific program focused on illuminating the most important fundamental aspects of cancer development and progression, with the goal of improving outcomes for cancer patients through our growing network of members and collaborators who are clinicians and clinician-scientists. To this end, innovative research at the McGill Cancer Institute will lead to the development of new therapies and therapeutic strategies, some of which are currently being tested in clinical trials with our partners.

The MCI will become established as a hub of major collaborative networks and cancer research consortia that are poised to be transformative for fundamental, translational and clinical cancer research in Montreal, across the province of Quebec and Canada-wide. Our "collaborate to cure" approach includes, in the last few years, the Lung Cancer Network as well as a Melanoma Network which bring together laboratory-based and clinical investigators from many institutions across Quebec and beyond. These networks are energizing and empowering research at every level, with the common goal of developing effective strategies for precision medicine that will impact on cancer care. This team-based approach is the way of the future and represents the most promising means of delivering innovative and patient-centric, "patient-to-bench-to-bedside" developments that ultimately lead to improved therapeutic options for cancer patients. Assuming positions of leadership in these programs will maximize impact of the MCI and ensure its position at the forefront of the field, determining the course of future developments in cancer research.

From this position of leadership, it has become evident that the current structure of cancer research at McGill must expand to continue developing the broader vision of our work. Along with other catalysts for change, the new Institute will evolve to meet the requirements of the field. To accomplish McGill's cancer research and educational objectives, a new Institute must be created to encompass our needs and meet the expectations expressed by our colleagues, partners, and key stakeholders. More specifically, we believe that creating an academic Institute, defined by McGill's APC Workgroup on Nomenclatures of Academic Units as "an academic administrative entity that functions like a School or Department, offering courses or teaching programs, typically at the graduate level" (https://www.mcgill.ca/senate/files/senate/d14-17), would be the best course of action, allowing us and McGill to meet our goals and accommodate ongoing and future growth in Cancer research, training and outreach.

Forming a McGill Cancer Institute with a convergence of the biomedical, physical, computational and social sciences represents the logical next step in the development of cancer research at the Faculty of Medicine. This will position McGill at the forefront of intersectoral cancer research, with opportunities to

build innovative new programs incorporating multi-omic "big data" analysis, state-of-the-art platforms and devices and technologies to improve cancer outcomes, enhance innovation and entrepreneurship. These distinct strengths will enable a new graduate level training program at McGill to provide the most talented young scientific minds in Quebec and beyond with unparalleled opportunities, and attract national and international talent. Through our unique program, our trainees will gain broader and deeper knowledge of cancer in a cutting-edge, intersectoral environment with instruction from leaders in diverse, yet complementary, fields of the physical, chemical, computational and biomedical sciences. In the new McGill Cancer Institute, we will exploit new developments in collaborative interdisciplinary research and increase our community outreach and involvement, while solidifying and enhancing McGill's national and international cancer research profile.

The growing scientific community nucleating on the cancer research thematic will provide infrastructure, human and financial resources that will be the initial seed for the new Institute. From this basis, the McGill Cancer Institute will be poised to grow and develop, offering an academic hub for investigators and clinicians involved in cancer research and training at McGill University. It is recognised that, with its broadened scope of activities, a McGill Cancer Institute will build a strategic fundraising plan, some of which is embedded in the current McGill capital campaign.

a. Name of the Proposed Institute

McGill Cancer Institute (MCI)

b. Name of the Proposed Director

Morag Park, Ph.D.

Director of the Goodman Cancer Research Centre

Diane and Sal Guerrera Chair in Cancer Genetics

James McGill Professor

Departments of Oncology, Biochemistry and Medicine

Faculty of Medicine

c. Lead Faculty and other Faculties Involved

Faculty of Medicine (Lead Faculty)

Faculty of Engineering

Faculty of Science

Letters of support from each Faculty, the Faculty of Medicine's leadership (including chairs of departments

and directors of schools), and several national and international leaders in the field, are included in **Appendix A**.

d. Physical Location

Main site: Cancer Research Building and McIntyre Medical Building (7th Floor), McGill University.

The proposed Institute will be located within the Cancer Research and McIntyre Buildings on McGill Campus. Teaching and research activities will primarily take place at the current sites, though some teaching activities will take place at the Faculties of Science and Engineering and at other locations in the Faculty of Medicine. Some research activities will take place in McGill teaching hospitals and other clinical sites. While the current site can accommodate the MCI during its initial phase, there is growing awareness at many administrative levels that this space will quickly become insufficient for the MCI as the Institute develops and grows. Expansion is therefore a goal of the MCI and ongoing discussions at the Faculty of Medicine are aiming to address the issue of new space allocation for the MCI.

II – Background for Creating the McGill Cancer Institute

The Goodman Cancer Research Centre was named in 2008, building on excellence in cancer research at McGill University and following completion of the Cancer Research Building of the Life Sciences Complex and a generous gift from the Goodman Family. The McGill University Life Sciences Complex CFI 4 funding opportunity ($42 M + $18 M in equipment) supported a building devoted to cancer research in 2008, integrating world-class cancer researchers from the McGill Cancer Centre with the Molecular Oncology Group within state-of-the-art facilities. Four of the eight co-PIs for the LSC CFI 4 application are still located in the GCRC (Drs. Muller, Park, Sonenberg and Tremblay). This internationally recognized group attracted substantial private support in the form of an endowment of $10 M, establishing the Rosalind and Morris Goodman Cancer Research Centre (GCRC), which is now recognized as a top research and training environment for cancer research in Canada.

The GCRC is an expansion of the McGill Cancer Centre, established in 1978 by Dr. Phil Gold and approved by Senate in 1988 as an autonomous unit with the ability to fundraise. Under the directorship of Dr. Clifford Stanners, the Centre obtained Quebec Government FCAR Centre status in 1989 and transitioned to a centre of the FRSQ in 2003 under Dr. Michel Tremblay's leadership, with each of these transitions contributing to its infrastructure and providing funding for administrative costs. Dr. Tremblay was also the first director of the integrated GCRC (2002-2012), while Dr. Peter Siegel was interim Director from 2012-2013 and Dr. Morag Park has been Director since August 2013. Since its inception, the mission of the GCRC has been to improve the understanding and treatment of cancer through excellence in fundamental and translational research programs, to train the next generation of cancer researchers and to engage in public outreach to raise awareness and foster hope that cancer can be managed and eventually eradicated through research. With continuous fundraising support from the Defi Canderel since 1989, the Centre developed a strong research training program supporting graduate student fellowships. In 2003 the

Centre, together with its scientific and clinical partners at the Lady Davis Institute and the RI-MUHC, developed a 6-year Training Program (McGill Integrated Cancer Research Training Program - MICRTP) supported by a CIHR Strategic Training Initiative in Health Research program.

As of November 2019, a new McGill Cancer Institute would regroup 38 faculty as Full and Associate Members and 4 emeritus professors, 25 of whom are based at the main site, while 13 are at other sites within McGill. Full members are tenured in and members of eight departments (Biochemistry, Oncology, Medicine, Physiology, Microbiology & Immunology, Human Genetics, Surgery, and Pathology). This is complemented by 15 Affiliate and Associate members who are appointed to various McGill departments (School of Computer Science, Biomedical Engineering, Bioengineering, Chemical Engineering, Chemistry, Social Sciences) as well as at the National Research Council of Canada, the University of Ottawa and the Van Andel Institute in Grand Rapids, MI, USA. The 25 Full Members of the Centre are supported by a highly qualified and dedicated staff of 90 scientific support personnel (Research Associates, Research Assistants, Technicians and Technology Platform Personnel) and, in FY19, 213 trainees (undergraduate and graduate students as well as post-doctoral fellows). Notably, in 2019, we celebrated the 30th anniversary of the contribution from the Defi Canderel and Mr. Jonathan Wener to training of generations of new cancer researchers, many of whom now hold leadership positions in academic and private sector cancer research, among many other fields, throughout the world.

In the last ten years, research output (e.g. grants and publications), human capacity and stature of the Centre have grown significantly and it is recognized as a national and international scientific leader in the field. Moving beyond traditional departmental lines, the Centre serves as an interdisciplinary, collaborative hub for researchers, clinicians, and educators from across the Faculty and the University involved in cancer research and knowledge translation. To meet the evolving needs of the cancer research community at McGill and beyond, we are convinced that the correct course of action is to create an academic Institute, as defined above. In the following section, we will describe the underlying rationale for this proposal and how the change to the academic status of an Institute will benefit the Faculty of Medicine and the broader McGill Community.

a. Drivers for Change

Several significant catalysts for change have evolved over the years:

Growth and Evolution of the Field

In the last 20 years, great strides have been made towards the understanding of basic molecular programs responsible for cancer initiation and development. Many discoveries and ongoing research programs have focused on therapeutically targeting key molecules responsible for tumour initiation and progression or on cancer prevention. Although there have been notable successes and more patients are living longer with cancer than ever before, the burden continues to be significant. Cancer remains the leading cause of death in Canada, with metastatic and drug-resistant cancers posing particularly recalcitrant clinical

problems that often present at diagnosis due to an inability to detect some cancers early. The cancer research field has discovered that addressing these unmet clinical needs depends on enhanced integration of strong mechanistic and functional understanding. This encompasses the integration into discovery and translational research of "patient-centric" models, based on observations and samples derived directly from cancer patients, with complex multi-omic, clinical and "big data" analysis pipelines, as well as new and disruptive technologies including nanotechnologies and biologics. To enable rapid translation of discoveries made at McGill, research units must also embrace a culture of innovation and build strong programs to foster entrepreneurship and collaboration across sectors. As well, it has become important to expose our trainees to developments in social sciences relative to cancer research, particularly given the important societal implications of innovations including genomics and personalized medicine. The establishment of the McGill Cancer Institute will be essential to develop research and training programs at the interface of the biomedical, clinical, physical and computational sciences as well as social sciences focused on tackling the major issues in modern cancer research. This approach will enable McGill-based cancer researchers to increase our understanding of cancer initiation and progression and develop new and effective screening technologies, as well as therapies for metastatic and resistant disease. The new Institute will also build programs and establish links to ensure knowledge translation, in partnership with other units throughout McGill and with the private sector.

Academic Appointments and Recruitment in the GCRC

A Centre is not a "hiring unit" and is therefore unable to solely appoint faculty members. As shown in **Appendix C**, all current Centre members, even though administered by and recruited by the Centre, have an academic "home" in various Faculties including Medicine, Sciences and Engineering and a diversity of departments (Anatomy and Cell Biology, Biochemistry, Oncology, Medicine, Physiology, Microbiology & Immunology, Human Genetics, Surgery, Pathology, Biomedical Engineering, Bioengineering, Chemical Engineering, Biology and Social Studies of Medicine), each with their own definitions and expectations. As a result, researchers with Ph.D.s are frequently appointed to clinical Departments (e.g., Pediatrics; Pathology; Medicine; Oncology; Surgery) or Schools and Centres (e.g. School of Computer Science, Centre for Intelligent Machines; Genome Innovation Centre). For some, this arrangement has worked well; for others, it has been suboptimal, especially for annual performance reviews and promotion (including mentorship and peer support).

One of the main objectives for the creation of the MCI lies in the future recruitment of talented investigators and retention of PhD and MD/PhD-level faculty members. Given that an academic Institute at McGill can function as a "hiring unit," a change in status would allow the MCI to appoint its own faculty members. The MCI would provide an environment designed to accommodate investigators from a wide range of disciplines but with a common research interest in cancer, which would align better with the research plans and career goals of these faculty members. Providing an academic home and career path for individuals from diverse backgrounds focused on cancer research is timely given the need for inter-disciplinarity in research and scholarship, curriculum development, assessment, and program evaluation in cancer. It would also allow for joint appointments and the inclusion of clinician-scientists as well as clinicians and interdisciplinary fundamental scientists as Faculty Members or Associate Members. This is

crucial for the integration of clinical and patient data-derived models with fundamental science to create an interdisciplinary program with high translational potential.

Graduate Programs in Cancer Research

Centres at McGill are currently unable to offer graduate programs because of their status as "Centres". During the past academic year (2018-19), 23 undergraduates, 153 graduate students and 37 post-doctoral fellows have trained in the laboratories of the full members of the GCRC. In 2018-19, twenty students graduated from diverse departments with Masters' or Ph.D. degrees where the topic of their thesis was based in cancer research. Our large student body, which is administered and supported by Centre training studentships, is also subject to differing expectations by each Departmental program. Although cancer research is becoming more interdisciplinary, McGill currently does not have a dedicated cancer science graduate program built on cutting edge research programs and interdisciplinary strengths. To date, we have worked closely with our colleagues in the Department of Biochemistry and the Program in Experimental Medicine, where most of our graduate students are enrolled, to offer a 6-credit course (EXMD635D1 and D2) focusing on basic and translational oncology. This course was developed to fulfill the needs of our Cancer Training program (MICRTP) which was first funded in 2003. Thus, we have shown our ability to develop popular and successful courses. Yet, within our present status, we cannot offer a Master's or Ph.D. program.

We propose to build an innovative Training Program in Cancer Research focused on the biomedical and physical sciences as well as on clinical developments in Oncology and Social Sciences in Medicine. We believe that this will appeal to and stimulate recruitment of graduate students and post-doctoral fellows with an interest in fundamental and applied cancer research, innovation and translational research as applied to personalized medicine. This group of prospective trainees is likely to include many who have a strong interest in cancer but a background outside of the biomedical sciences (e.g. computer sciences or engineering) who would not normally apply to programs within the Faculty of Medicine for graduate or post-doctoral studies. Thus, we anticipate that the unique programs offered by the MCI will enhance and diversify the base of trainees at the Faculty. The ability to offer graduate programs would enable us to train local as well as regional, national and international students in cancer research; it would also significantly increase our research and scholarly productivity and international visibility by training future leaders in fundamental, translational and social sciences and clinical cancer research.

Strategic Planning at McGill and in the Faculty of Medicine

McGill University Strategic Academic Plan

The overall mission of the MCI directly aligns with the strategic plans of McGill University, as articulated in the University's 2017 Strategic Academic Plan. The contribution of the McGill Cancer Institute, which will be fuelled by talent recruited from Quebec, across Canada and from the best institutions world-wide, will be a major contributor to the University's key objective of *leading innovation*. The McGill Cancer

Institute, with its associated graduate programs, will build an education program supporting training of the leaders of the future in cancer research. Empowered by this experience, graduate trainees will become local, national and world ambassadors for McGill once they embark on the next steps in their careers. This endeavour positions the McGill Cancer Institute in line with objectives of *Being open to the world* and in *Expanding diversity* in both people and mindsets. We anticipate that the McGill Cancer Institute training program will develop innovators and HQP for the Quebec biotechnology and medical technology industries as well as exceptionally talented young leaders with broad and deep knowledge across multiple sectors including biomedical and clinical cancer research, artificial intelligence and deep learning, as well as biomedical engineering and the physical sciences. The McGill Cancer Institute will explore the underpinnings of cancer based on existing programs and abilities of researchers to collaborate across research areas and sectors, seeking multidisciplinary interactions. Collectively, these strengths will allow us to better address the objective of *connecting across disciplines and sectors*.

Faculty of Medicine Strategic Research Plan (SRP) and Project Renaissance

In 2014, a joint strategic planning exercise established goals, directions and new initiatives in education and research for the Faculties of Medicine and Dentistry. Among the key developments for the Faculty of Medicine resulting from this exercise were a new Doctor of Medicine and Master of Surgery (MDCM) program and a Strategic Research Plan (SRP) which set research priorities, including financial support for research activities, as well as recruitment and space allocation. The SRP focused on building upon existing strengths to achieve high levels of excellence in prioritized research areas, with further emphasis on creating interdisciplinary teams and programs to facilitate knowledge transfer the and creation of new research interfaces, among them the initiative in Computational Medicine and the revamping and expansion of the MD/Ph.D. program. Project Renaissance was a new strategic planning exercise initiated in 2016 to update the preceding SRP and set priorities for the next five years, with the goals of supporting research excellence in strategic areas, training the next generation of health researchers, facilitating knowledge translation into beneficial health outcomes for patients and the population of Quebec, and providing key information to policy makers. Cancer is central to the new SRP as one of the four major disease areas of focus for the Faculty of Medicine. Furthermore, the updated SRP emphasizes a renewed focus on innovation, creativity, collaboration, education and discovery - all of which are pertinent to the advancement of cancer research at McGill as well as globally.

Creating the McGill Cancer Institute will be a major step forward in achieving the Faculty's objectives in cancer research. Many of the SRP's cross-cutting strategic priorities fall within the major disease theme of cancer. Key examples include "*Genetic and Environmental Determinants of Health and Disease*", where scientists are applying genomic approaches to the study of cancer, elucidating the epigenetic regulatory mechanisms involved in cancer and determining the role of the tumour microenvironment, including the extracellular matrix and stromal cells, in disease progression and response to therapy. Many research themes also address the area of "*Systems and Networks Approaches to Health Research*" through application of integrated "-omics" approaches, advanced imaging technologies and computational and quantitative approaches. The strategic priority of "*Personalized Medicine*" is addressed through efforts in the field of biomarker and molecular signature development for cancer risk assessment, prognostication and stratification for personalized therapies, as well as the innovative molecular, cell-based and animal models of cancer engineered by McGill scientists. The creation of the McGill Cancer Institute will allow us

to build on these successes, enabling further advancement of all these strategic priorities by facilitating the implementation strategies set out by the SRP. The MCI will excel in the *development of human capital and training the next generation of researchers* through enhanced recruitment of outstanding junior faculty members, postdoctoral fellows and graduate students through establishing innovative training programs in cancer research with an interdisciplinary approach and access to cutting edge technology. Attaining institute status will help to sustain and grow the *enabling technology platforms*, among the leaders in Quebec and in Canada, that have been established by the GCRC. Notable throughout the SRP is a strong emphasis on multi-disciplinarity and knowledge translation. Significant recent steps in these directions have been promoted by establishing leadership in multidisciplinary partnerships and consortia involving fundamental researchers, clinicians and clinician-scientists and industrial partners. The McGill Cancer Institute will take these initiatives further by integrating scientists and clinicians from diverse backgrounds into its membership and programs. Through these efforts, the McGill Cancer Institute will play a leading role in optimizing existing personalized cancer therapies and developing new therapeutic strategies, tools and devices, placing McGill at the forefront of this field and establishing the Faculty of Medicine as a leader in improving clinical outcomes for cancer patients, in line with its strategic objectives.

Faculty of Medicine Education Strategic Plan

Education is one of the five main themes of Project Renaissance. The Education Strategic Plan, which entered the implementation phase in 2018, incorporates input from stakeholders at all levels to build on existing strengths, address the needs of the community and define future directions for education of health professionals and biomedical scientists in the Faculty of Medicine. As with the SRP, the Strategic Education Plan places a strong emphasis on collaborative and interdisciplinary approaches, with the objective of creating a learning experience that will better prepare graduates in the biomedical graduates to contribute across many fields in academia, health care, industry and government. Indeed, one of the three major goals of the Education Strategic Plan is "to foster and encourage a culture that supports interdisciplinary and inter-professional partnerships underpinned by a collaborative educational environment". The training programs designed and offered to date have been aligned with this way of thinking. The creation of the McGill Cancer Institute would therefore represent a substantial step forward in achieving the Faculty's specific objectives in inter-professional and interdisciplinary education, with the planned training programs of the MCI in exceptional thematic alignment with the Faculty's overall strategic plan.

b. Guiding Principles

Although the successes of our cancer research community as a group constitutes a source of pride among the Faculty leadership and faculty, there remains a collective sense that the correct course of action to allow the programs to grow in breadth and depth, permitting them to reach their full potential, is to create the McGill Cancer Institute. In addition to the drivers for the change described above, our researchers see the following four key pillars as the main rationale for creating the ***McGill Cancer Institute***:

Enhance Clinical Partnerships

Unlike Centres, Institutes can appoint clinicians as Faculty members. This will greatly enhance our vision of becoming a cancer research hub that links basic science and clinical innovation. Bringing clinicians and clinician-scientists into the institute in this way will eliminate the two "degrees of separation" between PI and patient which currently exist, providing more opportunities to integrate fundamental, translational, social sciences and clinical research and improve patient outcomes.

Research Focal Point

Through the creation of an Institute, the MCI will take a leadership role as a focal point for innovative cancer research within McGill, Quebec, Canada and internationally. The overall objective will be to create a broad virtual network with global reach, with the new McGill Cancer Institute as its hub. This virtual network will expand beyond the Faculty of Medicine, recruiting leading researchers in fields whose discoveries are continually shaping the future of cancer research, such as artificial intelligence and other computational sciences, as well as engineering, the physical sciences and the social sciences.

Provide an Academic Home for Researchers

Creating an Institute will allow the appointment of new members directly to the MCI, thus establishing a well-defined career path for ambitious researchers and making the MCI an appealing destination for emerging leaders in their fields. It will foster a unity of purpose within the organization, free from distraction by the administrative and other demands that come from the appointment of members to outside Departments. This change would enhance the Institute's ability to recruit more interdisciplinary researchers, growing the organization's ability to leverage resources and serve as an incubator for ground-breaking fundamental and translational cancer research.

Greater Visibility and Perceived Reputation

Institute status is a title that promotes visibility through a greater perceived reputation within the academic, clinical, corporate and most importantly philanthropic communities. This will in turn allow the McGill Cancer Institute to attract a larger and more diverse donor base and build a sustainability plan. The McGill Cancer Institute will be able to build a strong brand that will increase our presence and influence in initiatives such as the McGill Cancer Challenge (MC^2), as part of McGill's Capital Campaign, in addition to developing a more prestigious image within the media and other public and professional spheres that will facilitate philanthropy and outreach.

Developing MCI Strengths

In reaching many critical milestones, a number of strengths have been defined: the diversity and commitment of its Core Faculty and Members; the building of a "community" of researchers and

clinicians; a significant involvement in the life of the Faculty of Medicine, with many Core Faculty and Members holding key leadership positions at a number of levels; mentorship of junior faculty, health care professionals, post-doctoral fellows, graduate and undergraduate students; building new scholarly activities; and knowledge translation. These strengths are our measure of success, but as a leading group, we have no intention of stagnating during a time of rapid evolution in our field. We must continue to nurture and build upon these strengths as we develop our intersectoral research program, fostering novel fields of cancer research, increasing our productivity, visibility, entrepreneurship and impact as we drive innovation leading to new treatments, tools and diagnostics for patients. The creation of an Institute will not only enhance the local, national and international exposure of McGill's ground breaking cancer research programs but, more importantly, allow us to fully seize this unique moment in time. By taking advantage of technological development and a paradigm shift towards multidisciplinary research and training, we will position McGill's Faculty of Medicine as a leader in fighting one of the greatest threats to human health of the 21st Century.

III – Consultation Process

Deliberate, frequent and in-depth consultations have been recurring themes underscoring the process of creating a McGill Cancer Institute. The beginnings of this journey go back to December 2017 when the Director of the Goodman Cancer Research Centre, Dr. Morag Park, presented the 'Cancer Vision' at the Dean's retreat. This presentation included several elements that introduced the idea of a McGill Cancer Institute (MCI). It explored the Institute as the fundamental element of a broad and ambitious vision for cancer research at the University - a vision that would extend well into the 21st Century, integrating research, learning, infrastructure, virtual research networks, community engagement and cross-cutting innovation.

Over the next months, Dr. Park continued to discuss and develop the idea of the MCI through both formal and informal discussions with stakeholders throughout the Centre, Faculty and University at large. Specific details of the Institute were next presented at the Faculty Council meeting in December 2018 and followed thereafter in February 2019 by a direction from the Dean of Medicine to begin a formal exploration examining the feasibility of creating a McGill Cancer Institute.

Being thus enabled, Dr. Park engaged in more formal exchanges with members of the Centre as well as key stakeholders throughout the University and current and prospective local, national and international partners. **Appendix B** of this proposal includes a list of the dozens of researchers and academic leaders who were consulted and in many cases formally solicited to endorse the effort. Among those expressing strong support for the creation of the MCI are the Faculty of Medicine's leaders in clinical and fundamental cancer research, as well as world-renowned experts in the field from outside McGill. Numerous discussions with leaders and members of other Faculties at McGill have also taken place with the aim of formally planning the multidisciplinary research and educational activities of the MCI. Specifically, meetings between Dr. Park and Dr. Bruce Lennox, Dean of Science, and Dr. Jim Nicell, Dean of Engineering, have been arranged for November 29, 2019 and December 3, 2019, respectively. Both Faculties have strong existing relationships with our researchers and the Deans have each expressed great enthusiasm

about developing these partnerships within the context of the MCI. Letters of support from the diverse group of stakeholders and partners consulted by Dr. Park is found in **Appendix A**.

This proposal also includes an assessment of the research environment of the Faculty of Medicine, McGill University and research institutes (cancer and otherwise) throughout Canada and the World. The insights uncovered through this process were integrated into *Part VI (Strategic Positioning)* of this proposal. It demonstrates that the MCI would be in a **unique position** to '*build on the success of existing collaborations, striving to strengthen relationships and establish new partnerships with like-minded institutes, stakeholders, policy makers and researchers across the spectrum of cancer-related disciplines*.' Further, with the greater autonomy offered through Institute status, the MCI would have the agility to become a flagship for cancer research, specifically with respect to energizing and enabling a confluence of *'technologies and approaches from the computational sciences (including AI), biomedical and chemical engineering, physics and mathematics,'* with the MCI acting as a global (virtual and physical) cancer research innovation hub.

The next period saw many milestones achieved with respect to the further conceptualization of the idea to form the MCI and curation of the information and stakeholder contributions into a concise yet comprehensive proposal for review by the Faculty Council. The details of each of these steps are included in **Appendix D** of this proposal.

IV – Description of the Proposed McGill Cancer Institute

The driving force behind the creation of the proposed McGill Cancer Institute is the desire to integrate leaders in fundamental, multidisciplinary and patient-centric cancer research with innovators in physical and materials sciences, engineering, computational sciences and social sciences. This is based on the emergence of machine learning and other computational methodology for big data integration and analysis, technology and approaches from engineering, mathematics and physics as essential elements of innovation and discovery in modern cancer research. This paradigm shift requires careful consideration of how to better integrate big data and new technologies into the overall framework of cancer research and personalized approaches to medicine through the lens of social sciences. The proposed Institute is guided in its mandate by excellence in fundamental, translational and clinical research as well as scholarship, education and community outreach and engagement.

The MCI will capitalize on the strengths of the cancer researchers at McGill and the accomplishments of the Goodman Cancer Research Centre Director, its Core Faculty, Research Scientists and Members (**Appendix C**). The Institute will also build on interactions with the past visiting speakers, partners, funders and collaborators, including strong relationships with national organizations (e.g., the Princess Margaret Hospital Cancer Research Institute, the Tannenbaum-Lunenfeld Institute, the British Columbia Cancer Agency, the Canadian Institutes for Health Research, the Fonds de Recherche du Québec en Santé, the Quebec Breast Cancer Foundation, the Terry Fox Research Institute, Oncopole, the Quebec Ministry for Economy and Innovation, the Consortium Québecois sur la Découverte du Médicament (CQDM), the Quebec Consortium for Novel Therapeutics and Biomarkers [QCC], the Brain Tumor Funders Collaborative (BTFC), the Lung Cancer Network, Stand Up to Cancer Canada, international networks (e.g., Cancer

Research UK, the Weizmann Institute, Cancéropôle Lyon Auvergne Rhône-Alpes [CLARA], the Netherlands Cancer Institute) and other universities and schools (highlighted in **Appendix E**).

a. Vision, Mission, Values and Goals

The overarching principle behind the creation of the McGill Cancer Institute is that an integrated, interdisciplinary and intersectoral approach in cancer research will create significant innovation with the goal of improving cancer outcomes. Our distinct strengths will enable the MCI training program to provide the most talented young scientific minds with unparalleled opportunities to gain broader and deeper knowledge of cancer in a cutting-edge, intersectoral environment with instruction from leaders in diverse, yet complementary, fields of the physical, computational, biomedical and clinical sciences.

The proposed **vision** of the new Institute is to deploy the power of fundamental and translational biomedical research and clinical research together with approaches from the physical, computational and social sciences, so that most cancer patients enjoy a full life.

The proposed **mission** is to advance knowledge of cancer biology through research and scholarship, education, community outreach and engagement, with the goal of engaging scientists and clinicians in interdisciplinary research programs for better patient care and health outcomes. By bringing together researchers and clinicians, teachers and learners, the Institute will enable collaboration across disciplines and professions that will foster practice-based research and scholarship, a spirit of curiosity and inquiry among learners and educators, and the support and development of scientific leaders in cancer research. It will also provide a forum for knowledge translation, integration, and evidence-based innovations and practices, as well as national and international partnerships.

The proposed Institute's core **values** are: commitment to the highest standards of academic rigor and excellence, integrity and ethical conduct in its activities. The MCI will also value academic freedom, curiosity and creativity, collaboration and community, open dialogue and respect.

The success of the Institute is contingent upon the dynamic interplay between fundamental scientists, clinicians, educators and cancer research trainees, all of whom will work together to achieve excellence and innovation in cancer research and training.

As a long-term **goal**, the Institute seeks to establish a thriving milieu that not only supports transdisciplinary research and scholarship in relation to cancer biology and therapy, but also seeks to offer new educational opportunities for future leaders in the field while building a community of researchers, clinicians, educators and learners dedicated to the pursuit of excellence. The Institute will also work with key partners in the Faculties of Medicine, Engineering and Science at McGill, across Canada and internationally to achieve shared objectives.

In the area of **research and scholarship**, the McGill Cancer Institute will aim to:

- Conduct high-impact interdisciplinary, collaborative cancer research to increase fundamental knowledge and enhance its translation into practice

- Seek to discover new paradigms responsible for cancer initiation, progression and metastasis and establish novel research methodologies in these and related research areas

- Influence the development of novel approaches for personalized medicine and enhance knowledge transfer for clinical development (new diagnostic and therapeutic strategies)

- Work to ensure that the translation and implementation of new knowledge concurrently informs research and scholarship ("bedside to bench to bedside")

- Build excellence in discovery and teaching, integration and translation

- Expand McGill University and the Faculty of Medicine's role as a national and international leader in cancer research

In the area of **education**, the McGill Cancer Institute will:

- Support and develop educators and leaders in biomedical, physical, computational and social sciences related to cancer research

- Design and deliver graduate programs in integrated cancer research studies starting with a de-regulated Certificate program and a full Master's degree program, and eventually a PhD program as well as a structured and mentored program for postdoctoral fellows, aspiring to train the leaders of tomorrow at McGill.

- Coordinate with the MD-Ph.D. and Clinical Investigator Programs of the Faculty of Medicine to integrate and train medical students/residents interested in a career in cancer research and oncology.

- Provide opportunities for all learners in the Faculties of Medicine, Sciences and Engineering to participate in an elective or scholarly endeavor related to cancer research

- Develop capacity-building, with a major focus on research and teaching, for the benefit of all Institute members

In **community outreach and engagement**, the McGill Cancer Institute will:

- Invite a broad range of stakeholders, including patients, to participate actively in the pursuit of excellence and innovation in cancer research

- Offer evidence-informed workshops for researchers, clinicians, educators and learners regarding novel cancer paradigms, technological innovations and treatments

- Engage in community-building opportunities and collaborative exchanges with other cancer centers, units, departments and programs, locally, nationally and internationally

- Offer professional development activities to the local, national and international community of researchers, clinicians and educators with dedicated interest in cancer research

- Provide visiting scholars with opportunities for collaboration and exchange in cancer research

- Organize scientific forums for the public to raise awareness of cancer-related issues and provide information on developments, breakthroughs and novel treatments available for patients.

b. A Convergence on Innovative Research Goals

We have identified five research domains through which the McGill Cancer Institute will advance. As depicted in Figure 1, these are: **1)** Preventing cancer initiation, progression and metastasis; **2)** Mobilizing computational medicine; **3)** Preventing and detecting cancer earlier; **4)** Neutralizing therapeutic resistance; and **5)** Hijacking our immune system to fight cancer. The development of these research themes is supported by 6 core innovation platforms housing and developing some of the most advanced technologies applicable to cancer research. These include: Single Cell Imaging and Analysis Platform (SCIMAP), Cell Vision Innovation Platform, McGill Integrated Core for Animal Modeling (MICAM), the Histology Innovation Platform, the Metabolomics Innovation Platform and the McGill Platform for Cell Perturbation (MPCP).

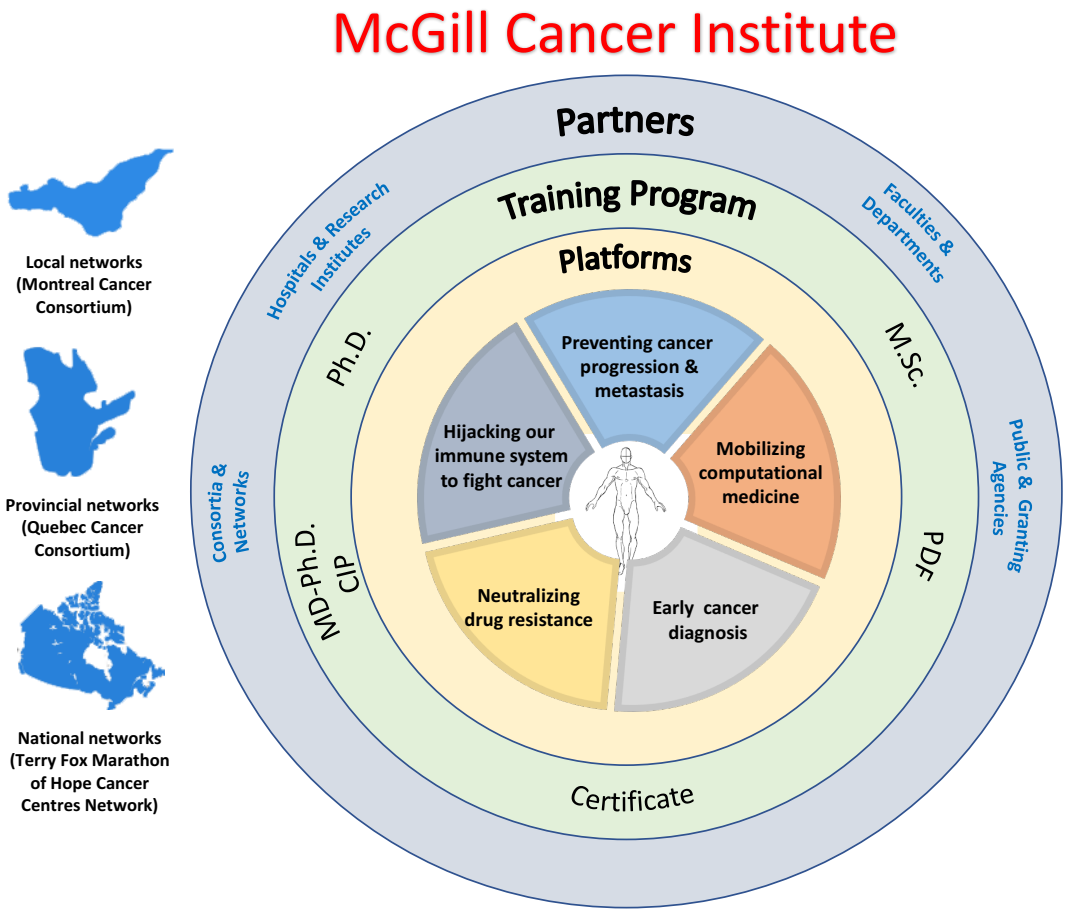

Figure 1

The research domains and strategies of the MCI have been established through extensive discussion and consultation with cancer researchers and colleagues in the Faculties of Medicine, Science and Engineering. These research domains clearly transcend disciplinary boundaries, with the objective of enhancing our leadership in these areas. They are also flexible; we will develop new directions over time, adapting to changing needs and imperatives and novel discoveries in the broader field of cancer. However, a focus on learners (and teachers) and patients (and families) will remain paramount. The Institute will evaluate its primary research domains and converging goals and strategies bi-annually. This iterative approach to identifying the most exciting and pertinent areas of focus for cancer research will help to ensure the Institute's status as a leader on the local, national and international stage.

Research Domains

Preventing and Detecting Cancer Earlier

Prostate and breast cancer screening has taught us that early detection leads to higher survival rates. However, many of the most clinically significant cancers are still diagnosed at far too late a stage in their progression. This significantly limits therapeutic options for patients, frequently ruling out potentially curative surgery, while advanced cancers often fail to respond adequately to drugs that could be much more effective at earlier stages of disease. This scenario typically leads to patients undergoing a series of painful, expensive and sometimes futile treatments and is associated with poor outcome. The Early Cancer Group of the MCI will collaborate with the McGill University and Genome Quebec Innovation Centre and colleagues across McGill's research and teaching hospital network to identify patients at the highest risk of developing cancer - instead of treating them after the fact. Collaborative programs using biomedical engineering, artificial intelligence and big data/computational approaches will be developed to create new diagnostic procedures and optimize existing ones, allowing earlier diagnosis of typically difficult-to-treat cancers, prediction of how early stage cancers evolve and identification of potential avenues for effective therapeutic intervention.

Neutralizing Therapeutic Resistance

Personalized medicine is revolutionizing cancer care by enabling us to match patient profiles to specific drugs. However, it is well known that not all patients respond to these therapies, while some cancers develop resistance to treatment – referred to as *de novo* and acquired resistance, respectively. These phenomena lead to relapse and inoperable, difficult-to-treat metastatic disease. MCI researchers will combine their multidisciplinary expertise with the cutting-edge technology and innovation platforms available to them and a broad-based collaborative network to tackle therapeutic resistance on four fronts: **1)** Targeting changes in protein synthesis that promote resistance to therapy; **2)** Targeting metabolic reprogramming in tumour cells and in the microenvironment; **3)** Understanding how epigenetic mechanisms drive adaptive transcriptional responses that underlie resistance and determining how they can be targeted; **4)** Finding and disrupting mechanisms for evasion of immune surveillance that are a key aspect of resistance to immunotherapies and other therapeutic modalities.

Preventing Cancer Progression and Metastasis

Metastatic cancer is notorious for being largely refractory to therapy and metastasis remains the biggest cause of death from cancer. The MCI will feature world-leading experts in metastasis from a range of backgrounds and fields who will coordinate their efforts, together with other McGill collaborators, to expand our understanding of metastatic cancer and determine how metastatic disease can be prevented or eliminated. These studies will include detailed, multimodal analysis of tumour cell-intrinsic mechanisms causing metastatic spread as well mechanisms of communication, signaling and metabolic interactions between cancer cells and their surrounding microenvironment including normal, or stromal, cells. The MCI research program in cancer progression and metastasis will leverage the institute's Innovation Platforms and access to clinical samples and patient-derived models of cancer to determine how to better detect and disrupt the process of metastasis. These efforts will lead to better ways of diagnosing and monitoring metastatic cancer in the clinic and new therapeutic strategies to prevent cancers from spreading, halt their growth in secondary sites or kill disseminated tumour cells and thereby eradicate metastases.

Hijacking our Immune System to Fight Cancer

lmmunotherapy is among the most important breakthroughs in recent medical history. By stimulating the activity of the immune system to attack tumour cells, or by blocking mechanisms used by tumour cells to evade the immune response, it can trigger durable complete responses and even cures in subsets of patients with select tumour types. However, many patients don't respond, and some patients experience an acceleration in the progression of their cancer while on immunotherapy, referred to as hyper-progressive disease (HPD). The basis for such heterogeneity in the response to immunotherapy is poorly understood, representing one of the most pressing clinical problems in modern cancer research. Immunotherapy programs at the MCI, enabled through ongoing projects under the aegis of the Montreal Cancer Consortium and the Quebec Cancer Consortium, will conduct some of the most thorough analyses to date on responses to immunotherapy in a wide range of cancers. The goals of these programs will be to identify biomarkers and create clinical tests to confidently predict immunotherapy responses, to identify new immunotherapy-based treatments and to devise new customized treatment strategies, such as those involving combinations of immunotherapy with other molecularly targeted therapies, to defeat immunotherapy-resistant cancers.

Mobilizing Computational Medicine and Social Studies of Medicine

Technological developments have always been a major factor enabling progress in cancer research, but the pace of technological change is greater today than at any point in history. Above all, unprecedented amounts of multi-omic and advanced imaging data are increasing our mechanistic understanding of carcinogenesis and tumour progression. This also presents challenges in the field of data analysis that must be overcome to extract the most meaningful information from vast quantities of molecular, "-omics" and patient clinical data. In addition, these data must be integrated effectively into personalized medicine through the lens of ethics and social sciences. Our cancer investigators have built collaborative networks

reaching across McGill University to bring computational biology, artificial intelligence and machine learning approaches into our current research program. The MCI will go beyond the current collaboration across departmental boundaries by incorporating leaders in the computer sciences and computational medicine as well as social studies of medicine as members and associate members of the Institute. The resulting deepening of the connections between fundamental biomedical researchers, clinicians and computer scientists will lead to groundbreaking new initiatives integrating machine learning and AI with clinical image analysis (including computer vision) and next generation sequencing of cancer genomes, transcriptomes and epigenomes from patient samples and patient-derived models. The MCI will participate in building platforms to link all these technologies with each patient's individual data, for example through the activities of many of our scientists within research consortia. This includes the Terry Fox Marathon of Hope Network of Cancer Centres, which is collaborating with Imagia on a SIF4-funded initiative to build such data integration platforms. Overall, this approach will empower better clinical decision making, and ensure that patient-derived knowledge informs pre-clinical studies in a "bedside to bench to bedside" approach that will allow MCI scientists to create the next generation of model systems for cancer research.

Cutting Edge Innovation Platforms

In the last 10 years, six high-performance, innovative scientific platforms have been created. These are headed by highly qualified, professional personnel who work closely with cancer investigators to facilitate their research. This collaborative model, combined with the depth and quality of expertise available, allows these platforms to drive technical development and innovation to respond to the demands of the ever-changing field of cancer research. These scientific Innovation Platforms will be an essential part of the new McGill Cancer Institute. Many research themes nucleate around these platforms, which have been outfitted with state-of-the-art equipment, largely through Canada Foundation for Innovation (CFI) grants and philanthropy. Key challenges in the future will be to establish viable business plans to make these platforms self-sustaining and, ideally, profitable, as well as developing data integration strategies to link individual platforms, generating new insights and a more complete picture of cancer biology that will permit the identification of new disease mechanisms and targets for novel treatments. We anticipate that these challenges can be surmounted, respectively, through the new administrative structure of the MCI and by closer integration of MCI members and platform managers, including those with backgrounds in computer science and big data analysis.

Single Cell Imaging and Analysis Platform (SCIMAP)

SCIMAP houses a suite of instruments for mass cytometry, a technique that combines flow cytometry with time-of-flight (TOF) mass spectrometry for the quantification of protein expression using specific antibodies conjugated to heavy metals. Mass cytometry technology allows for quantitative, multiplexed analysis of protein expression in both cell and tissue samples and can therefore be used to decipher the specific cell composition of tumours, through detecting protein markers of specific cell lineages. SCIMAP was established through funding from the CFI-8 initiative as well as through philanthropy, which enabled

purchase and installation of Fluidigm flow-based (Helios) and imaging (Hyperion) mass cytometers. This highly advanced technology is available at very few centres in Canada. The unique expertise of MCI scientists and staff and access to clinical samples provided by MCI-led consortia makes SCIMAP truly a one-of-a-kind facility with the power to conduct transformative studies to identify new biomarkers and characterize the tumour microenvironment *in situ*, including generating information on its spatial organization in unprecedented depth and detail. The recent acquisition of further funding from philanthropic sources, secured through McGill's MI4 initiative, will enable the recruitment of a highly experienced and qualified facility manager for SCIMAP, while also funding assay development. As an Innovation Platform of the MCI, we expect that SCIMAP will continue to grow as it facilitates a range of research projects involving both pre-clinical models and clinical samples from a larger group of investigators and gains access to new sources of funding through increased philanthropic support and competitiveness for external funding.

Cell Vision Innovation Platform

The Cell Vision Innovation Platform enables researchers to identify and separate various cell types using cell-specific markers expressed "on" or "in" cells. Although flow cytometry can provide similar information to mass cytometry, the Cell Vision Innovation Platform complements SCIMAP because, while mass cytometry provides greater multiplexing capability and can be used to analyze tissue sections including spatial information on cellular composition (imaging mass cytometry), flow cytometry does not destroy the sample as mass cytometry does. This allows live cells expressing specific combinations of protein biomarkers to be isolated from biological samples (fluorescence-activated cell sorting – FACS). The Cell Vision Innovation Platform integrates flow cytometry and cell sorting technology, resources and expertise across several departments at the Life Sciences Complex (including the GCRC and Department of Microbiology and Immunology). With recent developments including the acquisition of a new sorter through CFI-8 funding, the Cell Vision Innovation Platform Facility offers access to five analyzers and two sorting instruments for multi-channel flow cytometry. These technologies can be applied to cultured cells, tissue samples from pre-clinical models and clinical samples from cancer patients, providing vital information on the cellular composition of these samples.

McGill Integrated Core for Animal Modeling (MICAM)

MICAM has all the expertise and technology required for the design, generation and maintenance of transgenic animal models of cancer. These powerful models are a vital aspect of current cancer research and will continue to play an important role in the and the future McGill Cancer Institute's research program, allowing in-depth investigation of mechanisms of tumorigenesis, tumour progression and drug resistance in the context of a complete tissue microenvironment. MICAM routinely uses genome editing technology (CRISPR-Cas9) to establish novel mouse models specific to individual research projects with greater speed and precision than ever before. The MUHC-RI is contributing financially to the budget of the MICAM facility, thereby benefiting from internal prices for the research programs of their investigators while fostering deeper integration across research sites at the Faculty of Medicine.

Histology Innovation Platform

The Histology Innovation Platform is overseen by a board-certified veterinary comparative pathologist and is fully equipped to perform all techniques required for histological and pathological analysis of normal and cancer tissue samples, as well as possessing advanced automated instrumentation for immunostaining and high-throughput imaging of tissue samples, some of which was acquired through CFI-8. This platform is poised to become a major contributor to the research themes of the MCI.

Metabolomics Innovation Platform

The Metabolomics Innovation Platform has instrumentation for metabolic profiling of cells in real time, a suite of state-of-the-art mass spectrometry platforms (GC/MS, LC/MS, SFC-MS), access to nuclear magnetic resonance (NMR) technology and metabolic cages for the characterization of animal models. This gives the facility the capacity for comprehensive metabolic profiling of cancer cells, tumor tissue from animal models and clinical material. The development of the Metabolomics Innovation Platform was greatly facilitated by donations from the Fraser Trust and a long-standing group grant from the Terry Fox Research Institute, in partnership with the Quebec Breast Cancer Foundation. These contributions have allowed the expansion of the facility and purchase of further equipment including two new mass spectrometry systems. These developments have established this facility as a state-of-the-art and unique platform for cancer metabolomics in Canada that has become essential for our research program. The Metabolomics Innovation Platform has also collaborated with a total of 157 groups across Canada and around the world (e.g. U.S., U.K., the Netherlands, France, Sweden, Austria, Israel, Singapore, Australia). With the successful renewal of the Terry Fox New Frontiers Program Project Grant (TFNF PPG) in Oncometabolism, the Metabolomics Innovation Facility will now play a leading role in a network of facilities spanning McGill, the University of Ottawa and the Van Andel Institute that will be termed MIRGOV (Metabolomics Innovation Resource of the GCRC, U. of Ottawa and the Van Andel Institute), providing a further increase in capacity and opportunities for technological development that will maintain leadership in this field for the new MCI.

McGill Platform for Cell Perturbation (MPCP)

Research over the last decade has uncovered the complexity of cancer alterations and microenvironments that drive tumorigenesis, tumor maintenance, metastasis and drug resistance. To overcome this complex challenge, innovative unbiased screening approaches are required to systematically interrogate cancer signaling networks for next-generation cancer therapeutics development. A comprehensive platform for cellular perturbation serving the broader McGill biomedical community has been esatblished. The resources of the McGill Platform for Cell Perturbation include genome-wide libraries for gene silencing by RNA interference (RNAi), cDNA expression and CRISPR/Cas9 genome editing technologies. This platform will carry over to the MCI as important new technological improvements, unique and robust libraries of small molecules and full robotic capabilities are being acquired and integrated with existing infrastructure. This expansion of the MPCP will allow robust screening approaches that can be performed in tumor

organoid settings, including patient-derived organoids, to target multiple cancer vulnerabilities in a temporally regulated manner, and to expand on the limited chemical diversity space that current FDA-approved drugs occupy.

c. Key Activities

The McGill Cancer Institute's mission will be to advance research and scholarship, education, and community outreach and engagement, with the overall goal of promoting excellence and innovation in cancer research. To achieve the goals and objectives highlighted in each key area, many specific activities will be expanded by the new Institute, whereas others will be newly undertaken:

Research and Scholarship

In addition to applications to competitive funding mechanisms, scientific publications and presentations of findings at scientific meetings and to the public, the Institute will enhance existing activities and initiate and sponsor a variety of new activities to stimulate, support, and disseminate research and scholarship. These activities will also serve to bring different stakeholders together and help to ensure evidence-informed research, education and practice.

Weekly "Spotlight" Meetings

In the last two years, a popular series of talks entitled "Spotlight meetings" have been organized by the GCRC Graduate Student Society. Held every Friday, these meetings showcase the research projects of our trainees and are very well attended by trainees, faculty members and other staff. Unpublished work is often presented for feedback by the immediate community, including by associate members and innovation platform researchers, leading to many interesting collaborations. This seminar series also presents an opportunity to invite new Institute members to present a synopsis and general overview of their work to raise awareness of their research and of recent scientific and technological advances in their field among trainees, faculty and staff. The talks are followed by an informal get-together to continue discussion. This seminar series will be presented at the MCI, where it will be especially important in bringing our diverse group of researchers and staff together to foster collaboration and integration of research directions.

Biweekly Faculty "Chalk Talk" Science Meetings

Over the last year, a new bi-weekly lunchtime meeting has fostered interactions among cancer researchers, with one member presenting their full research program and novel, unpublished research ideas for the future. These presentations are informal, very dynamic and highly interactive with ideas, techniques, pre-clinical models, novel drugs and samples being shared by all members to facilitate novel

research projects and plan major potential grant applications. These "chalk talk" meetings are very well-attended. To facilitate presentations by off-site members of the Institute, we have invested in a state-of-the-art audio/visual telecommunications system to facilitate participation of all members. The presentation of these meetings at the new Institute will be essential to bring institute members and associate members together and allow each investigator to benefit from the institute's full complement of expertise across diverse cancer-relevant fields.

MCI Seminar Series and Symposia

A regular seminar series, such as the Frontiers in Cancer Research Series, will be presented at the new MCI. Details of the last 5 years of research seminars presented by external and internal speakers in cancer research can be found in **Appendix F.** During this period, this series has been offered in partnership with the Department of Biochemistry, as many of the future MCI members are also members of this Department. As an Institute, we will continue this practice while increasing the number of joint seminars with our associate members in the fields of clinical oncology, genetics, computer sciences, social sciences, biomedical engineering and engineering to 3 per year. This will broaden the scope of research presentations available for our trainees and members and encourage multidisciplinary collaborations. We have now acquired the necessary equipment and technology to stream our seminars to all other units and hospitals outside the Cancer Research building, which we expect will broaden the scope of participants and provide a more multidisciplinary perspective.

Throughout the 12-year existence (2004-2016) of the McGill Integrated Cancer Research Training Program (MICRTP), supported by CIHR-FRSQ Training Grants, McGill cancer researchers held a biannual, well-attended (200 attendees/meeting) international symposium dedicated to angiogenesis and metastasis (Montreal International Symposium on Angiogenesis and Metastasis - MISAM) where experts in these fields were invited to Montreal for 3 days to present their work and interact. As an Institute, this practice will be re-instated. We will attract donors to provide new and durable funding for this meeting, ensuring that the costs for our trainees and other attendees are kept to a minimum. The topics around which invited speakers will congregate will be selected to favour novel collaborative areas in cancer research, thereby expanding our scientific horizons.

Webinars

The new Institute will sponsor regular webinar events linked to specific cancer topics and research themes. These webinars will be open to Faculty Members and Associate Members, graduate students and other learners, and colleagues throughout the Faculty of Medicine and McGill; in this way, we will also link to national and international colleagues and partners. Our members will be trained by expert communications officers, working with the Faculty of Medicine's Communications Office and other key Faculty resources, to deliver effective lectures via webinar. To increase participation by our members, we intend to propose to the Faculty of Medicine and McGill University that effective webinar delivery could be included as part of the teaching responsibilities of younger, non-tenured assistant professors and considered as fulfillment of teaching commitments when they apply for tenure. We will also explore the

option of offering our webinars to an external, non-McGill audience for a fee, thereby creating another revenue stream for the Institute.

Graduate Student Research Day and Yearly Scientific Retreat

Sharing the exciting research performed by our trainees is at the heart of the McGill Cancer Institute's training mission. As such, we currently host a bi-yearly Graduate Student Research Day where trainees develop many skillsets relevant to communication and leadership. This event is organized exclusively by the graduate students and post-doctoral fellows under the guidance of our Student Affairs Coordinator. A prominent scientist is invited by the trainees to give a keynote seminar and participate in scientific discussions and exchanges with the trainees. Poster and oral presentations by trainees are also a key part of this event, with prizes offered for each. Upon the creation of the Institute, this Research Day event will become intersectoral with inclusion of our off-site members and co-supervisors to enlighten and enhance cross-disciplinary research activities amongst our trainees and members.

Cancer research is a fast moving, highly technology-driven field where key scientific concepts can evolve dramatically from year to year. To fully develop the scientific capacity of the McGill Cancer Institute, we will need to keep abreast of innovative concepts and new developments, engage in strategic planning to upgrade our scientific platforms and network with all available partners to take advantage of emerging funding opportunities. Thus, a yearly Scientific Retreat will be organized for all members, associate members and potential new members of the Institute in an off-site location, providing an opportunity for information exchange and planning from both scientific and Institute operations perspectives.

Peer Review of Research Proposals

The new MCI will institute a mandatory internal peer review system for all major grants submitted by full Centre members to Tri-Council as well as cancer-centric national and international granting agencies. This system will strengthen grant proposals by our investigators with structured comments and ideas based on the experience of senior members who have considerable expertise in grant reviewing, thereby increasing the number of successful proposals. This internal peer review forces applicants to assemble their proposals earlier in the granting cycle, such that three knowledgeable reviewers in their specific field can be consulted and an hour-long meeting convened to discuss the proposals and suggest specific improvements. This exercise has so far had many advantages. Notably, the CIHR success rate of our members has been elevated from 16% in 2016, prior to the institution of this system, to 33% and 53% in 2018 and 2019, respectively. Important scientific collaborations have also been established through interactions at these meetings, while earlier preparation of grant proposals has diminished the overall level of stress associated with these applications and facilitated the collection of pertinent grant-related information by the administrative team. This system will continue to be offered to all members of the McGill Cancer Institute.

Mentorship committees

Given the important demands of academic life at McGill University and the extremely competitive nature of external grants, all incoming investigators will be offered individual mentorship committees prior to their tenure process. For this, the young investigators choose 3 senior colleagues with whom they have natural affinities and who have scientific knowledge of their field of research. One of these colleagues must be a member of the academic department under which the young investigator has been recruited, thereby guaranteeing that policies and procedures specific to the tenure process in this unit are fully respected. The mentorship committee will be held annually and more often if requested, with a report circulated to committee members including the young investigator and then submitted to the Centre Director as well as the Chair of the Department(s). Although it is too early to formally gauge the benefits of this program, anecdotal evidence from the four investigators who have received this mentorship suggests that it is highly beneficial. As the McGill Cancer Institute is destined to grow and welcome a significant number of investigators in the coming years, we intend to formalize this policy.

Visiting Researchers and Scholars and Hosting Visiting Delegations

All cancer investigators have established scientific and technology-driven collaborations with many investigators world-wide, many of which are funded through national and international granting programs (see **Appendix G**, Research Grants held by members of Institute). The McGill Cancer Institute will continue to build on this tradition of welcoming national and international researchers and scholars to McGill. Researchers at the Institute will reach out to scholars working at other cancer research centers and institutes around the world to exchange ideas, provide new and fresh perspectives, and collaborate on diverse research projects and studies. **Appendix H** highlights the presenters and guests we have welcomed in the last five years. These exchanges have been extremely rich and rewarding, and we intend to build on this invaluable endeavour. s

Building New Opportunities through Collaborations, Consortia and Research Networks

New opportunities for cancer research funding in Quebec and throughout Canada have recently been established and growing networks of researchers and clinicians are primed for larger initiatives driven by major funding agencies, the provincial government and the federal government. As evidenced by the descriptions below, many full and associate members of the projected Institute will be well integrated into these networks, while other members will be added in the coming years. Network building will remain at the forefront of the activities of the McGill Cancer Institute, whether we join large consortia, participate in national and international team grants or establish large research networks.

Local, Provincial and National Cancer Research Consortia

Montreal Cancer Consortium (MCC) and *Terry Fox Marathon of Hope (MoH)*

The MCC pilot project of the *Terry Fox Marathon of Hope (MoH)* (June 2018) consists of the GCRC, Institute for Research in Immunology and Cancer (IRIC), McGill University Health Centre (MUHC), Jewish General Hospital (JGH), Centre hospitalier de l'Université de Montréal (CHUM) and Hôpital Maisonneuve-Rosemont (HMR). The MCC is a virtual comprehensive cancer network that collectively treats ~18,000

patients annually. It forms the Quebec node of the MoH Cancer Centre Network championed by the Terry Fox Foundation, with pilot projects currently ongoing at Princess Margaret Cancer Centre (Toronto), and BC Cancer Agency (Vancouver), in addition to the MCC. The MCC pilot grant was co-led by Ian Watson (GCRC) and John Stagg (CHUM) with GCRC PIs Morag Park, Peter Siegel, Guillaume Bourque, George Zogopoulos, Jonathan Spicer, Daniela Quail, and Logan Walsh, with aims to identify molecular and cellular mechanisms mediating response or resistance to targeted and immune therapies in melanoma and leukemia, eventually expanding to other tumour types.

MoH was funded by $150 M from the Federal government in April 2019 for 5 years to build the National network. This will be transformative for cancer research in Canada. Dr. Park is the Quebec Node lead, working with the Terry Fox Foundation as well as PMH and BCCA to build the national MoH initiative.

Strategic Innovation Fund – Stream 4

SIF4 (Collaborative technology development and demonstration) is a federal government program administered through Innovation, Science and Economic Development Canada. The GCRC is a member of the SIF4 initiative led by the Terry Fox MoH together with Imagia, a Montreal-based artificial intelligence (AI) company. This consortium was recently awarded $49 M from the federal government via SIF4 to build and support a Digital Health and Discovery Platform (DHDP) that will apply AI strategies to precision medicine to accelerate improvements in cancer care for Canadians. Together with the joint efforts of our associate Institute members from the Genome Quebec Innovation Centre and the Department of Computer Sciences, we aim to push through significant new developments in this field.

Quebec Cancer Consortium for Novel Therapeutics and Biomarkers (QCC)

The QCC, consisting of the GCRC, Institute for Research in Immunology and Cancer (IRIC), McGill University Health Centre (MUHC), Jewish General Hospital (JGH), Centre hospitalier de l'Université de Montréal (CHUM) and Hôpital Maisonneuve-Rosemont (HMR), is funded by the Fonds d'Accélération des Collaborations en Santé (FACS) program of the Ministère de l'Économie et de l'Innovation du Québec, with financial contributions from pharma and other partners. Led by Dr. Morag Park, the QCC aims to double recruitment of patients to clinical trials across all partner hospitals, harmonizing tissue banking activities and integrating platforms across all sites for cancer research and providing a basis on which to develop large research and clinical teams to address unmet clinical needs and build "systems readiness" for MoH activities across all sites.

Collaborative national and international grants

Stand Up to Cancer (SU2C) Canada Metastatic Breast Cancer Dream Team

A team led by Dr. Nahum Sonenberg, with GCRC PIs Dr. Morag Park, Dr. Peter Siegel, Dr. Bill Muller, Dr. Jerry Pelletier and Dr. Daniela Quail plus collaborators from the LDI, University of Toronto, University of Alberta, BC Cancer Agency and eFFECTOR Therapeutics (San Diego, USA) were awarded $2 M. This national, multidisciplinary team will develop novel strategies targeting the abnormal synthesis of proteins

in aggressive, metastatic breast cancers, including a clinical trial of promising new therapies that will be conducted at McGill hospitals as well as in Edmonton and Vancouver.

Cancer Research UK (CRUK) Grand Challenge initiative

GCRC PI and Director Dr. Morag Park and Associate member Dr. Lorenzo Ferri, with collaborators from the U.S. (Harvard, UCSF and Vanderbilt), the U.K. (Cambridge, London) and Israel (Weizmann Institute), were successful in their application to the CRUK Grand Challenges competition (£20 M/$32 M in total) to develop novel strategies targeting the abnormal inflammatory processes that drive many hard to treat cancers, including gastric, esophageal and colorectal cancers.

Terry Fox New Frontiers Program Project Grant (TFNF PPG) in Oncometabolism

A team co-led by GCRC Member Dr. Peter Siegel and Associate Member Dr. Julie St-Pierre obtained $6 M in funding from TFRI. This team, comprised of researchers from the GCRC, the Lady Davis Institute, Hôpital Maisonneuve-Rosemont (HMR), the University of Ottawa, and the Van Andel Institute (Michigan, USA), has established the GCRC as a leading Canadian and international centre for research into oncometabolism, a key field for new therapeutic strategies in cancer that has emerged over the past 10-15 years. This has included the development of the Metabolomics Innovation Platform at the GCRC, the leading facility of its kind in Canada which is supported by this national team grant.

Brain Tumor Funders Collaborative (BTFC)

Dr. Daniela Quail led a successful application to a partnership of five private philanthropic and advocacy organizations for $750K in funding. This partnership with Dr. Logan Walsh, also of the GCRC, and clinical investigators based at McGill and at the Netherlands McGill Cancer Institute in Amsterdam will leverage the advanced technological resources available at the GCRC and unique access to clinical samples from glioblastoma patients to identify biomarkers indicating potential benefit from immunotherapies, determine strategies for optimizing standard-of-care approaches in combination with immunotherapy and generate the first publicly available immune cell atlas of glioblastoma, comprehensively defining tumor-immune interactions at the single-cell level with spatial resolution.

Consortium Québécois sur la Découverte du Médicament (CQDM)

In addition to large-scale team grants and consortia funded by private agencies and government sources, several public-private partnerships have been established. Notable recent successes have included a successful application for a SynergiQc grant from the CQDM led by Dr. Alain Nepveu of the GCRC, with Dr. Michael Witcher of the LDI and in partnership with NEOMED Institute and the Canadian Cancer Society, to develop new strategies targeting DNA repair mechanisms in breast cancer ($6.1 M including in-kind contributions). Dr. Morag Park secured funding from CQDM, Merck, GSK, and McGill University (totaling $2.2 M) to develop a partnership with Aspect Biosystems to reproduce tumors from living cells of breast

cancer patients using Aspect's microfluidic 3D bioprinting technology. This project will combine this technology with cancer expertise and access to clinical samples to develop a physiological assay to assess the efficacy of anti-cancer drugs and predict responses to treatment in breast cancer.

Research Networks

Lung Cancer Network (LCN)

Dr. Logan Walsh was recruited from Memorial Sloan Kettering in August 2017 as the inaugural holder of the Lung Cancer Research Chair funded by contributions from the Goodman Family. Since starting at the GCRC, Dr. Walsh has developed a lung cancer research program together with clinicians at the Montreal General Hospital/MUHC (Jon Spicer, Lorenzo Ferri and Pierre-Olivier Fiset) and JGH (Jason Agulnik) to address key challenges in lung cancer. Unique to the GCRC/MGH/MUHC is the establishment of patient-derived preclinical models linked with lung cancer clinical trials, providing unique tools to identify new therapeutic strategies for lung cancer. The Lung Cancer Network (LCN) was established in 2018 and was the focus of fundraising for Gala 2018. In the last year, the LCN initiated an active biobanking program for lung cancers, with SOPs shared with other major lung cancer sites (CHUM), developed a lung cancer patient database incorporating shared SOPs and data fields with CHUM (supported by Oncopole within the MCC-MoH) and engaged with precision medicine initiatives at both sites. Jon Spicer and Jason Agulnik also jointly head the lung cancer node of the Rossy Cancer Network.

Melanoma Network

The Melanoma Network is a collaborative group of Montreal-based fundamental, translational and clinical scientists focused on melanoma. This network was established through the efforts of Dr. Ian Watson, a proposed member of the new Institute, beginning in 2015 to establish the Montreal area as a hub for melanoma basic science innovation and clinical translation. The network has grown from collaborations established through a Melanoma Mini-Symposium: "Networking from bench to bedside", held on December 4th, 2015 at the Goodman Cancer Research Centre and organized by Dr. Watson with Drs. Wilson Miller, Sonia Del Rincon, and Leon Van Kempen from the Lady Davis Institute and attended by over 60 scientists from academia and industry.

The Melanoma Network includes leading biomedical scientists, pathologists, melanoma oncologists and clinical trials experts from the Jewish General Hospital (JGH), McGill University Health Centre (MUHC) and the Centre hospitalier de l'Université de Montréal (CHUM), in addition to the GCRC. Among the key initiatives of this group of scientists is a project aimed at identifying the molecular determinants of the response to immune checkpoint inhibitors in melanoma, with collection and banking of clinical samples from patients on trials of these agents underway. Their activities are also part of the MCC, thereby linking them into the Terry Fox MoH Network, and are additionally linked to the QCC.

With these successes, the McGill Cancer Institute with its expanded number of members, research and clinical themes is primed for larger capacity building in research and scholarship.

Education and Capacity-Building

As stated above, the overriding goal in this area is to support and develop educators and leaders in cancer research. Importantly, this goal will be met in many ways, demonstrating our commitment to capacity-building and a meaningful engagement with the academic community at large.

Graduate Student Teaching and Supervision

One of the primary reasons for creating an academic McGill Cancer Institute is to offer graduate programs in cancer, to advance research and scholarship in this field, and to foster the development of individuals poised to take on research and leadership roles in cancer research.

The overall objectives and educational perspective of the McGill Cancer Institute in graduate training will be to expand and advance the development and translation of research at the convergence of the biomedical, physical and computational sciences, allowing trainees to develop skills and knowledge that go well beyond those acquired by graduates of existing programs focussed more exclusively on biomedical cancer research. To achieve this, our unique training modules will encompass courses on complex tumour microenvironments, single cell technologies, integrative "-omics" and machine learning methods to analyze complex, heterogeneous biomedical data sets. In addition, our trainees will be strongly encouraged to participate in optional courses in Social Studies of Medicine to increase the breadth of their training and encompass a societal view of cancer research.

Since 1989, the philanthropic contribution of the Defi Canderel has actively fundraised to support innovative student and postdoctoral training. As well, 12 years (2004-2016) of support from CIHR and FRSQ for the McGill Integrated Cancer Research Training Program (MICRTP) allowed us to fund over 160 highly qualified graduate students, post-doctoral and clinical fellows. This training program was made possible through joint efforts and strong collaborations of members of the GCRC with our colleagues at the Lady Davis Institute (Jewish General Hospital) and the RI-MUHC. All major decisions, including the organization and content of workshops and symposia, were taken jointly with coordinating committees. Each institution contributed a portion of the overall budget for studentships, fellowships and events. With the establishment of the new Institute, we intend to build on this successful model while also expanding our training activities, renewing our collaborations with our former partners and establishing new partnerships with other research units such as various academic departments (Anatomy and Cell Biology, Biochemistry, Oncology, Medicine, Physiology, Microbiology & Immunology, Human Genetics, Surgery, Pathology, Biomedical Engineering, Bioengineering, Chemical Engineering, Biology and Social Studies of Medicine), clinical Departments (e.g., Pediatrics, Pathology, Medicine, Oncology and Surgery) and Schools and Centres (e.g. School of Computer Science, Centre for Intelligent Machines, McGill University and Genome Quebec Innovation Centre).

As a measure of our past success, our former Canderel trainees have gone on to excel across multiple sectors of cancer research, with 26% being PIs in internationally renowned universities, 19% becoming researchers in major pharmaceutical companies and many others holding positions in government and the health care sector. Our students also now actively participate in science policy development and present at large national policy conferences (2018 Science Policy Conference in Ottawa; Canada-wide Naylor Report "Student Awareness" program; internships with the Chief Scientific Officer of Canada). We anticipate the continuation and expansion of this track record of success once new training programs have been developed within the new Institute.

Stipend Funding and Seed Grants

As of September 2019, 163 trainees have been enrolled in the laboratories of full MCI members. Twenty students have graduated with Masters' or Ph.D. degrees in the last year. An impressive number (83) of our graduate students and post-doctoral fellows are currently funded by internal and external programs, totaling $2.0 M in support. In the future, we will continue to dedicate considerable funding from our Canderel initiatives and other sources to stipends for 20-30 trainees per year. Further philanthropic support will also allow the Institute to establish annual seed grants to stimulate intersectoral research and training. Our intersectoral training initiatives will combine a strong academic foundation with innovative research incorporating unique combinations of cancer biology, bioinformatics and computational biology, clinical oncology, bioengineering and material sciences, multimodal data analysis, computer vision and image analysis, social sciences as well as training in innovation, entrepreneurship and other knowledge translation activities.

Recruitment and training events

To establish and develop the MCI training program, we will recruit the best students by hosting an annual recruitment event, offering prospective graduate students a unique opportunity to participate in team activities where innovative scientific thinking and leadership skills will be evaluated. Following the creation of the new Institute, this will be expanded to involve students from other disciplines beyond the biomedical sciences. The highest-performing students will be offered a one-year competitive studentship. An MCI recruitment committee will also identify the best trainees from leading institutions in strategic intersectoral and converging research areas with the aim of bringing them into the institute for the next stage of their training or as new faculty members. We also intend to create an annual Summer Internship Program targeting undergraduate students, serving as a talent pipeline for the recruitment and retention of the most promising new graduate students in Quebec. Our multi-day Summer School, to be held in the early summer every year, will allow a more immersive training experience where trainees will learn to apply best practices, working in team environments to translate research outcomes into commercial products. We will engage with scientifically active alumni occupying high-impact positions in research organizations, hospitals and industry to expand the reach of the MCI Training program and maximize local, national and international visibility. Advertising for our recruitment events will include standard posters, social media and direct engagement with partnering institutions (e.g. the Weizmann Institute, Israel and the CLARA Cancéropôle network, France).

At an annual retreat, trainees from the 38 labs of the MCI will present and discuss their research and network, while an *"Industrial Partner Day"* will also be held, where students will participate in group discussions with industrial partners, hear talks on industry direction or employment, and network to set up future internships. To encourage collaboration between groups and intersectoral training, MCI trainees will have the option of carrying out part of their graduate training in a laboratory other than their supervisor's. Student-centric activities will include training in professional skills facilitating entrepreneurship and entry into the workforce. Finally, we will foster student engagement with the public through our Public Forum series and through events as Young Women in Bio day, where female high school students will spend a day at the MCI.

Training in cancer research at the new institute will also include instruction and opportunities to gain experience in effective oral and written communication, refining writing and presentation skills, orienting presentations to a multidisciplinary audience with varying degrees of expertise, networking skills, elevator pitches and discussing research with non-specialists. Through collaborations during workshops or summer schools, trainees will practice a wide range of knowledge transfer skills and essential scientific and entrepreneurial skills (including ethics, project management, technology transfer – see also "Outreach to Biotechs, Innovation companies and Venture Capital", below). The overarching goal of all training events will be to promote interdisciplinary fluency (basic concepts and language/terminology), drawing on resources available not only through McGill's SKILLSETS, but also afforded by the Computational Medicine and Canada First Research Excellence Fund (CFREF) program at McGill.

Academic Student Training

In conjunction with the Program in Experimental Medicine, our cancer researchers have organized and coordinated since 2008 a full-year 6 credit course (EXMD635: Experimental and Clinical Oncology) associated with our funded training program at the time (CIHR/FRQS). In the new McGill Cancer Institute training program, we intend to build initially a Graduate Certificate of 15 credits (9 credits required and 6 credits as optional from many existing courses in our associated Departments) in line with intersectoral training approaches. We will also offer within the first two years a Master of Science in Cancer Research program which will include the same 15 credits of courses as presented in the Graduate Certificate, with added credits representing the experimental research projects carried out in the laboratories of our Institute members or associate members.

Among the required courses, we intend to continue offering the EXMD635: Experimental and Clinical Oncology course, developed and coordinated since 2008 by dynamic course directors (Wilson Miller, Nicole Beauchemin and Alain Nepveu) as a full-year 6 credit course originally associated with our funded training program of the time (CIHR/FRQS). This graduate course (25-30 graduate students/year) offers training in current oncology principles, combined with detailed 3.0 hour/week courses by basic scientists and clinicians on various tumour mechanisms/sites with a focus on personalized medicine and new therapeutic approaches. Evaluation of students relies on a weekly digital synopsis of the topics discussed, attendance of 2 tumour boards in our partner hospitals, a mid-term and final exam, a full report on a recently published scientific paper unrelated to the specific research field of the student, and a 5-minute oral presentation of the selected paper graded by other students attending the class. The current iteration of EXMD635 includes presentations by 38 professors, including new faculty who have been invited to

share their basic and clinical cancer knowledge. Although it is a very demanding course, it has always received glowing student evaluations and will form the foundational course of the new training program of the McGill Cancer Institute.

Beyond this foundational course, we propose to include an additional 3 credits of required courses building on our innovation platforms, a model to be tested in the current academic year (2019-20). New technologies are constantly expanding the boundaries of knowledge in cancer research. New technologies offered in its 6 scientific innovation platforms described above will contribute to this new development. To maximize the use of these Innovation Platforms and enhance the technical expertise of our trainees, we have organized two Workshops in 2019-2020 centred on these platforms as a pilot to judge the efficacy of this approach. If these are successful and satisfy student demands (after appropriate surveys and consultations), we will then collaborate with our academic partners to update the content of an existing 3-credit course to offer 5 full days/year of workshops encompassing theory and principles of the techniques used by our Innovation Platforms, as well as practical examples based on ongoing research projects of our investigators. A potential name for this course would be "New Frontiers in Cancer Research" . The contents of the course will be updated annually. Evaluation of graduate students will be based on class participation and team-work to prepare responses to final exam questions, writing of a summary of the presentations as well as critical review of a published scientific work where a combination of these techniques has been used.

To complete the necessary courses for a Graduate Certificate in Cancer Research, our trainees will have access to 6 credits of optional courses chosen by the trainees for their interest in specific areas of molecular and cell biology, genomics and genetics, oncology, pharmacology and drug development as well as artificial intelligence and social studies of Medicine. These courses are already available in various departments and discussions will be held to include these topics in our program with various departmental partners.

The McGill Cancer Institute's Training Program will focus on intersectoral and interdisciplinary courses providing our graduate students with extensive training in basic cancer research with related developments in biomedical engineering, engineering, and computer sciences/artificial intelligence, big data analyses and social sciences. Importantly, these new avenues are different from and complementary to the new Integrated Graduate Program in Oncology offered by the Department of Oncology that will offer four areas of specialization in 1) Population and global cancer control; 2) Psychosocial and palliative care; 3) Clinical cancer research; 4) Cancer care services and quality. To make sure that we avoid duplication and maximize the diversity and value of cancer research training at McGill University, the new MCI Training program developments will be structured in collaboration with our colleagues in the Dept. of Oncology.

Future Structure of Educational Program of the McGill Cancer Institute

To structure our program and respond to the needs of our intersectoral community, we have established a Training committee composed of 2 seniors and 2 junior members of the GCRC, 3 off-site members with various expertise and representatives of our graduate student, post-doctoral fellow and research

associate communities. This committee is currently headed by Dr. Nicole Beauchemin with activities coordinated by our Student Affairs officer Daniel Caron. We propose a similar structure for the new Institute to ensure that our future training programs remain highly relevant and dynamic while incorporating the diverse perspectives of our multidisciplinary institute membership.

Presently, most of our students are registered in various academic departments of the Faculty of Medicine. Our goal is to offer an interdisciplinary hub for intersectoral training initiatives combining a strong academic foundation and innovative research in cancer biology, clinical oncology, bioinformatics and computational biology, bioengineering and material sciences, multimodal data analysis, computer vision and image analysis. We expect that, within the next 3 years, the MCI will offer its own graduate program where MCI students will be expected to complete either a certificate of 15 course credits or a Master of Science in Cancer Research with 36 extra thesis course credits for experimental research projects (in addition to the same 15 credits as for the Certificate). Once these programs have been successfully implemented, the MCI will seek to establish its own Ph.D. program in Cancer Research.

Given the scope of the MCI cancer research program, we anticipate that medical students enrolled in the MD-PhD program and residents enrolled in the Clinician Investigator Program (CIP) with an interest in building a career in cancer research will be attracted to our training program. Every effort will be made to tailor our program to their specific training needs, coordinating with Faculty of Medicine committees presently overseeing the MD-PhD and CIP programs. Recognizing the importance of integrating clinical and research experiences for this cohort of trainees, the supervisory model will include clinical mentorship where a clinician-scientist or a combination of a scientist and clinician-investigator will supervise trainees. For the CIP stream, we will work with individual clinical Departments and Divisions to identify and develop residents as clinician-scientists, with tailored programs aiming to provide trainees with research experience protected from clinical service, while using the clinical mentorship model to ensure parallel clinical development. As well, there will be an emphasis on enrolling CIP trainees in the FRQS/MSSS training Program (Phase 1) for specialty residents with an interest in pursuing a research career, thereby creating a path of recruitment for our next generation of clinician-scientists. Following their completion of fellowship training (Phase 2), successful candidates would have an opportunity to join our Faculty as Phase 3 awardees, without dependence on a clinical PREM, and begin building their research programs within the FRSQ clinician-scientist model.

Community Outreach and Engagement

Consultations with other scientists

The Cancer unit has maintained open policies and practices for the last 25 years, including sharing research resources through our Biobar and providing access to the unique equipment and HQP, expertise and services of our Innovation Platforms at reduced fees for McGill and other academic users. Scientific consultations have been enhanced by recent initiatives such as the bi-weekly Faculty Chalk Talk Science Meeting, Spotlight presentations and Peer Review Grant Proposal committees described above. These consultation activities have been a tremendous success. The extensive new networks and consortia created in the last years (see above), where GCRC members coordinate with scientists at the provincial,

national and international levels, are based on sharing of projects, data, patient samples and publications. The newly-created MCI structure will continue to grow and develop these scientific interactions while adding a new dimension of intersectoral consultation through our diverse membership and collaborations and increased participation in multidisciplinary funding and team initiatives. We anticipate that the new institute will also provide a hub for conferences and symposia for project planning and sharing information on the latest interdisciplinary and intersectoral discoveries.

Outreach to patients, families and members of the public

The new Institute will seize every opportunity to disseminate the exciting results of our own research and offer clinical and patient perspectives through quarterly Public Forums. These conferences are held in the early evenings to attract all possible stakeholders (patients, families, lay public working downtown, students and volunteers) with the aim of explaining in the simplest possible terms the complicated experiments and technologies which lead to new therapeutic approaches or drugs for cancer patients. We anticipate that the new Institute will hold additional special, non-recurring events along the same lines as the Public Forums to deliver exceptional lectures aimed at educating the general public about important issues related to cancer research and treatment (e.g. Pancreatic Cancer Canada held an extraordinary Public Forum in Montreal together with our Public Forum organization).

Beyond our public forums and lectures, our researchers and trainees have partnered and engaged with donors and patients through the initiatives of major cancer agencies and charities (Canadian Cancer Society, Cancer Research Society, Terry Fox Run for the Cure, the Cure Foundation, the Canderel Run), supporting their missions through participation in their key events, including through fundraising and volunteering by trainees and staff. In the coming months, we intend to strengthen our ties to patients by forming a team of patients or patient delegates (family members or close representatives and friends) who will be embedded in a new *Learning Initiative* for our young investigators. This Learning Initiative will include patients in every training activity (Research Day, Spotlight seminars, Town Halls, Bi-Annual Galas, Special Workshops etc.) organized by and for our students and post-doctoral fellows. Over time, these patient representatives will not only be asked to deliver a short talk about their trajectory but will actively participate in shaping the events with the trainees and administrative staff.

The new Institute will have public outreach as a major component of its mission and will continue and expand upon these efforts under the guidance of administrative staff mandated to oversee communications, fundraising and outreach efforts, including our Director of Fundraising and Associate Director of Outreach and Development and in partnership with the Faculty of Medicine and McGill University.

Outreach to Biotechs, Innovation companies and Venture Capital

We anticipate that cutting edge, multidisciplinary research and training at the McGill Cancer Institute, in collaboration with other McGill units, will fuel therapeutic and technological developments with the potential to improve clinical outcomes for cancer patients. Coordinated and concerted efforts in knowledge translation will be essential to translate discoveries from our research programs into technology transfer, preclinical solutions, patentable opportunities and eventually commercialized

products. It is widely recognized that translation needs to be accelerated so that discoveries can be disseminated and translated appropriately and can reach and benefit patients faster. Collaborative research and training at the university level is now focused on fast-tracking the "bench to bedside" process and new training programs and workshops within the MCI will be developed to support and demystify this process in partnership with other Departments (e.g. Dept. of Biomedical Engineering as well as MI4 initiatives).

Across healthcare and medicine, it is commonly accepted that success in translational research requires not only technological innovation, but also the ability to overcome the real-world obstacles to widespread adoption. These include complex and dynamic economic barriers and regulatory hurdles, which are particularly acute in Canada. To address these challenges, the McGill Cancer Institute will form collaborative research and training partnerships with biotechnology and medical technology industry members. The MCI will also leverage resources at the McGill Office of Innovation & Partnerships work closely with the VPRI's Innovation and Partnerships team to facilitate industry-sponsored research and training partnerships. Recent examples of this approach include CQDM-funded projects involving NEOMED Institute, which entered a commercial agreement with our researchers in 2018 to identify small molecule inhibitors of two novel oncology targets, and Aspect Biosystems, who are developing their 3D bioprinting technology for studying the tumour microenvironment with our scientists. Further opportunities to establish links to the private sector will develop through the Institute's leading role in cancer research consortia and national networks, as well as initiatives and training of partners. This includes, for example, the SIF4-sponsored collaboration between the TFRI MoH network and Imagia, described above. Successful industry-sponsored research will not only catalyze the commercialization of new therapies and technologies, but also generate licensing revenue for the MCI, thus enabling a cycle of improved patient outcomes and new funding for translational research.

The MCI will prepare HQP for careers in biotechnology and medical technology with industry-focused training and experiential internships. We will partner with existing academic programs at McGill, including courses in translational biomedical engineering focused on medical device commercialization, and the MedTech Talent Accelerator CREATE program which places graduate students in industry internships and provides supplemental training on the medical technology industry. We will leverage internship funding programs like Mitacs (https://www.mitacs.ca/en/programs) and BioTalent (https://www.biotalent.ca/student-work-placement-program-student-page/) to alleviate the financial burden on corporate partners while ensuring students are properly remunerated. The MCI will also facilitate job and internship placement by participating in a collaborative career portal at McGill, currently under development, that will be dedicated to the biotechnology and medical technology industries (myFuture). To foster entrepreneurship, we will encourage our students and staff to participate in business pitch competitions at McGill like the Clinical Innovation Competition (CLIC) and the Dobson Cup. These competitions tend to attract investors including venture capital firms. We will aim to attract additional venture capital investment by attending and sponsoring investor conferences such as BIOMED Finance (https://www.biomedfinance.com/), and by inviting investors to attend and participate at our seminars and fundraising events.

The McGill Cancer Institute will continue to cultivate strong connections with McGill's Department of Biomedical Engineering, which has a network of private sector collaborations that have fostered translation and innovation activities leading to several spin-offs and commercialization initiatives. Close integration of clinicians, researchers and platforms at the McGill University Health Centre (MUHC) and

Jewish General Hospital/Segal Cancer Centre will also facilitate the translation of multidisciplinary and clinical collaborations. We will also seek to establish relationships with public-private societies and partnerships focused on knowledge translation in medicine, including MEDTEQ (the Quebec Consortium for Industrial Research and Medical Technology which is now part of SIF (Innovation Canada's Strategic Innovation Fund), CQDM, IVADO, Montreal InVivo, Medtech Canada and TransMedTech Institute. The McGill Cancer Institute would also be in a strong position to compete for funding in translational research initiatives from agencies such as NSERC (e.g. CREATE program) and CIHR (e.g. Collaborative Health Research projects).

Beyond developing our capacity to translate the research of the McGill Cancer Institute, we will also incorporate training in translational methods and knowledge as an integral component of our graduate certificate and degree programs. Here, we will also work with colleagues at the Department of Biomedical Engineering, whom we are supporting on a CREATE application to establish a program for the development and integration of machine learning and artificial intelligence approaches to healthcare, with a focus on cancer. In collaboration with BME, other Departments at the Faculty, the hospitals and their research institutes, we will develop translational training programs in cancer-relevant fields including regulatory approval, clinical studies and IP for cancer drugs. These key aspects of our training program will allow us to train and develop HQP equipped with real-world translational knowledge who would be poised to improve productivity in the biotechnology, pharmaceutical and medical technology sectors. As a long-term goal, we envisage the growth of a collaborative biotech/MedTech incubator centred on the McGill Cancer Institute and its partners, with similarities to other initiatives such as the District 3 Life Science community at Concordia University, which focuses on providing researchers with translational education and resources, while also attracting significant investment in facilities, platforms and start-ups.

Institute Website

The website for the new McGill Cancer Institute will represent a renewed and rebranded digital platform for researchers, students and community members to explore current and upcoming research-oriented events, research initiatives and partnerships, and relevant conferences and symposia. We will provide an up-to-date list of full, associate, affiliate and emerita members with short biographies and links to their own webpages, recently published discoveries of all members, information regarding our next public events and videos of previous Public Forums. By presenting our researchers and their work as well as the training programs and other opportunities available to potential new trainees, we anticipate that our website will be a key recruitment tool. Importantly, the website also provides vital information to our current trainees and staff on the various events, workshops, research days, symposia and stipend competitions available to them. Further important purposes of the website include providing information on our Innovation Platforms to partners and clients, including services provided, fees for use of these services and contact information. The website of the new Institute will also be designed with potential donors in mind, with information on our activities tailored for potential donors, descriptions of upcoming public outreach events and links to an online donation system. Our present website (https://mcgillgcrc.com) is currently undergoing a full content renovation and will be professionally rebranded once the creation of the new McGill Cancer Institute has been approved.

Inter-University Collaborations

Collaborating with similar units in Quebec and across Canada will remain a priority for the new Institute. The Institut de Recherche en Immunologie et en Cancer (IRIC, Université de Montréal) is the institute which is closest in themes and organization to the proposed McGill Cancer Institute: many of our members are sharing innovation platforms expertise and significant data. We have held joint research retreats in the past with IRIC members and will continue to collaborate intensely as we move towards the McGill Cancer Institute. A new joint Canderel initiative is already being planned with our partners at the CHUM to improve training of post-doctoral fellows within the MCI and facilitate the sharing of expertise. The breadth of inter-institutional collaborations and networks involving the GCRC is illustrated clearly in the description of our team funding (**Section IV**). These team grant initiatives and consortia, which will continue once the Institute has been created, include partners and stakeholders from multiple provinces across Canada, and collaborating international institutions. In the future, these collaborative partnerships will expand further to include additional experts in fields including physics, engineering and computational medicine as new joint interdisciplinary teams are constituted within the MCI and seek to establish their own networks of inter-institutional collaborations.

Faculty Exchanges

Recent initiatives include associate members who are appointed to several faculties and centres other than the Faculty of Medicine (Sciences, Engineering, Centre for Intelligent Machines). The Institute will continue to offer an interdisciplinary hub for collaborative research and knowledge translation, breaking down barriers and creating opportunities for cross-appointment and associate membership for investigators from a range of McGill Faculties engaged in cancer-relevant research. Our training program will incorporate a wide range of disciplines housed in various Faculties, Departments and units. We will aim to use courses already offered by several of these faculties, enabling undergraduate students to do electives or graduate students to expand their research base within the laboratories of all members of the MCI. We will also work with colleagues in other Faculties to jointly develop and offer graduate courses as part of the programs of the Institute and its partners in other Faculties. These efforts will ensure that interdisciplinary approaches are built-in to the training program of the Institute and allow us to draw on the widest possible base of relevant knowledge and expertise throughout the University.

Media Outreach

A key advantage and driving factor in the creation of the McGill Cancer Institute is to expand its internal and external stakeholder reach. The new Institute will have the mandate and resources to better tie-in clinicians and basic science researchers to improve overall patient outcomes, while working across disciplines with engineering, computational and physical science professionals/academics to better integrate globally impactful breakthroughs in areas such as Artificial Intelligence and Bioinformatics. These exciting developments will be of great interest to the public. The MCI will maintain an outward-looking perspective, engaging with local, national and international audiences by establishing a dynamic and engaging social media presence via outlets such as Facebook, Twitter and Instagram. Furthermore, these platforms will all be anchored and integrated with a streamlined and interactive website that

effectively promulgates the McGill Cancer Institute's brand, values and achievements. These media elements will be vital vehicles to maximize the MCI's ability to highlight its research projects and findings, innovations and resources. We anticipate that they will have a major impact on fundraising capabilities as well as drawing in the most promising recruits from a diverse pool of potential trainees.

A dedicated Communications Officer will be hired to support these initiatives and ensure that our communications platforms are effectively tied into the overarching vision and strategy of the Institute in Scientific, Advancement and Administrative Management lines of operation.

V – Membership and Governance

a. Proposed Membership

The McGill Cancer Institute will consist of the following academic staff: Director, Scientific Director (Cores/Platforms), three Associate Directors (Graduate Studies, Research and Outreach/Development), Full (Faculty) Members, Associate Members, Affiliate Members and Emerita/Emeritus members. In preparation for this proposal, the current members of the Goodman Cancer Research Centre were asked to indicate how they see their role in the new McGill Cancer Institute. Through various exchanges, conversations and consultations, some of these members expressed interest in being jointly appointed with Full (Faculty) Member status in the new Institute (main appointment in other departments but still an institute member). Others voiced an interest in remaining Core Faculty Members (who presently receive salary support from the Centre and are based primarily at the main GCRC site) or Associate Members.

Consequently, we have populated the categories below based on the information received thus far. Importantly, these designations will be confirmed once the McGill Cancer Institute is established and following conversations with the Chairs of relevant departments. Growth of the MCI will continue organically with a consideration of available space within the current infrastructure. Immediately upon the granting of institute status, planning for future space development opportunities will begin in earnest to continue growing the MCI over the ensuing decade.

Proposed Full (Faculty) Members

Proposed Full (Faculty) Members are researchers who have dedicated their professional lives to ground-breaking research in cancer. Upon the creation of the MCI, it is expected to have approximately 25 full members from the Faculty of Medicine with a projected growth within the first ten (10) years after the MCI's creation.

MORAG PARK, PhD, FRSC, FCAHS (Proposed Director of the MCI), is a Professor in the Departments of Biochemistry, Medicine and Oncology at McGill University and current Director of the Goodman Cancer Research Centre. She completed her Doctorate in 1983 at the University of Glasgow; she holds the *Diane and Sal Guerrera Chair in Cancer Genetics* and is a Fellow of the Royal Society of Canada. Dr. Park has served

as the Scientific Director of the CIHR Institute of Cancer Research, Director of the McGill Molecular Oncology Group and Joint Head of the Cancer Axis at MUHC. Her lab has been in operation since 1988 with a research focus on the molecular mechanisms of oncogenic activation of receptor tyrosine kinases and mechanisms for cell transformation using the Met or Hepatocyte Growth Factor (HGF) receptor oncoprotein as a model. Dr. Park's research goals have developed into a broader interest in understanding how multiple genetic alterations and epigenetic events synergize to promote tumorigenesis and progression in human breast cancer. This has involved both the generation of murine models of breast cancer involving the Met receptor as well as studies in human breast cancer. More recently, she has become a leader in determining the role of the tumour microenvironment and stromal cells in carcinogenesis and cancer progression, with a specific focus on the breast tumour microenvironment. Her leadership in this area has been recognized through her service as the Chair of the American Association for Cancer Research (AACR) Tumour Microenvironment Network. Dr. Park is a Fellow of the Royal Society of Canada and the Canadian Academy of Health Sciences. Over the course of her career she has won the Canadian Cancer Research Alliance Award for Exceptional Leadership in Cancer Research (2015), the Canadian Society for Molecular Biosciences Arthur Wynne Gold Medal Award (2016), the Robert L. Noble prize of the Canadian Cancer Society (2017) and the Grand Prix Scientifique from the Quebec Breast Cancer Foundation (2019).

THOMAS DUCHAINE (Present Associate Director of the GCRC), PhD, is a Professor in the Department of Biochemistry and member of the senior leadership team at the Goodman Cancer Research Centre as the current Associate Director. He completed his PhD at the *Université de Montréal* in 2001, then worked as a post-doctoral fellow at the University of Massachusetts Medical School under Nobel Laureate Dr. Craig C. Mello studying *Mechanisms of RNA-mediated gene silencing*. In 2005, Dr. Duchaine came to McGill University as a post-doctoral fellow under Dr. Nahum Sonenberg and Dr. Duchaine has been cross-appointed at the GCRC and Department of Biochemistry since 2006, becoming a Full Professor in March 2019. He is also a member of the Experimental Medicine program. Dr. Duchaine studies the functions of RNA and RNA-binding proteins in the control of genetic expression, with emphasis on the molecular aspects of RNA interference (RNAi), microRNAs and their implications in cancer. He was instrumental in revealing mechanisms underlying the fundamental properties of miRNAs, including translational repression by miRNAs, mechanisms of miRNA cooperativity and their importance, illuminating critical mechanisms of oncogenic transformation and indicating new therapeutic directions. Dr. Duchaine exerts leadership among his research community through top-tier research publications, but also through community-building at the GCRC and its partnering institutions. Over recent years, he has taken an active role in public outreach, engagement and mobilization, in part through the GCRC Public Forums where researchers and clinicians present the latest discoveries and practices and directly answer the questions of the community.

NICOLE BEAUCHEMIN, PhD, is a Professor in the Departments of Biochemistry, Medicine and Oncology at McGill University and core member (senior researcher and project director) at the Goodman Cancer Research Centre. She completed her Doctorate, Masters and Bachelor's degrees at the *Université de Montréal*. She completed her post-doctoral fellowship in Molecular Biology at *McGill University* from 1985 to 1988. Dr. Beauchemin has received salary awards from the Fonds de Recherche en Santé du Québec. Her research deals with colon cancer, which remains a leading cause of death in Canada. Her focus is on the molecular mechanisms of pathways involving CEACAM1, an Ig and carcinoembryonic antigen (CEA) family member, in cancer progression and metastasis and as a potential therapeutic target for colorectal cancer treatment. Her research team has mapped a signalling network involving CEACAM1-L with Receptor Tyrosine Kinases, the STAT3 transcription factor, several chemokines and cytokines that influences

metastatic progression in vivo. Her team has also investigated how the tumor stroma responds to CEACAM1-positive tumors via endothelial cells and myeloid-derived suppressor cells. Dr. Beauchemin has also developed a long-standing collaboration with Dr. Philippe Gros to identify and characterize colon cancer susceptibility genes using the power of reverse genetics. Many such genes have now been mapped and are being functionally analyzed. Dr. Beauchemin is currently Project Director within the GCRC.

MAXIME BOUCHARD, PhD, is a Professor in the Departments of Oncology and Medicine, a member of the Goodman Cancer Research Centre and a Canada Research Chair in Developmental Genetics of the Urogenital System. He completed his doctorate at the *Université Laval* in 1996 and his post-doctoral work at the *Research Institute of Molecular Pathology (IMP), Vienna, Austria* between 1996 and 2001. He remained at the IMP as a staff scientist until 2003 when he was appointed as an Assistant Professor at McGill University. Dr. Bouchard's research program is centered on epithelial morphogenesis and homeostasis. Based on the fascinating parallel between embryonic development and cancer, his team addresses crucial questions central to both fields, using the mouse urogenital systems (kidney, ureter, prostate) as a powerful model for studying vertebrate organogenesis, neonatal malformations and cancer recurrence. Dr. Bouchard's work directly addresses castrate-resistant prostate cancer (stem cells, apoptosis) and congenital anomalies of the kidney and urinary tract. His main research themes are *Stem cell homeostasis and lineage specification* in development, regeneration and cancer; *Epithelial cell plasticity* during embryonic kidney development and prostate cancer; and *Apoptotic cell signaling* in morphogenesis and regeneration. His team uses genetically engineered mouse models in combination with *ex vivo*, cellular and biochemical assays to elucidate the molecular mechanisms underlying developmental and neoplastic diseases of the urinary tract and prostate.

JOSEE DOSTIE, PhD, is a Professor in the Department of Biochemistry and member of the Goodman Cancer Research Centre. She completed a doctorate at McGill University in 2000 in the field of Biochemistry. Dr. Dostie completed post-doctoral training in Biochemistry and Molecular Biology at the University of Pennsylvania in 2004 and in Genomics and Genetics at the University of Massachusetts in 2006. She began her career at McGill in 2007 as an Assistant Professor in the Department of Biochemistry. Her research addresses the role of spatial chromatin organization in the regulation of gene expression in mammalian cells. He lab is particularly interested in defining how epigenetic modifications affect chromatin structure and genome function in "normal" and cancer cells. They are characterizing the molecular mechanisms involved in regulating the three-dimensional chromatin architecture and expression of Hox genes in leukemia cell models. Dr. Dostie has received several substantial research grants from organizations such as the Canadian Cancer Society Research Institute (2014) and Canadian Institutes of Health Research (2015) to continue her work in spatial epigenetics and leukemia.

IMED GALLOUZI, PhD, is a Professor in the Department of Biochemistry and member of the Goodman Cancer Research Centre. He was the recipient of a Tier II Canada Research Chair in Cellular Information System (2002-2012) and was the Associate Chair (Education) for the Department of Biochemistry. Dr. Gallouzi received his PhD in 1998 from the Graduate School of Biology and Health, Montpellier, France. His research examines novel ways to trigger the death of cancer cells and to prevent muscle wasting (cachexia), a debilitating syndrome characterized by a rapid loss of muscle mass in diseases such as cancer, AIDS or chronic infections. Recent studies in his lab have investigated the therapeutic potential of chemical compounds that impair protein production as drugs to prevent cachexia and block tumor growth. An additional focus of his group is the RNA-binding protein HuR, which regulates both cell growth and cell death. Importantly, excessive growth in cancer has been linked partly to an abundance of HuR. As well, his team

explores HuR cleavage and its putative role in resistance to chemotherapy, where their work has revealed potential novel mechanisms of drug resistance and indicated new avenues for therapeutic intervention in chemoresistant cancers.

VINCENT GIGUERE, PhD, FRSC, is a Professor in the Departments of Medicine and Biochemistry and member of the Goodman Cancer Research Centre. In 2013, he was appointed a Fellow, Academy of Sciences, Life Science Division, Discipline of Molecular Biology and Genetics with The Royal Society of Canada. Dr. Giguère is recognized as an international leader in the field of nuclear receptors. Dr. Giguère identified several members of the superfamily of nuclear receptors, most notably the estrogen-related receptors (ERRs), and revealed mechanisms demonstrating how these proteins work at the molecular level. His ground-breaking work also led to major advances in our understanding of the roles played by nuclear receptors and their natural and synthetic ligands in embryonic development, adult physiology and several diseases, particularly breast and prostate cancers. His most recent work has focused on understanding of how cancer cells meet the energy and resource requirements to sustain the needs of rapidly growing tumours, which intra-cellular metabolism is different from normal cells. In this context, he served as the leader of the TFRI Program Project Grant in Oncometabolism at the GCRC from 2009-2014.

PHILIPPE GROS, PhD, OC, FRSC, is a Professor in the Department of Biochemistry and member of the Goodman Cancer Research Centre. Dr. Gros received his Doctorate in 1983 from McGill University. He is a Distinguished Investigator of the CIHR, a Fellow of the Royal Society of Canada and was inducted as an Officer of the Order of Canada in 2016. In September 2018, Dr. Gros was appointed Deputy Vice-Principal (Research and Innovation) at McGill University. From 2013 until his current appointment, Professor Gros had served as Vice-Dean, Life Sciences, in McGill's Faculty of Medicine. Renowned throughout North America and abroad for his investigations and discoveries of genes, proteins, and pathways that influence complex human diseases, Professor Gros holds six patents and is the author of close to 400 scientific publications. He is also the recipient of numerous awards, including: the McLaughlin Medal for Scientific Excellence (2014), the Queen Elizabeth II Diamond Jubilee Medal (2013), the Killam Prize in Health Sciences (2009), and the Prix Wilder-Penfield (2008). His laboratory uses genetic approaches involving mouse models of infection with *Mycobacterium tuberculosis* (tuberculosis), *Plasmodium chabaudi* (blood stage malaria), *Plasmodium berghei* (cerebral malaria) and *Candida albicans* as well as models of cancer to identify host genes and proteins affecting the onset, progression and outcome of these diseases. His mouse genetic discovery platforms include inbred mouse strains, AcB/BcA recombinant congenic strains and various chemical carcinogenesis models. Dr. Gros' lab also develops bioinformatic tools to analyze rare and common genetic variants identified in cohorts of unique patients suffering from acute infections, chronic inflammatory conditions and cancer to identify variants in key genes regulated by pro-inflammatory transcription factors.

SIDONG HUANG, PhD, is an Associate Professor in the Department of Biochemistry at McGill University, a member of the Goodman Cancer Research Centre and a Canada Research Chair in Functional Genomics and. He is also an Associate Member of the McGill University Research Centre on Complex Traits and is the scientific director of the Genetic Perturbation Service at McGill University, which will become the McGill Platform for Cellular Perturbation at the McGill Cancer Institute. He studied Biochemistry and Molecular Biology at Boston University and subsequently obtained his PhD from the University of California, San Francisco in 2003, under the supervision of Dr. Erin O'Shea. He then joined the laboratory of Dr. Rene Bernards at the Netherlands Cancer Institute for his postdoctoral training. In 2013, he was appointed as an Assistant Professor at McGill University. His research focuses on using functional genomics to guide cancer therapy, overcoming drug resistance to cancer therapeutics and targeting hard-to-treat cancer driver

mutations. Specifically, Dr. Huang applies genome-wide genetic screening techniques including RNAi, cDNA overexpression and CRISPR/Cas9-based approaches to identify therapeutic targets and synthetically lethal genetic interactions in specific cancer types. His work has uncovered novel resistance mechanisms to cancer therapeutics, identified new treatment strategies and led to the establishment of clinical trials.

LAWRENCE KAZAK, PhD, is an Assistant Professor in the Department of Biochemistry and a member of the Goodman Cancer Research Centre. He also holds a Canada Research Chair in Adipocyte Biology. Dr. Kazak completed his Ph.D. with Ian J. Holt at the University of Cambridge, MRC Mitochondrial Biology Unit in 2013. He then moved to the Dana-Farber Cancer Institute and Harvard Medical School, where he worked on adipocyte thermogenesis in the lab of Bruce M. Spiegelman. Dr. Kazak joined McGill University as an Assistant Professor in 2018. The major focus of Dr. Kazak's lab is to identify the molecular mechanisms that drive adipocyte thermogenesis and investigate the involvement of mitochondrial and adipocyte biology in cancer. Thermogenic (brown and beige) adipocytes catabolize stored energy to generate heat (thermogenesis), and their activity powerfully combats obesity, type 2 diabetes and many cancers. By elucidating the genetic and metabolic pathways that control thermogenesis, Dr. Kazak's lab aims to recapitulate the positive effects of brown fat energy expenditure on health. His team's research aims are to determine the metabolic intermediates controlling creatine-dependent thermogenesis; identify the composition of the creatine-dependent thermogenic protein complex; determine the role of thermogenic effectors on combating obesity; and identify the role of creatine in tumorigenesis. His lab is currently supported by CIHR, NSERC, CFI and the Terry Fox Research Institute.

LUKE MCCAFFREY, PhD, is an Associate Professor with the Department of Oncology, an Associate Member of the Departments of Medicine and Oncology, Division of Experimental Medicine and a member of the Goodman Cancer Research Centre. Professor McCaffrey completed his Doctorate in Pharmacology at the University of Western Ontario in 2005. He then completed his post-doctorate work in the field of Cell Biology at the University of Virginia in 2010. Dr. McCaffrey began his career at McGill University as an Assistant Professor in 2010 with the Faculty of Medicine. Professor McCaffrey's laboratory studies how cell polarity controls epithelial morphogenesis, cancer progression and stem cell renewal. His team has two research areas: (1) epithelial morphogenesis and (2) tumor initiation, growth, invasion, and metastasis. The former examines development of epithelial tissues that line body surfaces, which requires the coordinated action of several cellular processes, including proliferation, apoptosis, directed cell motility, stem cell renewal, and differentiation. In this context, Dr. McCaffrey's group focuses mainly on the epithelium of the mammary gland. The latter explores the accumulating evidence that demonstrates a common characteristic of malignant transformation is the loss of epithelial polarity and organization. Dr. McCaffrey has built a network of collaborations with pathologists, clinicians, computational biologists and bioengineers to understand how epithelial polarity is disrupted in breast and ovarian cancer progression and how the physical properties of the microenvironment affect this process.

WILLIAM MULLER, PhD, FRSC, is a Professor in the Department of Biochemistry and a member of Goodman Cancer Research Centre. Dr. Muller completed his Doctorate in 1986 in Microbiology & Immunology at McGill University. He completed his post-doctoral fellowship in the field of Microbiology at Harvard Medical School in 1989. Among his many awards, Dr. Muller has been awarded the Canada Research Chair in Molecular Oncology a total of three times. He was made a Fellow of the Royal Society of Canada in 2011. Dr. Muller's laboratory focuses on the area of mouse models of breast cancer progression and the role of the epidermal growth factor receptor (EGFR) family of receptor tyrosine kinases in the induction of breast cancer. Dr. Muller is a pioneer in the field of genetically engineered mouse models (GEMMs) of cancer,

having developed one of the first GEMM of breast cancer in 1988 and subsequently establishing numerous models that remain widely used by the field. The major focus of Dr. Muller's team is to determine the relative contribution of the various EGFR family members and their coupled signaling pathways in mammary tumour progression induced by the oncogene ErbB2/HER2, which is the driver of ~20% of all human breast cancers as well as significant proportions of other cancers including gastric and lung malignancies. The results of these biochemical and genetic analyses will provide important insight into the molecular basis for ErbB2-induced tumorigenesis and metastasis. A major focus of Dr. Muller's group has been functional interactions between ErbB2 and cell surface receptors known as integrins, which mediate cell interaction with the microenvironment by binding to the extracellular matrix. He has identified essential roles for several integrins and associated intracellular signaling proteins in mammary tumorigenesis. Dr. Muller's more recent research interests include the regulation of epigenetic pathways and metabolism by ErbB2 signaling networks.

ALAIN NEPVEU, PhD, is a Professor with the Departments of Medicine (Division of Experimental Medicine) and Oncology and Biochemistry as well as a member of the Goodman Cancer Research Centre. Dr. Nepveu completed his Doctorate in Microbiology at the Université de Sherbrooke in 1984 and his Post-Doctoral Fellowship in Biochemistry at State University, New York - Stony Brook in 1987. Professor Nepveu's laboratory is interested in the regulation of transcription and the DNA damage response in mammalian cells. His team investigates how changes in transcriptional regulation can contribute to the initiation and progression of cancer and how processes that maintain genomic integrity in normal cells are utilized by cancer cells to increase genetic instability. A long-standing research interest of Dr. Nepveu's group has been the transcription factor and DNA repair regulator CUX1, Currently, Dr. Nepveu's lab is in the process of identifying drugs that inhibit the DNA repair functions of CUX1 with the aim of developing these drugs as anti-tumour agents that may sensitize cancer cells to DNA-damaging chemotherapy.

ARNIM PAUSE, PhD, is a Professor with the Department of Biochemistry and a member of Goodman Cancer Research Centre. Dr. Pause completed his Doctorate in Biochemistry and Molecular Biology at McGill University in 1994. He completed his post-doctoral Fellowship in Biochemistry, Molecular Biology and Cancer Research at the National Institutes of Health in 1997. As a graduate student in Dr. Nahum Sonenberg's lab, Dr. Pause identified the tumour suppressive EIF4EBP proteins, which are now widely studied. Since beginning at McGill in 2003, Dr. Pause has received several awards including, most recently, a Canada Research Chair in Molecular Oncology (Tier 2). Dr. Pause's lab has two main research interests: (1) The functional characterization of the metabolic regulatory network centered on FLCN and AMPK in cancer; and (2) The role of components of the ESCRT complex, which regulates vesicular trafficking in cells, in cancer. His group discovered the tumour suppressive properties of FLCN in a hereditary cancer syndrome (Birt-Hogg-Dube syndrome). Currently he uses a combination of in vivo models, including *C. elegans* and mouse models, as well as patient-derived models and cell lines, to study metabolic sensing and cellular trafficking networks in the progression of various human cancers.

JERRY PELLETIER, PhD, FRSC, is a James McGill Professor in the Departments of Biochemistry and Oncology at McGill University and a member of the Goodman Cancer Research Center. Dr. Pelletier was made a Fellow with the Royal Society of Canada in 2017. Dr. Pelletier received his Ph.D. from McGill University under Dr. Nahum Sonenberg in 1988. He trained as a post-doctoral fellow with Dr. David Housman at the MIT Center for Cancer Research from 1988-1991. He joined McGill University in 1991 and was promoted to full professor in 2002. Dr. Pelletier's lab focuses on defining mRNA structure/function relationships and how this impacts on gene expression in normal and pathological settings. He has a specific interest in the regulation of protein

synthesis, or mRNA translation, which is a fundamental process integral to cellular proteostasis with most regulation imposed at the level of initiation. Dr. Pelletier's laboratory uses chemical biology, RNAi screening technology, tractable mouse cancer models, and CRISPR-based precise genome engineering to probe and target various aspects of translation initiation in specific settings, including identification of cis-regulatory signals and characterization of trans-acting factors that govern this process, which is vital to understanding both normal and abnormal cell survival, differentiation, and proliferation. The lab's current efforts are exploring the role of mRNA translation in tumor maintenance and cell death mechanisms and characterizing their impact on treatment response. Dr. Pelletier's research program includes the pre-clinical development of several novel and unique inhibitors of mRNA translation initiation which have shown promise as potential cancer therapeutics.

DANIELA QUAIL, PhD, is an Assistant Professor with the Department of Physiology and member of the Goodman Cancer Research Centre. She completed a B.Sc. and Ph.D. at the University of Western Ontario, and a postdoctoral fellowship at Memorial Sloan Kettering Cancer Center in New York. She joined McGill in August 2017 and currently holds a Tier 2 Canada Research Chair in Tumour Microenvironment. Dr. Quail's laboratory is focused on the role of the tumour microenvironment during cancer progression, with a specific interest in tumour immunology and immunometabolism. Her team is investigating 3 major themes: (1) How do chronic inflammatory conditions, such as obesity, promote cancer progression? (2) What shapes the immune landscape in tumors, and how does this dictate response to therapy? (3) How does the microenvironment affect tumor progression within an immune privileged tissue, such as brain? To study the tumour microenvironment, her team uses cutting edge techniques such as highly-multiplexed imaging mass cytometry, intravital microscopy, single cell sequencing, and genetically engineered in vivo models. She is the manager of SCIMAP (Single Cell Imaging Mass Cytometry and Analysis Platform), which will become one of the innovation platforms of the McGill Cancer Institute.

PETER SIEGEL, PhD, is a Professor at the Departments of Medicine, Biochemistry, and Anatomy and Cell Biology and a former Associate Director and Interim Director of the Goodman Cancer Research Centre. Dr. Siegel currently leads the TFRI Program Project Grant in Targeting Metabolic Vulnerabilities in Cancer. He received his Doctorate in 1999 from the Department of Biology at McMaster University in Dr. William J. Muller's laboratory, where he studied the oncogenic activation of the Neu/ErbB2 receptor tyrosine kinase using transgenic mouse models. Dr. Siegel received his post-doctoral training (1999-2003) in Joan Massague's laboratory at the Memorial Sloan-Kettering Cancer Centre in New York City. Dr. Siegel's laboratory is focused on elucidating the cellular and molecular mechanisms that promote cancer metastasis, which is the deadliest aspect of the disease. His research program can be divided into three broad themes: the first is the identification of key tumor cell intrinsic molecules, signalling pathways and metabolic strategies that enable cancer cells to migrate, invade and metastasize. The second theme investigates the interactions between cancer cells and the primary and metastatic microenvironments in which they grow. The immediate tumor microenvironment includes the extracellular matrix components, resident parenchymal cells that comprise different organs/tissues and the infiltrating innate and adaptive immune cells, all of which influence the growth and spread of cancer cells. This theme includes Dr. Siegel's innovative studies of metastatic tropism, whereby particular cancer types metastasize to specific organs, an area where he has developed many important model systems and made key discoveries. His third research theme focuses on how these key molecules; pathways or tumor/stromal interactions can be targeted therapeutically.

NAHUM SONENBERG, PhD, OC, FRS, FRSC, is a Professor in the Department of Biochemistry, holds the Gilman Cheney Chair in Biochemistry and is a member of the Goodman Cancer Research Centre. Dr. Sonenberg received his Doctorate in 1976 from the Weizmann Institute of Science. Among the highlights of Dr. Sonenberg's numerous awards and recognitions include induction as an Officer of the Order of Canada in 2010, a Fellow of the Royal Society of London (UK) in 2006 and the Royal Society of Canada in 1992. Further, he is a recipient of the Wolf Prize (), the Prix du Quebec Wilder-Penfield (), Robert L. Noble Prize (2002), the Killam Prize for Health Sciences (2005), the McLaughlin Medal (2013) and the Canadian Cancer Research Alliance Award for Outstanding Achievements in Cancer Research (2015). Dr. Sonenberg's primary research has been on the translational control of protein synthesis. Notably, he discovered the mRNA 5' cap-binding protein, eIF4E, the rate-limiting component of the eukaryotic translation apparatus, and discovered the regulation of eIF4E by the eIF4EBPs. In addition, he has helped to decipher the roles of various other proteins involved in translation including the roles of other subunits of eIF4F (of which eIF4E is a member) Dr. Sonenberg also discovered the internal ribosome entry site (IRES) mode of translation, the cap-independent initiation of translation, which is critical for some mRNAs involved in stress, cell cycling and apoptosis and is used by many viral RNAs. His work in fundamental science has had immense impact on the study of cancer and has led to many efforts to therapeutically target translation initiation in cancer. Recently, he has expanded his research into a range of other topics such as oncolytic viruses as anti-cancer drugs, microRNA-mediated control of translation, and translational control of synaptic plasticity, learning and memory, including in disease states such as autism. He has trained many leaders in the field, some of whom have gone on to have successful careers at McGill and are current members or associate members of the GCRC.

JOSE TEODORO, PhD, is a Professor in the Department of Biochemistry and a member of the Goodman Cancer Research Centre. Dr. Teodoro received his Ph.D. from McGill in Biochemistry in 1994. He continued his postdoctoral studies at the University of Massachusetts in the Gene Function and Expression program, where he became an expert in virology. Dr. Teodoro's lab has a broad interest in identifying molecular pathways that limit tumour growth and delineating the mechanisms by which they become subverted in cancer. Towards this goal, his team is studying two distinct processes: (1) The Role of the p53 Tumour Suppressor in Inhibiting Angiogenesis; and (2) Viral Mechanisms of Tumour Cell Destruction. The former relates to understanding how tumors become vascularized and the mechanisms that can limit this process, some of which involve the known tumour suppressor protein p53. The latter theme is focussed on discovering the mechanisms by which viruses can affect the molecular machinery mediating cellular proliferation and trigger cancer cell death and how this could potentially lead to novel pathways that can be exploited for therapy.

MICHEL TREMBLAY PhD, CQ, FRSC, is a Professor in the Department of Biochemistry and a member and former Director of the Goodman Cancer Research Centre. Dr. Tremblay received his doctorate in Virology from McMaster University in 1988. He continued with his post-doctoral studies in the fields of molecular genetics as well as mammalian genetics and development at the National Institute of Child Health & Human Development until 1992, when he began his career at McGill University. Among his awards and distinctions are Fellowship of the Royal Society of Canada, awarded in 2006, Chevalier de l'Ordre du Quebec (2015), the Robert L. Noble Award from CCS and the McLaughlin medal of the RSC. Dr. Tremblay's lab focuses on protein tyrosine phosphatases (PTPases), which regulate many cellular signaling pathways and play essential roles in many biological and pathological processes. To date, his lab has successfully shown that PTPases play key roles in diabetes, obesity, spinal cord injury and infectious diseases as well as in diverse cancers. Dr.

Tremblay's work is leading to the development of new treatments for a broad range of human diseases. Among his other research interests are cancer immunotherapy, in which context he has identified important roles for phosphatases in immune cells, as well as stem cell biology and regenerative medicine. He currently serves as the director of the McGill Regenerative Medicine (MRM) network, which coordinates the research activities of investigators working in this area at McGill.

LOGAN WALSH, PhD, is an Assistant Professor at the Department of Human Genetics and a member of the Goodman Cancer Research Centre (GCRC), where he is also the inaugural Rosalind Goodman Chair in Lung Cancer Research. He completed his Doctorate in Biology, Oncology and Cancer Biology at the University of Western Ontario in 2010. He continued with his Post-Doctoral training at the Memorial Sloan-Kettering Cancer Center in Human Oncology and Pathogenesis until his arrival at McGill University in 2017. As a post-doctoral fellow, he was involved in seminal studies of immunogenomics and biomarkers of immune checkpoint inhibitor efficacy. His lab currently focuses on using translational genetics and immunogenomics to develop personalized medicine strategies involving immunotherapy in cancer. This includes the development of patient-derived models of lung cancer and the application of integrative experimental and bioinformatics approaches to identify novel therapeutic targets. With a rare combination of experimental biology and bioinformatics expertise, Dr. Walsh is ideally positioned to lead translational research programs involving fundamental scientists, computational scientists and clinicians. He is currently a leader within the Lung Cancer Network established at McGill in 2018.

IAN WATSON, PhD, is an Assistant Professor in the Department of Biochemistry and a member of the Goodman Cancer Research Centre. Dr. Watson received his Doctorate in 2010 in the field of Laboratory Medicine and Pathobiology at the University of Toronto. He completed his Post-Doctoral fellowship in Genomic Medicine (Division of Cancer Medicine) in 2014 at M. D. Anderson Cancer Center. Dr. Watson began at McGill University in 2015 where he was awarded a Tier II Canada Research Chair in Melanoma Genomics in 2016. For the past four years, Dr. Watson has led many multi-institutional collaborations including The Cancer Genome Atlas (TCGA) project to characterize the melanoma genome and perform integrative analysis with multiple data platforms at the DNA, RNA, and protein levels. His work has identified novel significantly mutated genes in melanomas and established a framework for genomic classification of melanoma into four subtypes, a system which is being implemented in the clinic with important implications for prognosis and therapy. To improve on the current diagnostic and treatment modalities employed in the clinic, Dr. Watson's lab aims to functionally characterize novel significantly mutated genes in melanoma, to develop new approaches to target melanomas lacking the frequently observed BRAF and RAS hotspot mutations and to determine the mechanisms mediating response and resistance to MAPK-targeted and immunotherapies in melanoma. To tackle these problems, Dr. Watson's lab employs computational approaches, in vivo models and biochemical techniques studying patient samples, cell lines, and melanoma mouse models. Dr. Watson's research has been supported by CIHR, the Melanoma Research Alliance and the V Foundation.

YOJIRO YAMANAKA, PhD, is an Associate Professor in the Department of Human Genetics and a member of the Goodman Cancer Research Centre. Dr. Yamanaka received his Doctorate in 1997 in the field of Molecular Biology at Osaka University. He completed his post-doctoral Fellowship in 2005 at the Samuel Lunenfeld Research Institute. Dr. Yamanaka began his career at McGill with the Department of Human Genetics in 2007. Dr. Yamanaka's research is focused on epithelial morphogenesis in early mammalian development and ES cells. Disruption of epithelia underlies the genesis of various diseases including cancer, where disorganization of tissue structures is a hallmark of malignancy and often results in

invasion and metastasis. Thus, understanding how an epithelium is generated and maintained provides the foundation to understand how diseases like cancer are initiated and progress. Dr. Yamanaka uses the early mouse embryo as a model to study epithelial morphogenesis in an in vivo 3D environment. Using live imaging techniques and cutting edge genetics approaches including CRISPR/Cas9-based genome editing, his lab analyzes dynamic cellular and molecular activities in individual cells during morphogenesis in developing mouse embryos and embryonic stem cells. Dr. Yamanaka's laboratory has also made great strides in studies on ovarian cancer development and progression, including the development of unique in vivo models of ovarian cancer. Over the past year, he has been awarded several substantial grants from both the Canadian Cancer Society Research Institute and the Cancer Research Society.

XIANG-JIAO YANG, PhD, is a Professor in the Department of Medicine, Division of Experimental Medicine and a member of the Goodman Cancer Research Centre. Dr. Yang received his Doctorate in the field of Biochemistry in 1990 at the Shanghai Institute of Biochemistry. He completed his post-doctoral Fellowship 1994 at the National Health Institute. Dr. Yang began his career at McGill University with the Department of Medicine in 1997. In 2002, he was the recipient of the Harold E. Johns Award from the National Cancer Institute of Canada. Dr. Yang's laboratory focuses on the molecular and epigenetic basis of cancer, stem cells and animal development, especially about how cell signaling regulates chromatin modification, gene expression, and other events in the nucleus. His research program is mainly divided into the following three parts: (1) Characterization of histone acetyltransferases, enzymes that activate gene expression; (2) Function and regulation of histone deacetylases, which repress gene expression; and (3) Post-translational modifications of proteins involved in cell differentiation and reprogramming. Dr. Yang is a current recipient of a Canadian Institutes of Health Research (CIHR) grant to study the roles of the chromatin regulator Brpf1 in mouse embryogenesis and hematopoietic stem cells.

GEORGE ZOGOPOULOS, MD, PhD, FRCSC, FACS, is an Associate Professor with the Department of Surgery and a member of the Goodman Cancer Research Centre. Dr. Zogopoulos received his Ph.D. in Experimental Medicine at McGill University in 1998. He continued in his studies to complete his Doctorate in Medicine at the University of Toronto in 2002. Dr. Zogopoulos completed his first Fellowship as a Resident of the General Surgery/Clinician Investigator Program at the University of Toronto in 2009, his second Fellowship (Research) in the field of Cancer Genetics at the Samuel Lunenfeld Research Institute of Mount Sinai Hospital in 2009 and his final Fellowship (Clinical) in the field of Hepato-Pancreato-Biliary Surgery and Abdominal Organ Transplantation at the University of Toronto in 2011. He began his career at McGill University in 2011. Dr. Zogopoulos conducts a translational research program in pancreatic cancer, focused on elucidating the genetics of pancreatic cancer, investigating the therapeutic sensitivities of subsets of pancreatic cancer, translating these findings to clinical care, developing genetic and clinical screening strategies for individuals at a high life-time risk for pancreatic cancer, and establishing surgical treatment strategies for locally advanced pancreatic cancer. To pursue these research goals, Dr. Zogopoulos established a prospective clinic-based research registry for patients with pancreatic cancer and related conditions (the Quebec Pancreas Cancer Study), with an accompanying biospecimen repository and a patient-derived pancreatic cancer mouse xenograft program. His clinical interests include the surgical treatment of pancreatic, biliary and hepatic malignancies as well as abdominal organ transplantation. Dr. Zogopoulos is a recent recipient of two very substantial grants from the Terry Fox Research Institute and the National Pancreas Foundation respectively to study *enhanced pancreatic cancer profiling for individualized care* (EPPIC).

Proposed Associate Members

TAL ARBEL, PhD, Eng., is a Professor at the Department of Electrical and Computer Engineering, a member of the Quebec Order of Engineers and an Associate Member of the Goodman Cancer Research Centre. Dr. Arbel received her PhD in 2000 at McGill University in the field of Computer Science. Her PhD thesis on object recognition using entropy maps was awarded the D.W. Ambridge Prize for the best dissertation in Physical Sciences and Engineering at McGill University. Beginning at the Montreal Neurological Hospital Dr. Arbel developed ground-breaking computer vision methods, initially for neurology and neurosurgery. She subsequently developed an interest in applying these methods to detect tumours and other lesions in brain images. Dr. Arbel joined the Department of Electrical and Computer Engineering in 2001, building a research program aimed at developing algorithms to interpret medical images, which are used to assist in drug discovery and diagnostics, graphical models for pathology in large datasets of patient images, models for computational neuroanatomy and software for image-guided neurosurgery. She has also worked on facial attribute classification and labelling in real-world videos. Dr. Arbel leads the Probabilistic Vision Group, which is part of the Centre for Intelligent Machines, and is an Associate Member of the Montreal Institute for Learning Algorithms (MILA). Her recent work looks to use deep learning in medical image analysis. Her research is supported by grants from the FRQNT, NSERC and the International Progressive MS Alliance.

GUILLAUME BOURQUE, PhD, is a Professor in the Department of Human Genetics, the Director of the McGill University and Genome Quebec Innovation Centre, McGill University, Canadian Center for Computational Genomics and an Associate member of the Goodman Cancer Research Centre. He is also a Principal Investigator with the Institute for the Advanced Study of Human Biology (ASHBi), Faculty of Medicine, Kyoto. Dr. Bourque received his doctorate at the University of Southern California in the field of Applied Mathematics in 2002. He completed his post-doctoral Fellowship in Applied Mathematics at the Université de Montréal in 2004. Dr. Bourque began his career at McGill in 2010 as an Associate professor in the Department of Human Genetics. He is a member of the Research Advisory Board of CIHR's Institute of Genetics, the Research Advisory Council of Compute Canada (the national platform for high-performance computing), CANARIE (responsible for Canada's ultra-fast network backbone) and is on the External Consultant Panel of ENCODE. He leads the Canadian Center for Computational Genomics (C3G), a Genome Canada bioinformatics platform, and the McGill initiative in Computational Medicine (MiCM). He is also the head of the Epigenomics Mapping Center at McGill, a project that oversees data generation and processing as part of the Canadian Epigenetics, Environment and Health Research Consortium (CEEHRC), which is associated with the International Human Epigenome Consortium (IHEC). He is also the chair of the Integrative Analysis working group of IHEC, is responsible for the IHEC Data Portal and has undertaken genome-wide epigenetic analysis in a range of conditions. His research interests are in comparative and functional genomics and epigenomics with a special emphasis on applications of next-generation sequencing technologies.

ALBERTO CAMBROSIO, PhD, is a Professor in the Department of Social Studies of Medicine. He trained as a biologist at Universität Basel in Switzerland before coming to Quebec, where he completed a Masters in Environmental Sciences at Université de Sherbrooke and a Ph.D. in History and Socio-Politics of Science at Université de Montréal. He then completed post-doctoral training at Université du Québec à Montréal, then Université de Montréal and finally in the Science, Technology & Society Program at the

Massachusetts Institute of Technology (MIT). He joined the Department of Social Studies of Medicine at McGill in 1990, where he served as Chair from 2005 to 2016. Dr. Cambrosio's research interests focus on studies of innovation at the interfaces between the clinical, fundamental, and industrial (biotechnology and pharmaceutical industry) cancer research sectors. Specific areas of interest include analysis of "Genomics in Action" – public, academic, and commercial programs capitalizing on therapeutic insights offered by molecular genetics and genomics of cancer. He also uses advanced computational tools to characterize cancer research "metaknowledge" networks, to trace the development and interactions of research teams and collaborative networks, including multi-centre clinical trials, their topics of study and the landscape of institutions that host them, as well as fundamental and clinical technologies in cancer research. He has been an invited researcher/visiting professor at major foreign institutions including the University of Edinburgh, Sciences Po (Paris), Mines Paris-Tech, the Max-Planck Institute for the History of Science (Berlin), and the University of Cardiff. His research has been supported by major Canadian (CIHR, SSHRC, FRQSC, Genome Quebec) and foreign (French Cancer Research Institute) agencies.

DAVID DANKFORT, PhD, is an Associate Professor in the Department of Biology (Faculty of Science) and an Associate Member of the Goodman Cancer Research Centre. Dr. Dankfort completed his doctorate at McMaster University in the field of Molecular Biology, under the supervision of Dr. William Muller, in 1999. He completed his post-doctoral Fellowship at the UCSF Helen Diller Family Comprehensive Cancer Center, Department of Cellular and Molecular Pharmacology, University of California in 2005 and was appointed as an Assistant Professor in the Department of Biology at McGill (Faculty of Science) in 2008. Dr. Dankfort's lab uses the power of genetics, viral technologies and engineered mouse models to understand signaling by the Ras family of oncogenes and their downstream effectors in human lung cancer and malignant melanoma. His research aims to uncover mechanisms determining how Ras pathway activation can lead to either cancer, permanent growth arrest (senescence) or apoptotic cell death. Overall goals of his group are to: uncover genes that mediate progression to malignancy, determine how timing of tumour suppressor loss affects disease progression and determine if the cancer stem cell is the ultimate therapeutic target for disease treatment.

ALLEN EHRLICHER, PhD, is an Associate Professor in the Department of Bioengineering and an Associate Member of the Goodman Cancer Research Centre. Dr. Ehrlicher completed his Doctor Rerum Naturalium in the field of Physics at Universitat Leipzig in 2007. Between 2008 and 2013, Dr. Ehrlicher completed five post-doctoral Fellowships at Harvard University: three at Harvard Medical School in Nephrology, Translational Medicine as well as Hematology and Nephrology, one with the School of Engineering and Applied Sciences and a fifth with the Department of Physics. Dr. Ehrlicher began his career at McGill University in 2013 as an Assistant Professor with the Department of Bioengineering (Faculty of Engineering). Dr. Ehrlicher is interested in determining how biological systems convert chemical energy into active forces in precisely controlled ways, key aspects of the field of mechanobiology. By studying cellular processes, and recreating them *in vitro*, he investigates the specific molecular details of biological forces in normal and disease states, including cancer. He received a $12.5 million CFI grant (as a co-applicant) for the Integrated Quantitative Biosciences Initiative. He has also received many grants from the Canadian Institutes of Health Research for the study of mechano-transduction.

LORENZO FERRI, MD, PhD, is a Professor in the Departments of Surgery and Oncology. He is the David S. Mulder Chair in Surgery, a clinical scientist specializing in the management of complex malignancies of the foregut, and heads the McGill University Program in Upper GI Cancer. Dr. Ferri is also an Associate Member of the Goodman Cancer Research Centre. Dr. Ferri completed his MD in 1996 at McGill University

in Surgery. Between 1996 and 2005 Dr. Ferri completed five certificates in various surgical specializations from top-tier institutes throughout the World. He completed his Doctorate in 2008 at McGill University in Experimental Surgery. Dr. Ferri began his career at McGill in 2010 as an Associate Professor of Oncology. Dr Ferri has initiated numerous clinical programs and studies for esophageal cancer including: Novel combination chemotherapy regimens for neoadjuvant treatment of adenocarcinoma; Optimizing the palliation of metastatic disease; and extensive work into the investigation and optimization of outcomes after esophageal surgery. He is the first physician in Canada to introduce a novel technique of removing early cancers of the esophagus and stomach through endoscopic means and has been invited throughout North America to speak on this method. This clinical work is closely coupled to both translational and fundamental research in cancer-inflammation cross talk. In this context, Dr. Ferri has collaborated with Dr. Morag Park to establish a program in developing patient-derived models of upper GI cancers and is a member of the CRUK Grand Challenges team, with Dr. Park and external collaborators, examining the roles of inflammation in cancer. Dr. Ferri's work has been funded by several other agencies including the Canadian Institutes of Health Research and Canadian Cancer Society. One of his most recent discoveries highlighting the novel finding implicating Neutrophil Extracellular Traps in the metastatic process (Journal of Clinical Investigation – August 2013) was widely reported in the global lay media including National Public Radio, Australian Broadcasting Corporation, and Radio Canada.

ALEXANDER GREGORIEFF, PhD, is an Assistant Professor in the Department of Pathology and an Associate Member of the Goodman Cancer Research Centre. He completed his Doctorate in the field of Cell biology at Utrecht University in 2006. Dr. Gregorieff completed two post-doctoral Fellowships, the first was completed in 2008 at the Netherlands Acadamy of Sciences, Utrecht University and the second in 2015 at the Samuel Lunenfeld Research Institute of Mount Sinai Hospital. Dr. Gregorieff began his career at McGill University with the Department of Pathology in 2017. His current research interests stem from his doctoral thesis in the lab of Dr. Hans Clevers at Utrecht, where he studied the Wnt/Tcf pathway and its role in driving intestinal development and homeostasis. As a postdoctoral fellow in the lab of Dr. Jeff Wrana at the Lunenfeld-Tanenbaum Research Institute, Toronto, he determined the role of the Hippo signaling effector, Yap, in intestinal stem cells during regeneration and cancer initiation. Dr. Gregorieff's research goals are to study the role of the Hippo pathway in stromal cells during gut homeostasis and tumorigenesis and to dissect the signals underlying cellular plasticity of adult stem cells. To achieve these goals, he is currently developing a broad range of genetic tools including genetically engineered mouse models and organoid models.

DAVID JUNCKER, PhD, is a Professor and Department Chair of the Department of Biomedical Engineering as well as an Associate member of the Goodman Cancer Research Centre. Dr. Juncker completed his Doctorate in the field of Microfluidics at the Université de Neuchatel 2002. Between 2002 and 2005, Dr. Juncker completed three Fellowships – two with the IBM Zurich Research Laboratory (2004), and one with the Swiss Federal Institute of Technology (2005). Dr. Juncker began his career in 2005 as an Assistant Professor with the Department of Biomedical Engineering. His lab is exploring various facets of miniaturization and integration in biology and medicine, which includes the conception, engineering and utilization of novel micro and nanotechnologies for manipulating, stimulating and studying oligonucleotides, proteins, cells, and tissues. The research foci comprise the development of novel scalable antibody microarrays for protein profiling and their use for biomarker discovery and early diagnosis of disease such as cancer. These include but are not limited to self-powered lab-on-a-chip approaches for diagnostics at the point-of-care and low-cost thread-based devices for use in global health

applications; microfluidic probes for brain slice perfusion and single cell manipulation; and nanogradients for studying neuronal cell navigation. The research in Dr. Juncker's lab is highly collaborative, and it is highly interdisciplinary with undergraduate and graduate students, post-doctoral fellows and staff from all areas of Science and Engineering.

CHRISTOPHER MORAES, PhD, is an Assistant Professor in the Department of Chemical Engineering and an Associate Member of the Department of Biomedical Engineering and Goodman Cancer Research Centre. Dr. Moraes is also affiliated with The Research Institute of the McGill University Health Centre. He completed his Doctorate in Mechanical and Biomedical engineering at the University of Toronto in 2010. He continued in the field and completed a post-doctoral Fellowship at the University of Michigan in 2014. Dr. Moraes began his career at McGill University as an Assistant Professor in 2014 and has developed a research program analyzing tissue microenvironments, in which cells are subject to a variety of physical forces and chemical cues, in healthy and diseased states. An important aspect of his research is the design and construction of microtechnologies to probe the complex relationships between mechanics, materials, and biological function in engineered tissues. By creating precision tissue engineering tools and cell culture systems, his team gains insight into the physical mechanisms underlying cardiovascular, cancer and respiratory diseases, with the aim of applying this knowledge in designing the next generation of therapeutic discovery platforms.

JANUSZ RAK, MD, PhD, is a Professor in the Department of Pediatrics and an Associate member of the Departments of Biochemistry and Oncology as well as an Associate Member of the Goodman Cancer Research Centre. Dr. Rak completed his MD in General Medicine at the Medical Academy of Wroclaw, Poland, in 1980. He continued his studies and completed his Doctorate in the field of Tumor Biology and Experimental Therapy at the Polish Academy of Sciences in 1986. Dr. Rak completed two post-doctoral Fellowships – the first as a Fulbright scholar where he studied tumor biology at the Michigan Cancer Foundation (1990), and the second at the Sunnybrook and Women's College Health Sciences Centre in Toronto. Dr. Rak began his career at McGill University with the Department of Pediatrics as an Associate Professor in 2006. His laboratory seeks to understand the impact of oncogenic mutations on cancer-related cellular interactions and vascular events: angiogenesis, coagulopathy, metastasis. Dr. Rak analyses the impact of oncogenes on tissue factor (TF), a potent pro-coagulant, signaling and angiogenic regulator (present on cancer cells and microvesicles) and has become a world-renowned expert in the biology of exosomes, a class of extracellular vesicle that is frequently released by cancer cells and can mediate intercellular communication. He also studies the implications of vascular aging for antiangiogenic treatment of cancer in children. The objective of these efforts is to bring together the knowledge of intracellular oncogenesis and the events that occur in the tissue or systemic microenvironment, which controls the fate of cancer cells, their dormancy, tumour initiation and the ability to cause disease.

MARTIN RICHER, PhD, is an Assistant Professor in the Department of Microbiology & Immunology and an Associate member of the Goodman Cancer Research Centre. He completed his Doctorate in 2010 at the University of British Columbia in the field of Microbiology & Immunology. Dr. Richer continued his studies with a post-doctoral Fellowship in Microbiology & Immunology at the University of Iowa, which he completed in 2014. He began his career at McGill University in 2014 and has developed a research program examining effector and memory CD8 T cells in the immune response to intracellular pathogens, immunopathology and autoimmunity. He also studies the immune response to Zika virus infection, including the immune correlates of host protection from Zika virus infection and how viral evolution may allow Zika virus to counter the host immune response. Research in the Richer lab is

focused on understanding the role inflammatory cytokines play in the biology of both effector and memory CD8 T cells, with a view to devising strategies to improve vaccine design as well as the development of therapies aimed at preventing or treating chronic infection, autoimmune diseases and cancer.

KALEEM SIDDIQI, PhD, is a Professor in the School of Computer Science, a full member of McGill's Centre for Intelligent Machines and an Associate member of both the Department of Mathematics and Statistics and the Goodman Cancer Research Centre. Dr. Siddiqi received his Doctorate in electrical engineering from Brown University in 1995. Dr. Siddiqi completed his post-doctoral Fellowship in computer science at Yale University in 1998. He began his career at McGill University as an Assistant Professor with the School of Computer Science in 1998. Drawing on techniques from singularity theory, partial differential equations, geometric flows and graph theory, his lab group is broadly concerned with the problem of shape analysis in computational vision and medical imaging, with the aim of devising general purpose theories of shape for applications in biomedicine, robotics and industry. A key theme is the development of "generic" models, which support a notion of similarity between qualitatively similar shapes. In 2018, Dr. Siddiqi received a substantial NSERC Discovery Accelerator Supplement to support his ongoing research.

JONATHAN SPICER, MD, PhD, is an Assistant Professor of Surgery, a Dr. Ray Chiu Distinguished Scientist in Surgical Research, Program Director, Advanced Thoracic and Upper GI Surgical Oncology Fellowship, Rossy Cancer Network Lung Disease Site Leader, Director of the Thoracic Oncology Biobank and Associate member of the Goodman Cancer Research Centre. Dr. Spicer completed his MD at McGill University in 2005. He completed his surgical internship at the University of British Columbia in 2006 then returned to McGill University to complete his PhD in Experimental Surgery (2013). Dr. Spicer completed his training in Cardiothoracic Surgery at the world's largest cancer center – University of Texas, MD Anderson Cancer Center in Houston. His clinical interests focus on minimally invasive approaches to lung cancer as well as complex resections for advanced thoracic malignancies. He has paired his clinical focus with a comprehensive research program in cancer metastasis. His laboratory studies the link between inflammation and metastasis with a specific focus on the role of neutrophils in lung cancer metastasis and the role of neutrophil extracellular traps in surgical patients, as well as immunotherapy for locally advanced lung cancer where, with his colleagues, he has become a leader in clinical trials of checkpoint inhibitors in this disease. Dr. Spicer is also a key member of the Lung Cancer Network established at McGill in 2018, with Dr. Logan Walsh and colleagues from MUHC/MGH, the JGH and collaborators at CHUM.

Affiliate Members

Affiliate Members will include colleagues from outside McGill who have partnered with McGill faculty members and wish to be involved in pursuing the mission and goals of the new Institute. These individuals will be named after the inauguration of the Institute and will include one colleague from each Quebec University as well as colleagues from Canadian and international universities.

Other Members

Other categories of membership include: visiting member (a visiting scholar, appointed to the Institute

for a limited term), postdoctoral fellows, and student members. These categories will be populated once the Institute has been formed.

b. Proposed Process for Becoming a McGill Cancer Institute Member

Researchers, clinicians and educators at McGill University with a specific interest in cancer research will be invited to submit a CV and an application for membership to the new Institute. Applications will consist of a statement of intent, describing how individuals believe they can contribute to the goals of the new Institute, how the Institute can be of benefit to them, and how they view their accomplishments and proposed initiatives in cancer research. The new McGill Cancer Institute will welcome the membership of basic scientists, clinicians, educators and researchers and their integration into strong multidisciplinary research and training programs. Our goal is to continue cultivating these critically important interactions by opening Institute membership to the Faculties of Medicine, Sciences and Engineering or any other faculty where significant new advances in cancer research could be nurtured. Applications will be reviewed by a Membership Committee (described below and initially consisting of the proposed Director, the Associate Director and three senior members of the Institute), with the goal of ensuring broad representation across the entire spectrum of cancer research. Each level of membership will require specific commitments and benchmarks (e.g., time dedicated to research, publication and scholarly output; involvement in graduate programs), which will be reviewed on an annual basis. Institute members will also be expected to indicate their affiliation with the Institute on all grants, publications and other relevant documents.

c. Proposed Governance

The McGill Cancer Institute will be led by a Director, a Chief of Operations (COO) and a team of three Associate Directors who will be responsible for the "pillars" of the new Institute: research and scholarship, education and capacity-building, and community outreach and engagement. The MCI will create an Executive Committee to help oversee day-to-day operations of the Institute with the Director and COO as well as an external Advisory Board. Several additional committees will also be created in line with the mandate of the Institute. The proposed management structure is outlined in **Appendix H**, and the main responsibilities of each committee are described below.

Role of the Director of the McGill Cancer Institute

The Director of the McGill Cancer Institute will be responsible for the development of the "pillars" of the new Institute: research and scholarship, education and capacity-building, and community outreach and engagement. This mandate will be carried out through managing and working closely with the Chief of Operations (COO), the Institute Executive committee, the Director of Fundraising and a team of three Associate Directors (Graduate Studies, Research and Outreach/Development). By managing this team of Directors and administrative staff and by chairing the Executive Committee, Membership and Promotions Committees (described below and in Appendix H), the Director will implement the MCI's mission and

values and oversee its overall research, education and outreach programs, assuring that the MCI achieves its goals in each domain. The Director will represent the MCI in consultations and interactions related to scientific, educational, strategic planning, organization and policy with the Faculty of Medicine and other Faculties associated with the Institute, as well as at the University level and in national and international associations and collaborations. The Institute director will interface with the Scientific and Advisory Board(s) and report to the Vice Principal, Health Affairs and the Dean of the Faculty of Medicine.

Executive Committee

To ensure the effective governance of the Institute, an Executive Committee will be created to help implement the MCI's vision, mission and values and assure that it achieves its goals. The Executive Committee will also oversee the daily operations of the Institute and its subcommittees, guide strategic planning and budget development exercises and participate in the development of policies and procedures. This Executive Committee will consist of a Chair (Director of the Institute), the Chief of Operations, the three Associate Directors overseeing Research, Graduate Studies, and Community Outreach, a Scientific Director overseeing daily operations of the MCI Innovation Platforms and the Director of Administration responsible for Academic Affairs, Human Resources and Finance Administration. Regular meetings with members and associate members of the Institute will be held every 3 months to help ensure that faculty members' interests are adequately reflected in the mandate and operations of the Institute. Digital participation of off-site members will be made possible to stimulate their interest in the administration of the Institute. Executive Committee membership will be made available to all members and to the McGill community via email and the Institute website.

External Advisory Board

The Institute will be guided by an External Advisory Board, chaired by the Dean (or delegate) of the Faculty of Medicine, which will help to promote the MCI's vision and advance its mission and provide an opportunity for discussion and a forum for the Director to seek advice. It will also provide an external/independent perspective on the Institute's operations, structure and function. The Advisory Board will consist of a Chair, 1-2 leading academics (external to McGill) with expertise in Cancer, 1-2 academics from the broader McGill community, 1-2 prominent members of the Montreal community with an expertise in Philanthropy, as well as a Director or Dean emeritus. The academic members of the External Advisory Board will be chosen to reflect the multidisciplinary nature of the research and training programs of the Institute. The Terms of Reference, including membership of the Advisory Board, will be made available to all members and to the McGill community via the Institute's website.

Scientific Advisory Board

Given that the Institute will work together closely with many educational units in the Faculty of Medicine and at McGill, an Advisory Board, consisting of key partners in the Faculty of Medicine (e.g., the Faculty Development Office) and at other Faculties of McGill (e.g., Faculty of Science; Faculty of Engineering and others as required) as well as prominent scientists from other national and

international cancer research centres, will be created. The Scientific Advisory Board, which will be chaired by the Director of the Institute, will be expected to provide valuable input regarding emerging trends and issues in cancer research as well as feedback regarding Institute priorities. The Terms of Reference, including membership of the Scientific Advisory Board, will be made available to the McGill community via email and the Institute's website.

Other Committees

Other committees will include a Research Committee, a Graduate Program Committee, a Platform/Core Oversight Committee, a Membership Committee, and a Promotions Committee.

Research Committee

The Research Committee will support the Institute in its promotion of research and scholarship across the continuum of cancer research. This committee will help to guide the research directions of the new Institute and the development of enhanced infrastructure support and resources for research activities. It will also help to oversee the creation of processes for scientific peer reviews and internal reviews of grants and manuscripts, devise strategies to enhance success in funding competitions, oversee the Institute's internal awards, advocate for cancer research and helping to shape the Institute's vision moving forward. The committee will consist of a Chair (Associate Director of Research), a Secretary, and 2-3 Institute members with appropriate experience and expertise.

Graduate Program Committee

The Graduate Program Committee will provide guidance in the creation of the MCI's graduate programs, beginning with design of the new Graduate Certificate Program and creation of the Master's program, and then the Ph.D. program a few years after the establishment of the Institute, all in collaboration with colleagues throughout the Faculty of Medicine as well as the Faculties of Science and Engineering, the School of Computer Science and the Centre for Intelligent Machines. The Graduate Program Committee will also help to develop and support new training initiatives, periodically review the content of the graduate programs to ensure that they are aligned with the most up-to-date knowledge and practices, identify relevant marketing strategies and oversee the selection of high-caliber candidates, ensuring that they acquire the necessary skills required to graduate. The committee will consist of a Chair (Associate Director of Graduate Studies), the Student Affairs Officer, 2 Senior and 2 Junior members as well as 3 off-site associate members with expertise in the development of Master's and PhD programs. We will also include a representative post-doctoral fellow and one of our Research Associates.

Membership Committee

The Membership Committee will be responsible for helping to identify and recruit new members, review membership applications, and monitor the status and contributions of Institute members. This

Committee, which will also advise the Executive Committee on membership issues, will consist of a Chair (the Director of the Institute), one Associate Director, and 2-3 members of the academic staff who have been selected by the Executive Committee to reflect the Institute's members' constituencies.

Promotions Committee

The Institute will follow the University's regulations related to the promotion of academic staff as outlined in the Regulations Relating to the Employment of Tenure Track and Tenured Academic Staff as well as the Regulations Relating to the Employment of Contract Academic Staff. The Institute will also follow the Faculty of Medicine's Academic Appointments and Promotions Policy (https://www.mcgill.ca/medicine-academic/promotion). The Promotions Committee will be chaired by the Institute Director and will include senior members of the Institute; where appropriate, joint Promotions Committees will be struck for the academic staff who hold joint appointments.

Platform/Core Oversight Committee

The Platform/Core Oversight Committee will monitor and assess the performance of the Institute's six Innovation Platforms, all of which are described in detail above (**Section IV**). This committee will be responsible for ensuring the financial sustainability and sound management of each platform, working closely with the six platform directors. It will also guide strategic planning and key decisions on matters including acquisition or upgrade of equipment and recruitment of staff as required. The Platform/Core Oversight Committee will be chaired by the Scientific Director of Cores and Platforms and will also consist of the Core/Platform Manager, the Associate Director of Research and 2-3 Institute members whose research involves extensive use of the Innovation Platforms.

VI – Strategic Positioning

The creation of the McGill Cancer Institute will help to distinguish the Faculty of Medicine and McGill University from peer institutions in many ways. Primarily, the Institute will present unique opportunities to advance fundamental and translational cancer research through deep integration of ideas and methodologies from multiple disciplines. The MCI will address key questions in its five research domains through applying the combined expertise of its members in the biomedical, physical and computer sciences, clinical oncology, engineering and mathematics, empowered by our technology and innovation platforms and working with innovative patient-derived models, samples and data. These factors will also create unique opportunities in training, allowing the MCI to offer to truly interdisciplinary, technology-driven and patient-centric programs that will equip trainees to become leaders in modern fundamental, translational and clinical cancer research. Such approaches are widely seen as integral to the future of research and training in the biomedical sciences. Well-coordinated and integrated research and training

programs that incorporate all the required elements are rare and difficult to achieve. Rather, most interdisciplinary projects involve at least some partners who must work to cross silos and barriers. McGill and the Faculty of Medicine are already firmly established as among the national leaders in cancer research and in training the next generation of researchers and clinicians. By allowing researchers of all relevant disciplines to be appointed to the same academic entity and permitting the establishment of stronger relationships with McGill's unique network of teaching hospitals, the McGill Cancer Institute will remove impediments to interdisciplinary cancer research and training. The MCI will create an open space for dialogue, debate, innovation and collaboration across the spectrum of cancer research among its members and with other Faculty of Medicine units as well as members of the Faculties of Science and Engineering, the McGill University and Genome Quebec Innovation Centre, the School of Computer Sciences and the Centre for Intelligent Machines. The convergence of research areas at the MCI will allow the recruitment of faculty members and trainees from previously untapped talent bases, allowing them to grow in exciting new research spaces. We will be able to attract, develop and retain future leaders in cancer research and significantly enhance the national and international profiles of McGill University and the Faculty of Medicine in this field. Therefore, in multiple ways, the creation of an Institute will increase our research productivity (as evidenced through success in funding applications, high impact publications, patents and novel drugs or therapies), elevate our status as a cutting-edge institution for training and advance our global leadership.

a. Importance to McGill University

The mission of the McGill Cancer Institute has important parallels with that of the overall mission of the University, which has at its core: "the advancement of learning and the creation and dissemination of knowledge, by offering the best possible education, by carrying out research and scholarly activities judged to be excellent by the highest international standards, and by providing service to society." Knowledge creation, research and scholarly activities will also be central to the mission of the MCI. Given the exceptional performance and high international standing of the proposed members of the MCI, we are confident that the research and scholarly activities of the institute will be at the cutting edge of cancer research, substantially advancing fundamental and clinical knowledge of cancer and garnering significant international recognition. Major discoveries developing from our research program will fulfill McGill's objective of creating knowledge, which we will disseminate through our knowledge translation, training and public outreach initiatives. The ability of the MCI to contribute to McGill's goal of offering the best possible education will be strongly enhanced by institute status, as we will be able to offer our unique, interdisciplinary programs to graduate students.

The vision and mission of the new McGill Cancer Institute will also contribute directly to McGill's three academic mission themes: research, student life and learning, and community engagement. As discussed above, our dynamic, multidisciplinary research and training programs will contribute substantially to achieving each of the five objectives of McGill's Strategic Academic Plan. We will "*be open to the world*" and "*expand diversity*" through recruiting the most talented young researchers and training the brightest students and post-doctoral fellows, including many international faculty members and trainees. Our ressearchers have actively participated in efforts to increase the diversity of the scientific workforce and

break down barriers that hold back underrepresented groups, for example by hosting an annual "Young Women in Bio Day". Our large and growing network of international collaborations and interactions will also enhance McGill's openness to the world. These programs will continue to develop into the new MCI and we expect that they will expand significantly, leading to further initiatives promoting openness and diversity. As mentioned above, the MCI aims to position McGill as the national leader in interdisciplinary and patient-centric cancer research. This will reinforce McGill's reputation as a global leader and will contribute directly to the objectives to "*lead innovation*" and "*connect across disciplines and sectors*". The MCI also has clear and ambitious objectives in community building and public outreach, aiming to enhance academic exchange and professional development within McGill and across the broader academic community while also engaging with the public through such programs as our Public Forums, via traditional media outlets and social media and through frequent events aimed at disseminating information on and raising awareness of cancer research and treatment. In so doing, we will play an important role in fulfilling McGill's objective of "*connecting with our communities*".

b. Importance to the Faculty of Medicine

The mission of the Faculty of Medicine is "to educate future and current health care professionals and scientists based on the highest standards of excellence and principles of life-long learning, together with the pursuit of novel research and clinical innovation, to improve the health of individuals and populations worldwide". Our Faculty's mission statement is crafted to reflect the pillars of excellence and innovation from the diverse range of health and basic sciences that form our collective work. During the various consultations held to determine the future structure of the new McGill Cancer Institute (see **Section III**), there was enthusiastic support for its potential to be an interdisciplinary and inter-professional entity, able to cross departmental lines and the boundaries between disciplines and fields. The ability to provide an academic career pathway for cancer researchers from many disciplines spanning the biological, physical and computer sciences, engineering, mathematics and social sciences, to offer graduate courses in interdisciplinary cancer research to promising young fundamental scientists and MD-Ph.D. trainees with clinical expertise and the ability to efficiently translate discoveries and novel ideas from fundamental science to the clinic were also seen as important priorities and tangible reflections of our mission statement. Opportunities to collaborate and build broader programs involving other Departments, Institutes and Schools of the Faculty of Medicine are obvious and have been noted by leaders within those units (See **Appendix A**). This includes collaboration in research and in training the next generation of cancer researchers and clinicians, both of which are critical goals for the Faculty of Medicine.

Strong ties of our researchers with other leading Faculty of Medicine Departments and units involved in research and training in the field of cancer have been vital to the success of our programs. More specifically, the Departments of Biochemistry, Medicine, Oncology, Physiology, and Human Genetics, the Lady Davis Institute and Segal Cancer Centre at the Jewish General Hospital and the MUHC, with its associated Research Institute, have been integral partners of the GCRC. This is demonstrated by the extensive networks of jointly-funded research projects and co-authored papers involving cancer research members with investigators from all these Departments and Institutes. Tangible links are also provided

by the appointment of scientists from all these units as members and associate members of the new MCI. The fundamental and clinical research partnerships between these key McGill units have been formalized in cancer research consortia, networks and team grants including the Montreal Cancer Consortium/Marathon of Hope Network of Cancer Centres, Quebec Cancer Consortium, Stand Up to Cancer Canada Metastatic Breast Cancer Dream Team, Terry Fox New Frontiers Program Project Grant in Oncometabolism, CRUK Grand Challenges initiative, Lung Cancer and Melanoma Networks (see **Section IV**). Cancer investigators and partners at the Faculty of Medicine have also collaborated closely to build training programs in cancer research, notably the McGill Integrated Cancer Research Training Program as well as the EXMD635 course. The establishment of the new McGill Cancer Institute will reinforce these collaborations and partnerships by bringing a stronger multidisciplinary approach to joint research and training initiatives, consistent with the Institute's mandate and its consolidation of expertise from across the spectrum of cancer research. Institute status will confer the ability to establish closer links with McGill's hospital network, including the appointment of clinicians and clinician-scientists as members and associate members which will develop closer ties with the JGH/Segal Cancer Centre, the MUHC/Cedars Cancer Centre and the MGH. Such improved cooperation and deep connections will lead to better translation of multidisciplinary research at the McGill Cancer Institute into clinical trials and practice, facilitate the development of biobanks and clinical databases and bring the clinical and patient perspective directly to the Institute's training programs. Overall, the Institute will retain and strengthen the collaborations and connections with other vital cancer research intensive units within the Faculty of Medicine, while gaining the ability to act as a more effective partner with a stronger voice and enhanced ability to contribute to shared initiatives and achieve common goals.

c. Importance to other Faculties at McGill

Advances in research and scholarship that will result from the formation of the McGill Cancer Institute will have implications for all units involved in the fundamental and clinical investigation of cancer as well as training in these areas. The Faculty of Science as well as the Faculty of Engineering have close ties with many Departments within the Faculty of Medicine, including Biochemistry, Anatomy and Cell Biology, Human Genetics, Oncology and Physiology, that currently house a number of future Institute members. This extensive network of existing interactions will carry over to the MCI, with enhanced potential for further collaboration based on the interdisciplinary program of the new Institute. Additionally, many Faculties and units not traditionally associated with the biomedical sciences are now prominent within the area of cancer research, reflecting the growing importance of diverse fields to modern cancer research. Providing a dedicated academic and physical space in an institute to integrate the research and training activities of computational scientists, engineers and physicists active in cancer research, alongside biomedical researchers and clinicians, will be of immense benefit to Faculties currently housing these personnel. This would include the Department of Biology and School of Computer Science (Faculty of Science), the Departments of Bioengineering, Chemical Engineering and Computer and Electrical Engineering (Faculty of Engineering) and the Centre for Intelligent Machines (Interfaculty – Science and Engineering). Beyond these direct interactions involving the membership and associate membership of the Institute, the MCI will create further significant opportunities to connect across disciplines with members of diverse Faculties through collaboration, significantly enriching and supporting McGill's

educational and research communities. All these interactions have critical implications for McGill's competitiveness in a research funding landscape which is increasingly reflective of an overall shift towards inter-disciplinarity and large-scale collaborations. With the deep integration of diverse disciplines of cancer research and broader collaborations enabled by the MCI, we expect that the researchers involved will significantly bolster their opportunities and success in funding competitions as the Institute's plan is implemented.

d. Relationship with other Cancer Research Centres, Departments and Institutions outside McGill

The GCRC currently benefits from an extensive network of local, national and international partnerships (see **Section IV**). All Institute members collaborate extensively on an individual basis and as part of teams with investigators based at institutions outside McGill - in Montreal, nationally and internationally. This includes many co-authored publications and jointly held funding (**Appendix G**). Locally, our cancer researchers play a leadership role in major initiatives such as the consortia (Montreal Cancer Consortium (MCC) and Quebec Cancer Consortium for Novel Therapeutics and Biomarkers (QCC)), which involve numerous partners outside McGill, including the CHUM, Hôpital Maisonneuve-Rosemont, IRIC and a range of pharmaceutical companies. Nationally, major initiatives involving the GCRC include two Stand Up To Cancer Canada Dream Teams (Breast Cancer and Metastatic Breast Cancer), uniting investigators at the GCRC and other McGill units with partners at University of Toronto, UBC and the University of Alberta, and the Terry Fox New Frontiers Program Project Grant in Oncometabolism, which brings GCRC and LDI researchers together with partners at the University of Ottawa and the Van Andel Institute (Michigan, USA). Also described in **Section IV** are international team grants including the Cancer Research UK (CRUK) Grand Challenge, which involves GCRC, MUHC investigators and collaborators from the U.S., U.K. and Israel, as well as the Brain Tumour Funders' Collaborative (BTFC), a collaboration between GCRC, MNI and NKI (Netherlands)-based investigators. In addition, the GCRC has been successful in establishing public/private partnerships through various mechanisms including Strategic Innovation Fund – Stream 4 (SIF4), where we are a member of the initiative led by the Terry Fox MoH together with Imagia, a Montreal-based artificial intelligence (AI) company, and the Consortium Québécois sur la Découverte du Médicament (CQDM)-funded projects involving Montreal and BC biotech companies including NEOMED Institute and Aspect, respectively.

The MCI will benefit from forged close international links with leading cancer research institutes and centres including the Weizmann Institute (Rehovot, Israel; 8 collaborative exchanges between scientists, students and postdoctoral fellows) and Cancéropôle Lyon Auvergne Rhône-Alpes (CLARA – France; joint organization of meetings and other scientific exchanges). Our scientists have also played prominent roles in collaborative projects including the Natural Science Foundation of China (NSFC)/FRQS Research Program on Cancer Research and the Faculty of Medicine's collaboration with the RIKEN Institute (Japan). All these joint research projects, consortia and multi-institutional team grants will continue following the establishment of the McGill Cancer Institute. Moreover, we anticipate significantly increased opportunities for the new Institute to participate in national and international initiatives focused on interdisciplinary and translational cancer research. With increased autonomy, a professional and

supportive administrative structure and an enhanced profile conferred by Institute status, the MCI will strengthen relationships and establish new local, national and international partnerships involving stakeholders, policy makers and researchers across the spectrum of cancer-related disciplines.

e. Contributions to Cancer Research

In the last three years alone, our investigators have published over 400 articles in the most widely read and respected peer-reviewed journals. Collectively, their research articles have been cited over 330 000 times (lifetime), giving them an average h-index of 47. This group of scientists includes many winners of the most prestigious prizes, including the Wolfe Prize, Prix du Quebec – Wilder Penfield Prize, Killam Prize, Gairdner International Award, Grand Prix Scientifique of the Quebec Breast Cancer Foundation, Robert L. Noble Prize of the CCS and the McLaughlin Medal of the Royal Society of Canada, as well as 7 Fellows of the Royal Society of Canada and 2 Officers of the Order of Canada. Our scientific output has substantially shaped our knowledge of the fundamental biology of cancer and has led directly to new therapeutic and diagnostic approaches. As our knowledge of the complexity of cancer has grown, cancer researchers have increasingly shifted its approach towards patient-centric and multidisciplinary research to accelerate the development of effective personalized medicine for cancer. This is reflected in a network of collaborations across disciplines and in the recent diversification of our Associate membership, which now includes engineers and computational scientists as well as clinician-scientists. This collaborative, interdisciplinary approach will be at the heart of the proposed Institute, seeking to deepen our understanding of cancer biology and lead to new treatments by increasing and strengthening interactions across silos and disciplines. We therefore anticipate that the McGill Cancer Institute will take a leading role in the field of cancer research as it continues to be transformed by new technologies and approaches from the computational sciences (including AI), biomedical and chemical engineering, physics, mathematics and social sciences. The five specific research domains of focus for the MCI are not only reflective of our areas of scientific strength, but have been chosen to allow us to have maximum impact on developments in cancer research in both the short and long-term. Therefore, based on the current strength of the faculty who will become MCI members and associate members, the forward thinking of our strategic and scientific planning and our technological strength, the McGill Cancer Institute is poised to make major advances in the effort to understand cancer biology, develop optimal therapeutic strategies and rapidly translate them to the clinic.

f. Contributions to Training

Trainees, including graduate students and post-doctoral fellows, are essential to the life of any research unit, as they help create a collective obligation to ensure an environment modeling responsible, ethical research practices, respectful collegiality, and imaginative inquiry. Our contributions to the training of future leaders in cancer research have been highlighted throughout this proposal. The growing realization

that solutions to the major problems in cancer research will require integration of knowledge and approaches from many fields has spurred major initiatives aimed at building and strengthening interdisciplinary research and training programs. Giving the brightest young minds entering the field the best possible grounding in interdisciplinary approaches to cancer research is essential to ensure that future researchers in the academic, private sector and clinical settings are fully equipped to become leaders and innovators by taking advantage of the opportunities conferred by developments in technology and unprecedented amounts of data. With the structure of an Institute, our programs for graduate students, MD-Ph.D. students, post-doctoral fellows and medical residents will achieve this goal, giving trainees the opportunity to develop expertise in computational biology and "big data"-based approaches, biophysics and bioengineering, alongside molecular and cell biology and physiology as well as social sciences. The interdisciplinary ethos of our training programs will set them apart from those of most of our peer institutions, while ensuring that all learners participate in a collegial and collaborative environment that aims to pursue innovation and excellence in cancer research.

VII – Financial Resources: Available and Required

Present Status and Planned Strategy – Advancement

The Goodman Cancer Research Centre (GCRC) generates nearly $300,000 annually in revenue from endowments. These generous gifts from donors serve to support the Centre's research and operations. Furthermore, the GCRC has the capacity to generate $1.5 M bi-annually through the GCRC Gala – a formal dinner that hosts more than 800 guests in a large marquee set-up on McGill's Lower Campus. This is considered a premier charity event in the city and serves to both market the brand of the Centre in addition to providing an excellent vehicle for stable and predictable fundraising, which has grown steadily. The Gala has raised over $10.3 million since its inception in 2010, including endowments for the Centre, with a net profit from all Galas of $ 7.8 M. This has provided revenue for recruitment, research support, public outreach and administrative support. The 2020 Gala is projected to generate over $2 M net.

In addition, Défi Canderel has benefited immensely to our trainees, having raised over $7.5 M for the Goodman Cancer Research Centre over the past 30 years. The 2019 edition of the Défi Canderel is expected to bring in over $500,000 in net revenues this year and is used to support recruitment and training of the next generation of Cancer Researchers.

In 2019, McGill and the GCRC invested in building fundraising capacity for the larger Campaign for the Third Century. As such, the Faculty of Medicine has identified the GCRC as one of five priorities within the campaign framework. The overall goal within the Campaign is $80 M for the GCRC. This includes donations already collected plus anticipated revenues from the Gala and Défi Canderel. This figure is consistent with a recent benchmarking study of the GCRC undertaken by McKinsey as well as the vision and needs identified by GCRC leadership.

While these fundraising initiatives are ongoing, they are readily transferrable to the new McGill Cancer Institute. Indeed, one of the key outcomes of these campaigns will be to generate sufficient excitement and donor interest to support the operations of the new McGill Cancer Institute as well as kick-start infrastructure funding support for a physical expansion of the MCI from its initial location in the Cancer pavilion. This expansion is critical to the continued growth in scale and intensity of research output in McGill cancer research in addition to the creation of space for future clinical outputs.

VIII – Implementation Plan

It is hoped that this proposal will be approved by the spring of 2020 and that the new McGill Cancer Institute will be launched in June 2020. This implementation plan is, therefore, based on this timeline.

a. Phase 1 – Launch of the New Institute (May 2020 – April 2021)

Administrative

- Launch the new McGill Cancer Institute at the 10th Anniversary Donor Gala on June 4th 2020, with special invitations to past and current Centre donors, key partners at the University, and faculty members with an interest in cancer research and education.
- Define and confirm positions of Associate directors, Program Director and Chief Operating Officer (COO) of the new Institute.
- Recruit personnel to positions not yet filled within the MCI administrative structure (particularly the COO).
- Establish a business plan for each of the 6 Innovation Platforms with the goal of establishing and maintaining their sustainability.

Research-oriented

- Establish 5-6 Programs within the Institute with themes nucleating around the established Innovation Platforms, thereby aligning and regrouping membership to Programs within the Institute.
- Recruit two new tenure-track scientists (Ph.D. or MD-Ph.D.) with expertise and research interests in the relationship between cancer and metabolism, inflammation and immunity
- Recruit new off-site Associate members to the MCI from partnering programs and units at McGill, with an emphasis on building the interdisciplinary structure of the Institute (e.g. Chemistry, Engineering, Computer Sciences, Genomics, Social Studies of Medicine, clinicians, LDI, and others)
- Organize, structure and sponsor the 1st Bi-Annual MCI Townsend Symposium centered around inter-disciplinary cancer research in the biomedical and physical sciences, to be held in late spring 2021 to celebrate the one-year anniversary of the new Institute.

Community outreach

- Continue to secure philanthropic support for the new Institute and its diverse programs and activities including the Public Forums.
- Continue to develop an ongoing initiative to create a joint Canderel-sponsored training program with our partners at CHUM-RI focused on new post-doctoral recruits identified as future leaders.
- Outreach for philanthropic support to create new chair for new incoming Director of Institute.
- Establish the *Learning Initiative* to embed patients or patient delegates into trainee-initiated or other trainee-focused learning activities.

Training

- Hold yearly studentship and fellowship competitions (internal and recruitment awards). Develop and include a new category of award (Townsend-Lamarre awards) with increased stipend to trainees co-supervised by a member of the Centre and any of our off-site associate members to better integrate research projects and training in biomedical science and medicine with physics, bioinformatics, biomedical engineering and computer sciences
- Bolster existing collaborations with academic departments to establish an undergraduate cancer research stream program.
- Discuss the inclusion of available graduate courses with chairs of various academic Departments. These would serve as complementary courses in the new Graduate Certificate and Master's of Cancer Research programs of the Institute.
- Design a new 3 credit course (Special Topics in Cancer Research) to be included as a mandatory course in the Graduate Certificate and Master's/Ph.D. programs of the Institute (see **section IV**, Education and Capacity Building).
- Discuss and implement, with appropriate curriculum committees in the Faculty of Medicine and elsewhere in the University, the design and establishment of the Graduate Certificate and Master's/Ph.D. programs of the Institute. Obtain University approval for launch of the redesigned courses and the new Certificate and M.Sc. programs.

Phase 2 – Consolidation of the New McGill Cancer Institute (May 2021 – April 2022)

Administrative

- Recruit two new junior tenure-track investigators to the MCI, replacing retiring members
- Recruit new Associate Members to support the expanded research mission of the new Institute

Research-oriented

- Hold the 1st Bi-Annual MCI Townsend Symposium, centered on inter-disciplinary cancer research involving biomedical and physical sciences, in late spring 2021.

- Organize and hold a scientific Institute retreat in autumn 2021, with all full MCI members and associate members, to discuss the recruitment of the new Director of the Institute, to structure new young investigator recruitments to the MCI and to delineate future strategic directions.

Community outreach

- Outreach for philanthropic support for a new building with interdisciplinary space housing the new McGill Cancer Institute
- Outreach for philanthropic support to create a new chair for an incoming Director of the Institute

Training

- Hold annual studentship and fellowship competitions (internal and recruitment awards as well as Townsend trainees)
- Recruit the first post-doctoral fellows to undertake the joint Canderel new leaders training program with our partners at CHUM-RI focused on post-doctoral projects requiring teamwork and leadership
- Structure and submit a proposal for a new PhD program in cancer research to the University and the government

Phase 3 – Growth of the McGill Cancer Institute (May 2022 – April 2023)

Administrative

- Recruit two new young tenure-track investigators to the MCI, replacing retiring members. Undertake an active search for a new Director of the McGill Cancer Institute.

Research-oriented

- Organize, structure and sponsor the 2nd Bi-Annual MCI Townsend Symposium centered around inter-disciplinary cancer research involving the biomedical and physical sciences, to be held in late spring 2023 to celebrate the one-year anniversary of the new Institute

Community outreach

- Hold the 12th Anniversary Donor Gala in June 2022, with invitations to past and current Centre donors, key partners at the University, and faculty members with an interest in cancer research and education
- Outreach for philanthropic support for a new building housing the new McGill Cancer Institute
- Continue outreach for philanthropic support to create new chair for new incoming Director of Institute

Training

- Hold annual studentship and fellowship competitions (internal and recruitment awards as well as Townsend trainees)
- Welcome the first cohort of PhD graduate students in Cancer Research in the McGill Cancer Institute
- Recruit post-doctoral fellows to undertake the joint Canderel training program with our partners at CHUM-RI, focused on post-doctoral projects requiring teamwork and use of key scientific platforms.

IX – Conclusion

This proposal is the result of a significant amount of work by many dedicated individuals involved in cancer research, motivated by discussions with colleagues throughout the Faculty of Medicine, other McGill Faculties and key partners across Canada and internationally. This represents the culmination of a process of examination of the strengths and constraints and the desire to build a new vision that is forward-thinking and poised to capitalize on technological advances and the new possibilities created where once divergent fields now meet. It is in this space, where medicine and biomedical science are empowered by advanced computational techniques and new technologies from the world of engineering and the physical sciences, where the necessary advances in understanding and treating cancer will be made. The McGill Cancer Institute will be at the forefront of these new developments, bringing advanced fundamental sciences together and uniting them with clinical research in a "patient-centric" approach that develops and applies the most advanced technology to patient-derived models, large banks of clinical samples and data to establish new directions in personalized medicine for cancer. We have planned the McGill Cancer Institute in such a way as to maximize its potential for growth while building on the achievements and maintaining the established guiding principles. The consultation process leading up to the preparation of this application was rigorous and comprehensive, often marked by passionate debate, and it has led to a sense of excitement and engagement among colleagues throughout the Faculty of Medicine, many of whom are ready and willing to participate in the multidisciplinary research and training programs to be offered by the new McGill Cancer Institute.

The establishment of an Institute dedicated to multidisciplinary Cancer Research at McGill University comes at a critical time in the development of the field. The rapid growth of computational techniques incorporating artificial intelligence, including machine learning, and the application of biomedical and chemical engineering are poised to provide solutions to the major problems and challenges that have made cancer the leading cause of death in Canada and a scourge to public health around the world. Presently, McGill University and the Faculty of Medicine must adapt by integrating their existing areas of strength to create programs that will maintain leadership in cancer research. Together, we must also ensure that we can train the next generation of innovators and leaders who will be knowledgeable and adept in all the aspects of modern cancer research. As mentioned previously, the new Institute would be

among the leading sites in Canada where research and graduate studies in the field of cancer are undertaken with a truly interdisciplinary approach, moving beyond traditional departmental lines and disciplinary boundaries to create new knowledge, enable capacity-building, and promote knowledge translation. Importantly, the Institute would provide an interdisciplinary and inter-professional academic home for researchers from diverse fields, clinicians and clinician-scientists who are motivated to advance knowledge in cancer, enhance student learning, and improve health care. In fulfilling this mission, the new Institute would be a global leader in the field of cancer research and training. It would also be poised to attract the most talented new faculty members, clinicians, post-doctoral fellows, graduate and medical students who have an interest in pursuing cancer research and scholarship with a multidisciplinary approach in a dynamic, cutting edge environment at one of the world's great universities.

As discussed above, strengthening the Faculty of Medicine's position as a national and international leader in cancer research and training is in complete alignment with numerous strategic priorities of the Faculty of Medicine and the University. The general need to work effectively across faculty and departmental boundaries in both research and training is stressed very clearly in the strategic research and education plans of both. The new Institute will be instrumental in helping the Faculty and the University in attaining these objectives in the field of cancer. The proposal to establish the McGill Cancer Institute is therefore not only timely with respect to developments in this specific field but also in the context of the growth and future development of research, education and practice in Medicine at McGill.

Appendix A – Letters of Support:

Internal to McGill

Letter from Dr. Armen Aprikian, Professor, Department of Surgery/Urology; Head, Division of Urology, Department of Surgery; Director, Cancer Care Mission and Head, Department of Oncology, McGill University Health Centre; Urologist-in-Chief, McGill University Health Centre

Letter from Dr. Albert Berghuis, Chair Department of Biochemistry; Distinguished James McGill Professor, Departments of Biochemistry and Microbiology & Immunology

Letter from Dr. Eduardo Franco, Chair, Gerald Bronfman Department of Oncology; Minda de Gunzburg Chair in Oncology; James McGill Professor

Letter from Dr. David Juncker, Professor, Department Chair, Department of Biomedical Engineering; Principal Investigator, McGill University & Genome Quebec Innovation Centre

Letter from Dr. Jim Martin, Chair, Department of Medicine; Harry Webster Thorp Professor of Medicine; Physician-in-Chief, McGill University Health Centre.

Letter from Dr. Bruce Mazer, Executive Director/Chief Scientific Officer (CSO) of the Research Institute of the McGill University Health Centre (RI-MUHC) (Interim); Head of Child Health Research at the Montreal Children's Hospital (MCH) of the MUHC; Professor - Department of Pediatrics

Joint Letter from: 1) Dr. Rod McInnes, Director, Lady Davis Research Institute; Professor and Alva Chair in Human Genetics 2) Dr. Gerry Batist, Director, Segal Cancer Centre and McGill Centre for Translational Research in Cancer; Deputy Director and Senior Investigator, Lady Davis Institute, Jewish General Hospital; Minda de Gunzburg Professor of Oncology, and Professor of Medicine and 3) Dr. Josie Ursini-Siegel, Investigator, Lady Davis Institute; Associate Professor, Department of Oncology

Letter from Dr. Don Sheppard, Director, McGill Interdisciplinary Initiative in Infection and Immunity; Chair, Department of Microbiology & Immunology; Professor, Departments of Medicine, Microbiology & Immunology

Letter from Dr. Eric Shoubridge, James McGill Professor; Professor and Chair Human Genetics, Professor and Isaac Walton Killam Chair in Neurology and Neurosurgery; Investigator, MNI Rare Neurological Diseases and Neurodegenerative Diseases research groups

Letter from Dr. John White, Joseph Morley Drake Professor and Chair, Department of Physiology.

External to McGill

Letter from Dr. Francois Benard, Associate Dean, Research, BC Cancer Agency; Professor, Department of Radiology, UBC Faculty of Medicine

Letter from Dr. Michel Bouvier, Chief Executive Officer, IRIC; Principal Investigator, Molecular Pharmacology Research Unit, IRIC; Professor, Department of Biochemistry and Molecular Medicine, Faculty of Medicine, Université de Montréal

Letter from Dr. Joan Brugge, Director of the Ludwig Center and Louise Foote Pfeiffer Professor of Cell Biology, Harvard Medical School

Letter from Dr. Margaret Frame, Science Director, CRUK Edinburgh Centre; Director, MRC Institute of Genetics and Molecular Medicine (IGMM), University of Edinburgh (United Kingdom)

Letter from Dr. Anne-Marie Mes-Masson, Associate scientific director, Basic and translational research, CRCHUM; Full professor, Department of medicine, University of Montreal; Director, Cancer research network, FRQS

Letter from Dr. Ben Neel, Director, Laura and Isaac Perlmutter Cancer Center, Professor, Department of Medicine, NYU Langone Health

Letter from Dr. Brad Wouters, Senior Investigator, OICR; Executive Vice-President, Science and Research at University Health Network; Professor, Department of Radiation Oncology, University of Toronto

Letter from Dr. Armen Aprikian

Centre universitaire de santé McGill
McGill University Health Centre

Centre du cancer des Cèdres
Cedars Cancer Centre

Armen Aprikian
MD FRCS(C)
Chef, département d'oncologie
Directeur médical, Mission de soins pour le cancer
Titulaire de la chaire Richard Tomlinson pour la recherche en urologie
Director, Department of Oncology
Medical Director, Cancer Care Mission
Richard Tomlinson Chair for Urologic Research
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October 31, 2019

Morag Park, Ph.D, FRSC, FCAHS
Director, Goodman Cancer Research Centre
Diane and Sal Guerrera Chair in Cancer Genetics
James McGill Professor
Departments of Oncology, Biochemistry and Medicine
McGill University

Dear Dr. Park;

It is with great pleasure that I write to express my strongest support and enthusiasm for your plan to establish the McGill Cancer Institute. I enjoyed discussing this initiative with you recently and I am certain that it would be a significant and necessary step forward for cancer research and training at McGill, with important positive repercussions for enhanced clinical collaborations on large scale projects.

Fundamental and clinical research is absolutely essential to the activities and programs of the MUHC, the Faculty of Medicine and McGill University in the field of cancer. As Director of the Cancer Care Mission at the Cedars Cancer Centre and Fast Family Director of Oncology at the MUHC, I have made research one of our major priorities. Your proposal for the McGill Cancer Institute, which brings together faculty from many disciplines and departments to tackle the most critical questions in cancer research, is extremely timely and commendable. Rapidly occurring developments in cancer research are integrating technology from many different fields with large amounts of data from fundamental science as well as clinical data and large data sets of patient derived data. In this environment, research programs must evolve to include multidisciplinary approaches. As such, there is a clear need at McGill for an institute dedicated to multidisciplinary cancer research, with strong links to the hospitals and their Research Institutes as well as the Faculty of Medicine's research and teaching Departments. The McGill Cancer Institute will fulfill this need, serving as the dedicated academic and research base for a diverse network of biomedical, physical and computational scientists as well as clinician-scientists and engineers.

Over the years, many of our oncologists and pathologists from the Cedars Cancer Centre and throughout the MUHC have enjoyed numerous productive collaborations with GCRC scientists, while some MUHC clinician-scientists have also become associate GCRC members. Notably, the MUHC is also a key partner of the GCRC in several broader initiatives in cancer research, with other hospitals and institutes from McGill and elsewhere in Montreal. These include the Montreal Cancer Consortium, which is the Quebec pilot project of the Terry Fox Marathon of Hope Network of Cancer Centres, and

the MEI-funded Quebec Cancer Consortium for Novel Therapeutics and Biomarkers. The creation of the new institute is certain to catalyze the growth of this network of interactions. Integrating our clinical researchers into your dynamic program, through collaborations and Associate membership, will bring a multidisciplinary research perspective to clinical investigations at the Cedars Cancer Centre, while increasing the access of the new institute to vital clinical resources such as biobanks, many of which have been built in close collaboration with GCRC members, plus samples for the establishment of "living biobanks" of patient-derived cancer models and large amounts of crucial patient data. These resources will allow the Institute to get the most out of the suite of advanced technologies found in its Innovation Platforms and empower its computational medicine programs.

Overall, the close partnership of the Cedars Cancer Centre and the new Institute will greatly facilitate translational research in cancer at the Faculty of Medicine, establishing a path from the discovery of new therapeutic approaches through to clinical trials. As the MUHC's Urologist in Chief, I am particularly looking forward to the benefits of the new Institute for research in urologic cancers. I note that several of the future members of the Institute, and current GCRC members, have done outstanding work on the fundamental biology cancers of the genitourinary system, particularly prostate cancer. The establishment of the Institute would significantly advance fundamental and translational research into prostate cancer and other GU cancers by leveraging a unique assembly of new technologies and expertise and fostering collaborative teams of clinicians, clinician-scientists and laboratory-based researchers from previously disparate fields. The same approach will undoubtedly have substantial positive effects throughout the entire McGill oncology community.

A further area where the McGill Cancer Institute can have a major impact on the Faculty of Medicine, and on McGill University more broadly, is education and training. Like the GCRC, the MUHC is fully committed to excellence in training the next generation of leaders in cancer research, in line with the strategic plans of the Faculty of Medicine. We have cooperated on a number of very successful training initiatives in the past, particularly the McGill Integrated Cancer Research Training Program (MICRTP), which sought to provide graduate trainees in the biomedical sciences with broad-based training in the fundamental and clinical aspects of cancer research. The need to develop this approach, giving trainees knowledge and experience in a wide range of fields involved in cancer research, is greater now than ever before. Working together, I am certain that we can build on our past successes to create unique programs that will equip graduate trainees in fundamental cancer research, MD/Ph.D students and medical residents, via integration with the Clinician Investigator Program, with the knowledge and experience they need to become leaders in modern cancer research.

To conclude, I am very happy to provide my full endorsement of your proposals for the McGill Cancer Institute. Your plans have the potential to significantly strengthen cancer research and training programs at McGill's Faculty of Medicine, providing a multidisciplinary hub for collaborations and networks that will also maximize our collective potential to achieve clinical impact. I look forward to working with you during this transition and to establishing the strongest possible ties between the MUHC and the new Institute in order to benefit all of our clinicians, researchers, trainees and patients.

Sincerely yours,

Armen Aprikian, MD. FRCS(C)

Letter from Dr. Albert Berghuis

Department of Biochemistry
McGill University

Albert M. Berghuis, Ph.D.
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November 5, 2019

Morag Park, Ph.D, FRSC, FCAHS
Director, Goodman Cancer Research Centre
Diane and Sal Guerrera Chair in Cancer Genetics
James McGill Professor
Departments of Oncology, Biochemistry and Medicine
McGill University

Dear Morag:

I am delighted to provide you with this letter supporting your proposal to create a new Cancer Institute at McGill, building on the outstanding success of the Goodman Cancer Research Centre. Throughout the existence of the Centre, the Department of Biochemistry has been an extremely close and vital partner. As we have discussed, this partnership, which has been a major factor in the success of both the Department and the Centre will, of course, continue once the Goodman Cancer Research Centre moves to the next step to become a Cancer Institute.

The depth and scope of the network of interactions between the Department of Biochemistry and the new Institute are most obvious from the fact that 19 members of the GCRC, which are proposed members of the new Institute, are full members of the Department of Biochemistry. This is by far the largest overlap of the new Institute with any department and reflects the extent and importance of the current synergy between the Department of Biochemistry and the GCRC, which also includes joint research funding from all major agencies in Canada. The partnership formed between our two units through joint appointment of faculty members and associate members would be the basis for building a new and deeply collaborative relationship between the Department of Biochemistry and the Institute.

Cancer has always been a major research focus for many of our investigators. Like the GCRC and the new Institute, we are committed to cultivating partnerships and establishing new projects that cut across disciplines, bringing new perspectives and a range of technological approaches to key fundamental problems in cancer and beyond. We also recognize the importance of translating fundamental knowledge to the clinic to develop new therapeutic approaches that will improve patient outcomes. All of these key aspects of our research will be enhanced significantly by a new Institute, which will bring together a collaborative network of leaders from across McGill, including experts in the computer sciences and engineering as well as oncologists and clinician-scientists. The ability to collaborate closely and easily with these new Institute members will open new opportunities for all members of the Department of Biochemistry, regardless of whether they also become members of this Institute. The core technologies and Innovation Platforms of a Cancer Institute will be of great benefit to the Department of Biochemistry and to McGill-based researchers more broadly, providing access to unique, cutting edge technologies that accelerate research in many areas of the biomedical sciences. This also represents a continuation of our current partnership with the GCRC, including jointly operated platforms such as the Genetic Perturbation Service, which will become the McGill Platform for Cellular Perturbation. Overall, this network of interactions will drive innovative research into the molecular basis of cancer and build a pipeline for the translation of our cutting-edge fundamental research into the clinic.

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Importantly, education and training is another vital aspect of the relationship between the Department of Biochemistry and the GCRC. As so many of the GCRC's current members are appointed to our Department, we have considerable experience in working with you to train the leading young minds in cancer research. We have worked together in the past to create extremely successful programs for graduate students, including the McGill Integrated Cancer Research Training Program (MICRTP), as well as the current, very successful EXMD 635 course. We are looking forward to working with the new institute to develop new courses and training programs that go beyond the existing ones to include continued professional training, MD/PhD options as well as medical residency programs. As we have discussed recently, the Department of Biochemistry would continue to be a strong partner in these endeavours, with students enrolled in these programs having access to some of our outstanding courses, providing a solid grounding in key fundamental aspects of cancer research, while our trainees will also benefit from access to your innovative new training programs. The continuation of our collaborations in education and training also presents an opportunity to access new pools of students and fellows who can be brought into the Department of Biochemistry via the Institute, including those from diverse backgrounds such as engineering and computer science, who will be enticed by the Institute's exciting, multidisciplinary training programs in cancer research.

I look forward to continuing and strengthening the long-standing connections between the Department of Biochemistry and the GCRC and I express my strongest support for a new Cancer Institute. Together we will be able to create modern, high-impact research and training programs that will take advantage of the latest developments and to firmly establish McGill and the Faculty of Medicine among the world leaders in groundbreaking cancer research.

Sincerely,

Albert M. Berghuis, Ph.D.
Chair, Biochemistry Department
Distinguished James McGill Professor

Letter from Dr. Eduardo Franco

McGill | Faculty of Medicine | Faculté de médecine

Gerald Bronfman Department of Oncology
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October 28, 2019

Dr. David Eidelman
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Re: Support for a McGill-wide Cancer Institute

Dear Dr. Eidelman,

I hereby provide my strong support for the vision that our colleague, Dr Morag Park wishes to bring to the cancer research community at McGill. Her proposal for the creation of a virtual McGill Cancer Institute that brings together the many assets that the oncology community has on campus and across the city is commendable. It creates a stronger critical mass of researchers and resources than is presently available in the siloed structure of McGill's cancer research community. As a result, the opportunities to attract funding and retain talent will likely increase, making McGill more competitive.

Although I expect that the governance of such institute will be debated among the many stakeholders, the proposal has much merit and does not pose a threat to or diminish the stature of the different units at McGill and its teaching hospitals that are currently devoted to clinical practice, research, and education at all levels. As you would expect, our currently planned graduate program would benefit from this reorganization of assets under a McGill Cancer Institute. There are many areas of cooperation among this academic department and the cancer research centers affiliated with McGill, including the Goodman Cancer Centre and the Segal Cancer Centre. The vast majority of cancer researchers at McGill and all oncology clinicians are singly, jointly, or cross-appointed in this department. Therefore, a vibrant and interconnected academic community is already in place. Regarding the PGME programs under our responsibility, i.e., medical, radiation, and surgical oncology, they will greatly benefit from being associated with this hypothetical super-structure of a McGill Cancer Institute.

Respectfully yours,

E. Franco

Eduardo Franco

cc: Dr. Morag Park

Letter from Dr. David Juncker

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October 31st, 2019

Morag Park, Ph.D, FRSC, FCAHS
Director, Goodman Cancer Research Centre
Diane and Sal Guerrera Chair in Cancer Genetics
James McGill Professor
Departments of Oncology, Biochemistry and Medicine
McGill University

Dear Dr. Park,

It is my pleasure to write this letter of support for your upcoming initiative to create the McGill Cancer Institute. I am truly excited by the opportunities that will come from this development, building on the already extensive interactions of the Department of Biomedical Engineering (BME) with investigators currently at the Goodman Cancer Research Centre, as well as future institute members from other McGill departments. Formally uniting this diverse, collaborative network within the academic home of the McGill Cancer Institute will establish the Faculty of Medicine and the University as leaders in modern, multidisciplinary cancer research. Joint recruitment of faculty between the McGill Cancer Institute and partners including the BME Department will also deepen integration and strengthen the scientific programs of all stakeholders, while I will also encourage BME researchers to join the institute as Associate Members.

The BME Department is currently engaged in a range of important collaborations with groups at the GCRC that integrate our lab-on-a-chip, microfluidics and biosensor technologies with innovative cancer models, including patient-derived models that have been spearheaded by GCRC investigators. These projects have benefitted from joint funding from CFI (2015), under your leadership, and are yielding exciting results. I anticipate many more important opportunities to continue building our collective research capacity as part of your vision of a strong, multidisciplinary cancer research institute. Closer integration of biomedical engineering into the overall fundamental and translational cancer research landscape at McGill will benefit all parties involved, accelerating new discoveries, offering opportunities for new partnerships with the private sector and bringing innovative technology into the clinic. I am confident that this will ultimately lead to improvements in cancer diagnosis and treatment and better outcomes for patients.

As you know, the BME Department was also heavily involved in recent discussions to establish a new training program in multidisciplinary cancer research with the GCRC and colleagues from the Centre for Intelligent Machines and the Department of Engineering. Though this was not funded as an FRQS Centre, the partnership developed an important framework for future initiatives.

I was very pleased to hear from you recently that the multidisciplinary training programs we have been developing will be a major part of the new McGill Cancer Institute, including cutting edge programs for graduate students. Given the recent technological developments and particularly the growing importance of computational approaches in fundamental and clinical cancer research, I firmly believe that providing a solid grounding in a wide range of cancer-relevant fields is essential to allow McGill's research trainees and medical students to excel. This includes computer science, engineering and physics together with the disciplines of biology and medicine that are traditionally associated with cancer research. I welcome the opportunity to closely integrate the research and training expertise of the BME Department with the McGill Cancer Institute. For example, BME is currently developing a graduate program in Translational Biomedical Engineering, with the aim of training industry ready HQPs. This efforts could be expanded to encompass translational training programs pertinent to the Cancer Institute, such as regulatory approval, clinical studies and IP for cancer drugs. In any case, the courses will be accessible to trainees within the institute, while BME trainees could also benefit from access to other courses offered by the institute. I would also welcome the opportunity for BME and the McGill Cancer Institute to jointly develop and offer courses and programs in the future. Furthermore, multiple BME members are involved in an NSERC CREATE application on Machine Learning for Biomedical Data: From Molecules to Organisms that is supported by the GCRC, and that aims at integrating machine learning and artificial intelligence for health and disease management, and in particular cancer.

Going forward, we envision the joint recruitment of frontier researchers that are at the interface of biomedical engineering and cancer research and will benefit from the proximity of collaborative partners and cutting-edge facilities to promote cross sectional research and training programs. BME has developed strong ties to stakeholders in the private sector who have been instrumental in translation and innovation activities in our department and have led to several spin-offs and commercialization initiatives. Through our close integration within the institute, our researchers will continue to cultivate these ties and channel them to their partners at the McGill Cancer Institute.

To conclude, you have my unreserved support for the transition of the Goodman Cancer Research Centre to institute status. I am very happy to offer my endorsement and look forward to our future collaborations.

Sincerely,

David Juncker, Ph.D.
Professor and Chair

Letter from Dr. James Martin

James Martin, MD, DSc

Harry Webster Thorp Professor
Chair, Department of Medicine
McGill University

Professeur de médecine
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October 21, 2019

Morag Park, Ph.D, FRSC, FCAHS
Director, Goodman Cancer Research Centre
Diane and Sal Guerrera Chair in Cancer Genetics
James McGill Professor
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McGill University

Dear Morag,

I am writing to convey my enthusiastic support for the Goodman Cancer Research Centre's application to become the McGill Cancer Institute.

Excellence through leadership in research, education and clinical care is the mission of the Department of Medicine. As the largest department within the Faculty of Medicine, our members have developed and coordinated many research projects involving clinicians and basic scientists at McGill's hospitals and biomedical research departments, including investigators from the Goodman Cancer Research Centre. These have been extremely productive endeavours, beneficial to the reputation of the Faculty and the University. With the many recent technological developments and growing diversity of cancer research, I can see the need for an institute dedicated to multidisciplinary and translational cancer research at McGill. The establishment of an institute under the skilled leadership from the Goodman Centre and the oncology community would significantly elevate the profile of the University and the Faculty of Medicine in this field and bring important opportunities for national and international collaboration.

In the domain of education, the potential for collaboration between the Department of Medicine and the proposed institute is substantial and could be transformative for training in cancer research at McGill. Currently, the Department of Medicine offers EXMD 635, a graduate course in experimental and clinical oncology created by members of the GCRC, which involves 38 Faculty from the GCRC, Department of Medicine and other Departments and is highly sought after by students (topped at 30 students and is always oversubscribed). This course has been immensely successful and

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represents a solid platform on which to build a unique training program based on the strong interdisciplinary expertise of the McGill Cancer Institute and the Department of Medicine, with partners from other units within the Faculty of Medicine and elsewhere in McGill. The new McGill Cancer Institute, working together with the Department of Medicine, will therefore enhance the education and training of future leaders in multidisciplinary cancer research.

The strong synergy between the proposed McGill Cancer Institute and the Department of Medicine is also evident in the number of members of the Department, particularly the Division of Experimental Medicine, who are currently GCRC members or associate members and will become part of the McGill Cancer Institute. Eight of the Institute's future members are currently Faculty in the Department of Medicine, including yourself as well as Drs. Beauchemin, Bouchard, Giguere, Muller, Nepveu, Siegel and Tremblay, with a further seven being Associate Members in our Department. Four proposed Associate Members of the Cancer Institute are also currently Associate Members of the Division of Experimental Medicine. Such extensive connections between the Department of Medicine and the McGill Cancer Institute will ensure the continuation of our successful collaborations in research and training and provide opportunities for growth.

Bringing leading investigators from wide-ranging disciplines into the McGill Cancer Institute will establish closer links between the Department of Medicine and these diverse investigators, bringing their innovative research closer to the clinic and presenting unique opportunities for training medical residents and clinician-scientists, in addition to fundamental scientists. This speaks to the third aspect of the Department of Medicine's vision – that of achieving excellence through leadership in clinical care. Ultimately, the formation of the McGill Cancer Institute will benefit patients by giving future clinicians access to a modern, multidisciplinary research and training environment and by accelerating the translation of novel ideas and approaches for cancer diagnosis and therapy to the clinic.

It is therefore with great pleasure that I express my full support for the McGill Cancer Institute. I look forward to a close and productive relationship with the new institute that will be greatly beneficial to the overall mission of the Faculty and McGill University.

Sincerely,

James G. Martin, MD, DSc
Harry Webster Thorp Professor
Chair, Department of Medicine
McGill University

JGM/cdi

Letter From Dr. Bruce Mazer

Centre universitaire de santé McGill
Institut de recherche

McGill University Health Centre
Research Institute

Bruce Mazer
MD

Directeur exécutif et scientifique en chef (par intérim)
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October 31, 2019

Morag Park, Ph.D, FRSC, FCAHS
Director, Goodman Cancer Research Centre
Diane and Sal Guerrera Chair in Cancer Genetics
James McGill Professor
Departments of Oncology, Biochemistry and Medicine
McGill University

Dear Morag,

This letter is to express my full support for the establishment of the McGill Cancer Institute. I am happy and excited to support you as the Goodman Cancer Research Centre grows and evolves to create a dynamic and forward-looking new hub for cancer research at McGill.

The RI-MUHC has enjoyed a long and successful partnership with the Goodman Cancer Research Centre, with tangible connections established through cross appointed faculty members. This will continue as the GCRC transitions to become the McGill Cancer Institute, giving you a strong support network as your new programs develop, with seven proposed members of the new institute being members of the RI-MUHC, while four of the Associate members are also RI-MUHC investigators. Interactions between our two units include our joint efforts in biobanking of cancer samples, pipelines for developing patient-derived cancer models and many research collaborations at the individual investigator level. Recently, we have also become partners in Quebec-based and national consortia that have strengthened clinical and fundamental research collaborations between us and across the cancer research landscape, in Montreal and nationally. These include the Montreal Cancer Consortium pilot project of TFRI's Marathon of Hope network, as well as the Quebec Cancer Consortium, funded by the provincial government (MEI FACS program). The transition of the GCRC to the McGill Cancer Institute will allow you to recruit clinician-scientists directly to the new institute, bring even closer integration with the RI-MUHC, the other Research Institutes of the Faculty of Medicine and McGill's hospital network. Combined with the patient-centric nature of your research program and incorporation of diverse expertise from many fields, this will empower the leadership of the McGill Cancer Institute within these consortia and help them achieve their goals.

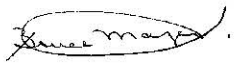
Rather than remaining static, our collaborative networks will grow as a result of the exciting, interdisciplinary research program you have planned for the McGill Cancer Institute. In particular, there is significant potential for collaborative projects incorporating the wide-ranging expertise of your members in the biomedical and

physical sciences, engineering and computer science alongside our strong translational and clinical research programs. Together we will be able to build a framework within a truly patient-centered research environment that facilitates innovation, clinical translation of fundamental science and growth of clinical trials in personalized medicine for cancer. The RI-MUHC alone manages ~4,500 new cancer cases per year. Collaborations between us and incorporating the other hospitals and RIs in the Faculty of Medicine will give our investigators access to substantial patient populations, large numbers of valuable samples and crucial data. This network, which is being built through the MCC and QCC, will be strengthened considerably by the creation of the McGill Cancer Institute.

The RI-MUHC and GCRC also have a rich history of collaboration in training cancer researchers, as partners in the previous CIHR Strategic Training Initiative (MICRTP – McGill Integrated Cancer Research Training Program), which was extremely successful. These interactions could resume as part of an innovative new training program that could be offered jointly by the McGill Cancer Institute and the RI-MUHC. This is an exciting prospect for giving the brightest and most capable trainees the grounding in modern multidisciplinary and patient-oriented cancer research that they will need to excel in their future careers. There is clearly a unique opportunity here for progressive joint training programs and modules for graduate students and post-doctoral fellows and also to provide important training opportunities and fellowships in fundamental cancer science for medical residents. Such programs would contribute greatly to the achievement of the Faculty of Medicine's strategic goals in education and training for biomedical scientists and clinicians and position McGill as a leader in this crucial area.

I believe that a dynamic, forward-thinking McGill institute dedicated exclusively to multidisciplinary cancer research would play a vital role in achieving our objectives of advancing the understanding, diagnosis and treatment of cancer and thereby significantly improving patient outcomes. This would provide an excellent complement and strong collaborative partner for the cancer research programs at the RI-MUHC. It therefore gives me great pleasure to strongly endorse your plans for the McGill Cancer Institute.

Sincerely,



Bruce Mazer, MD
Executive Director & Chief Scientific Officer (Interim)
Research Institute of the McGill University Health Centre

Letter From Dr. Roderick McInnes, Dr. Gerald Batist and Dr. Josie Ursini-Siegel

Hôpital général juif
Jewish General Hospital

McGill

Institut Lady Davis de recherches médicales | Lady Davis Institute for Medical Research

November 6, 2019

Morag Park, Ph.D, FRSC, FCAHS
Director, Goodman Cancer Research Centre
Diane and Sal Guerrera Chair in Cancer Genetics
James McGill Professor
Departments of Oncology, Biochemistry and Medicine
McGill University

Dear Morag,

It is with pleasure that we support your efforts to create the Goodman Cancer Institute. As you are aware, researchers with the LDI cancer axis and Goodman Cancer Research Centre have a long and successful history of collaborative and innovative projects in cancer research. This has led to numerous co-authored papers (60 publications thus far) and multi-center grants involving LDI investigators and their colleagues based at the GCRC. This includes (1) the Quebec Cancer Consortium (MEI FACS program), (2) the Montreal Cancer Consortium, which is funded by TFRI and forms part of their recently established Marathon of Hope Network of cancer centres, (3) the recently renewed Terry Fox New Frontiers Program Project Grant in Oncometabolism, (4) the Oncopole grant in therapeutic resistance, (5) a recently funded QBCF-IRICoR grant and (6) the Stand Up To Cancer Canada Metastatic Breast Cancer Dream Team, which is led by Dr. Nahum Sonenberg (GCRC) and co-led by Dr. Michael Pollak (LDI).

By obtaining institute status, you will be able to gain greater control over academic appointments and training programs, which will surely strengthen the cohesive ties between the LDI and GCRC. In addition to our strong ongoing collaborations in research, the Lady Davis Institute and the Goodman Cancer Research Centre have also been close partners in training the next generation of leading cancer researchers. Here, there is further potential for us to unite our expertise and resources, building on the success of our past joint programs. The LDI was a key partner in the McGill Integrated Cancer Research Training Program (MICRTP), with Dr. Wilson Miller (LDI) and Dr. Michel Tremblay (GCRC) as co-PIs of the CIHR-funded program. With this history of collaboration in building successful training programs for graduate students and post-doctoral fellows, I am extremely confident that we will be able to build new joint programs to prepare students and fellows for success in modern, technology-driven and multidisciplinary cancer research. We are therefore certain that these collaborations will continue and that future partnerships will become more extensive and effective following the transition of the GCRC to an institute status.

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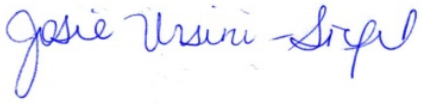
In summary, we support your initiative to create the Goodman Cancer Institute and we are eager to continue collaborating with you and your colleagues to renew and expand upon our past successes in research and training.

Sincerely,

Roderick R. McInnes, CM, OOnt, MD, PhD, FRSC
Alva Chair in Human Genetics
Director, Lady Davis Research Institute - Jewish General Hospital
Professor of Genetics and of Biochemistry, McGill University

Gerald Batist, MDCM, C.M., C.Q., FRCP (C), FACP, FCAHS
Professor of Oncology, McGill University
Director, Segal Cancer Centre, Jewish General Hospital
Head, Cancer Axis - Pharmacology, Lady Davis Institute
Director, McGill Centre for Translational Research in Cancer, Lady Davis Institute



Josie Ursini-Siegel
Principal Investigator, Lady Davis Institute
Associate Professor, Departments of Oncology and Biochemistry, McGill University
Director, Molecular Oncology Group, Lady Davis Institute

Letter from Dr. Don Sheppard

McGill | M[i]4 Interdisciplinary Initiative in Infection and Immunity

November 12, 2019

Morag Park, Ph.D, FRSC, FCAHS
Director, Goodman Cancer Research Centre
Diane and Sal Guerrera Chair in Cancer Genetics
James McGill Professor
Departments of Oncology, Biochemistry and Medicine
McGill University

Dear Dr. Park,

I am delighted to write this letter in support of your proposal to create a new Cancer Institute at the Faculty of Medicine. As we have recently discussed, your plans will incorporate the existing strengths of the Goodman Cancer Research Centre while bringing together expertise and interest in cancer research from across the Faculty and beyond. I commend this multidisciplinary proposal as well as your commitment to training and entrepreneurship.

I believe that there are a number of clear parallels between your proposal for the new Cancer Institute and the McGill Interdisciplinary Initiative in Infection and Immunity (MI4), which I direct. Like infectious and immune diseases, cancer is a major threat to human health in the 21st century and a subject of intensive study by the McGill community. However, harnessing the collective knowledge, expertise and resources of groups located at diverse departments, hospitals, research institutes and centres presents a significant challenge. A key motivating factor behind the creation of MI4 was to address the compartmentalization of McGill's infectious/immune disease research community, due to administrative and geographic barriers that limited collaborations between investigators with complementary expertise who would benefit from working together. In response to this challenge, MI4 has worked to bring McGill's immune and infectious disease researchers together, and provide them with the support they need to build interactions and collaborations that address key problems in the field. I can clearly see how your proposed Institute will be able to unite cancer researchers across the McGill community, in order to break down real and perceived barriers between clinical and fundamental researchers who study different aspects of cancer biology within different McGill Departments and Faculties. By providing an academic home within the Faculty of Medicine for this diverse and talented group of researchers, the McGill Cancer Institute will develop the multidisciplinary approaches required for innovation and knowledge translation to improve outcomes for cancer patients.

As we have discussed, there is an opportunity to build on our existing partnership with the Goodman Cancer Research Centre to develop extensive, mutually beneficial interactions between MI4 and the McGill Cancer Institute. I would envision that many MI4 members would become full or Associate Members of the McGill Cancer Institute and vice-versa. For example, Dr. Martin Richer, who is currently an Associate Member of the GCRC and will become an Associate Member of the Institute, is already appointed to the Department of Microbiology and Immunology, which I chair. Because cancer is a *disease of altered immunity*, research into immune-oncology is clearly an area where we would be excited to work with the new Institute in order to develop co-develop- collaborative research projects that address key questions in immuno-oncology and the fundamental aspects of the role played by the immune system in carcinogenesis, tumour progression and therapeutic resistance. Together, the McGill Cancer

Institute and MI4 will have a greater capacity to secure funding for and drive the development of programs and platforms that will enable the pursuit of our mutual research objectives. Such investments in technology are already ongoing, as MI4 has recently provided funding to SCIMAP, the mass cytometry platform at the GCRC that will become part of the McGill Cancer Institute's portfolio of technologies. This provides a blueprint for further joint investment in both cutting edge infrastructure that will benefit the entire research community at the Faculty of Medicine, as well as other McGill-based researchers with an interest in human disease. In addition, the Seed Grant program developed by MI4 may also serve as a model for similar initiatives by the new Institute to accelerate comprehensive, team-based multidisciplinary and translational research in cancer. This program has already supported two seed grants in the immuno-oncology space, one of which was co-funded by MI4 and the GCRC.

Another area of convergence between our initiatives is our commitment to the the development and support of training programs that promote the integration of disciplines and foster knowledge translation. During our recent conversations, I was excited to hear about your plans for a bold, forward-thinking graduate training scheme for the McGill Cancer Institute that will give research trainees, and eventually MD/Ph.D students and medical residents involved in the clinical investigator program, the knowledge and skills needed to flourish in the multidisciplinary, technology-driven academic environment of the future. I can envisage additional opportunities for MI4, the McGill Cancer Institute and the Department of Microbiology and Immunology to collaborate in designing training courses and programs bringing fundamental and clinical aspects of cancer immunology together with other biomedical sciences, computer sciences, engineering and physics. This would be a significant step forward in realizing the Faculty of Medicine's strategic plans in education and training and would be of immense benefit to trainees involved in MI4 programs as well as those of the McGill Cancer Institute and many other units.

To conclude, I am fully supportive of your plan to create the McGill Cancer Institute as this very much aligns with my vision of how thematic interdisciplinary research can be best supported at McGill. I am excited by the potential for collaboration and the substantial net positive effect this would have on our research and training efforts at the Faculty of Medicine and at McGill University. I look forward to working with you to achieve these goals in the near future.

Sincerely,

Don Sheppard M.D. FRCPC
Director, McGill Interdisciplinary Initiative in Infection and Immunity
Chair, Department of Microbiology & Immunology
Professor, Departments of Medicine, Microbiology & Immunology
McGill University

Letter from Dr. Eric Shoubridge

Department of Human Genetics
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November 6, 2019

Morag Park, Ph.D, FRSC, FCAHS
Director, Goodman Cancer Research Centre
Diane and Sal Guerrera Chair in Cancer Genetics
James McGill Professor
Departments of Oncology, Biochemistry and Medicine
McGill University

Dear Dr. Park,

It is with great pleasure that I write this letter of support for your proposal to create the McGill Cancer Institute. Based on the demonstrated achievements of the Goodman Cancer Research Centre, I am sure that this new initiative will be wildly successful. I am excited about the prospect of building on the existing links between the Department of Human Genetics and the GCRC to advance the Faculty of Medicine's priorities in the area of cancer research.

Cancer is a genetic disease and, given its importance as the leading cause of mortality in Canada, is a major research interest of the Department of Human Genetics. With a large proportion of our faculty and Associate members currently engaged in cancer research, there is a basis for extensive research interactions and collaborative projects involving the Department and the McGill Cancer Institute. Notably, two current GCRC members and proposed members of the McGill Cancer Institute, Drs. Logan Walsh and Yojiro Yamanaka, are appointed to the Dept. of Human Genetics, while Drs. Guillaume Bourque, Yasser Riazalhosseini, and Hamed Najafabadi, members of Human Genetics, are currently associate members of the GCRC. This attests to the depth of current interactions between our Department and the GCRC and bodes well for the future relationship with the McGill Cancer Institute. Joint recruitment of new faculty members to the Department of Human Genetics and the McGill Cancer Institute would bring complementary expertise to both. This would also provide a unique opportunity to further integrate research on cancer genetics with other disciplines, including the physical sciences, computational biology and engineering, through the multidisciplinary framework provided by the new McGill Cancer Institute.

The mission of our Department also emphasizes the importance of providing the best possible training in genetics for the next generation of medical doctors and biomedical scientists. We have embraced advanced technologies through our strong partnerships with the McGill University and Genome Quebec Innovation Centre, McGill's hospitals and affiliated Research Institutes, and leading Research Centres such as the GCRC. By establishing the McGill Cancer Institute, as we have discussed, you will be able to offer thoroughly modern, multidisciplinary graduate training with the aim of eventually building programs for Ph.D and MD/Ph.D students, as well as medical

residents. This presents an outstanding opportunity for us to work together to ensure that medical students and cancer research trainees at McGill receive an education that is both broad-based and thorough, incorporating cutting edge genetics and genomics with knowledge and technology from diverse fields relevant to cancer. The potential for complementary graduate training programs and jointly offered and co-developed courses between the Department of Human Genetics and the McGill Cancer Institute is truly exciting. I welcome the opportunity to move forward with these initiatives.

In some respects, the history of the Department of Human Genetics parallels the development of the McGill Cancer Institute. With the rapid development of the field of Human Genetics, the Centre for Human Genetics was established in 1979 to coordinate and promote human/medical genetics research, health care activities and training at McGill. Continued growth then made it apparent that the administrative limitations of a Centre were restrictive in terms of recruitment, training programs and the career development and recognition of our academic staff. These limitations were overcome in 1993 with the creation of the Department of Human Genetics. As the GCRC is facing similar issues, I have no doubt that the transition to an Institute, which affords many of the same capabilities as a Department, is exactly what is needed to further the growth and development of research and training programs in cancer at the Faculty of Medicine.
I am therefore very happy to express my strongest support for your plans to create the McGill Cancer Institute. I eagerly anticipate working with you to continue building cutting edge cancer research and training programs that will significantly raise the profile of the Faculty and of McGill University in these very important areas.

Warmest regards,

Eric Shoubridge, PhD FRSC
Professor and Chair, Department of Human Genetics
Isaac Walton Killam Chair in Neurology and Neurosurgery
McGill University

Letter from Dr. John White

DEPARTMENT OF PHYSIOLOGY

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November 12, 2019

Morag Park, Ph.D, FRSC, FCAHS,
Director, Goodman Cancer Research Centre,
Diane and Sal Guerrera Chair in Cancer Genetics,
James McGill Professor,
Departments of Oncology, Biochemistry and Medicine,
McGill University

Dear Morag,

It gives me great pleasure to express my support and enthusiasm for your proposal to create a new Cancer Institute at the Faculty of Medicine. Based on our recent conversations, I see this as a positive development that will catalyze cancer research at the Faculty and at McGill University more broadly. Given our mutual research interests and the ongoing collaboration between the Department of Physiology and the Goodman Cancer Research Centre, I am confident that our Department and the new institute can work closely together to advance McGill's research and training objectives in the field of cancer.

The Department of Physiology has long-standing interests in the study of fundamental cellular and physiological processes of great relevance to cancer, for example in the fields of molecular and cellular biology, endocrinology, metabolism and immunology, among others. We are particularly interested in developing and applying a range of technological and experimental approaches, including biophysics, electrophysiology, advanced imaging techniques, mathematical modelling and computational biology to address key research questions. These strengths are highly complementary to the multidisciplinary vision that you have proposed for the new institute and will present unique opportunities for extensive, multifaceted collaborations that leverage the powerful combined technologies and resources that will be available at both the Institute and our department. In this regard, I note that the Department of Physiology has been the academic base for several GCRC scientists over the years, including current GCRC member Dr. Daniela Quail as well as former member Dr. Russell Jones. These investigators established dynamic research programs in key aspects of cancer physiology, bringing considerable benefit to both our Department and to the GCRC. Continued joint appointments of faculty at the Department of Physiology and the Cancer Institute will be highly beneficial for both units and will strengthen our interactions.

In addition to the great potential for collaborative research involving the Department and the new Institute, it is easy to foresee significant opportunities to improve graduate student training in the biomedical sciences related to cancer at the Faculty of Medicine. Some GCRC trainees are currently registered in our Department and have access to our graduate-level courses, while students in Physiology have benefitted from programs developed by the GCRC, with its partners, such as the EXMD 635 course in Experimental Oncology. There is considerable scope for these existing interactions to develop upon the establishment of the new Institute. Indeed, we share numerous aspects of our philosophy and approach to education and training, including our emphasis on giving trainees a strong foundation in multiple complementary approaches to studies of molecular and cellular biology as well as the broader integration of physiological systems. We provide advanced training at the Ph.D. level in aspects of quantitative & computational physiology that could be integrated into training approaches

developed by the new Institute, with input from partners at the Faculty of Engineering, School of Computer Science and Centre for Intelligent Machines. Overall, I am certain that we could cooperate to take advantage of the unique possibilities presented by the creation of the Institute, creating training programs for M.Sc and Ph.D students that incorporate a strong grounding in physiology and related disciplines into a cutting edge, multidisciplinary framework.

Your proposal to create a bold, multidisciplinary Cancer Institute represents a major step forward for the Faculty of Medicine. I anticipate that the Cancer Institute will be a strong contributor to our academic community and I look forward to working with you on new avenues for collaborative research and training. I am very happy to give your application my full endorsement and I wish you success in your endeavour to create the McGill Cancer Institute.

Sincerely yours,

John H. White, Ph.D.,
Professor and Chair

Letter from Dr. Francois Benard

BC CANCER
Provincial Health Services Authority

October 15, 2019

Morag Park, Ph.D., FRSC, FCAHS
Director, Goodman Cancer Research Centre
Diane and Sal Guerrera Chair in Cancer Genetics
James McGill Professor
Departments Oncology, Biochemistry and Medicine
McGill University

Dear Morag,

It is my pleasure to write this letter of support for the transition of the Goodman Cancer Research Centre into the McGill Cancer Institute. I was happy to hear about these very welcome developments in our recent conversation and I am excited by your ideas and plans for a strong, interdisciplinary and patient-centric scientific program, an approach that I strongly endorse.

With my own background and work in cancer imaging and nuclear medicine and my current role in a vibrant and diverse institute, I have seen first-hand how the integration of diverse fields is vital to modern cancer research. As the Vice President of Research at BC Cancer, and Associate Dean of Research and the BC Leadership Chair in Functional Cancer Imaging at the University of British Columbia (UBC), this is the approach I have taken in building successful programs. Strong clinical connections as well as enhanced integration with the physical sciences, which will be made possible by your transition to Institute status, are also essential to increase efficiency in translational research and establish new research directions. I therefore firmly believe that the incorporation of diverse technologies and disciplines, including computer science, engineering and physics, into a new cancer institute, where they would be integrated with biomedical and clinical disciplines, will be a major step forward for McGill. Your fundamental and translational research programs, which already feature nationally recognized initiatives in biobanking and patient-derived cancer modeling and are now linked to the Terry Fox Marathon of Hope Cancer Centres Network (MOHCC), will be significantly strengthened by the establishment of the new institute. There would also be major benefits of such an institute for training the next generation of cancer researchers and bringing in a new cohort of cancer researchers from the physical sciences as well as future clinician-scientists. Trainees would have the opportunity to gain knowledge and expertise in the wide range of technologies and approaches that are currently transforming cancer research, positioning them to become leaders in the future.

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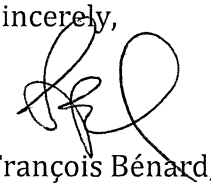
BC Cancer and UBC have many important connections with the GCRC and McGill. The establishment of the McGill Cancer Institute would present substantial opportunities to build on existing collaborations and establish new ones. While many of our investigators collaborate on an individual basis, we have recently also become partners in a number of national initiatives that take a team science approach. A recent example is the Stand Up To Cancer Canada Metastatic Breast Cancer Dream Team, which incorporates extensive collaborations between investigators from McGill and BC Cancer. I am confident that the McGill Cancer Institute would be a major contributor to critical pan-Canadian research efforts in cancer research, including the Terry Fox Research Institute (MOHCC) network and many other current and future teams and networks.

On behalf of my colleagues at BC Cancer and UBC, I express my enthusiastic support for your application for Institute status at McGill's Faculty of Medicine. I look forward to continuing and building on our interactions with you and the members of the new Institute in the future.

Sincerely,



François Bénard, MD, FRCPC
Vice President, Research and Distinguished Scientist, BC Cancer
Associate Dean, Research and Professor, Radiology, UBC
BC Leadership Chair in Functional Cancer Imaging

Letter from Dr. Michel Bouvier

Université de Montréal

Faculty of Medicine
Department of Biochemistry and Molecular
Professor

Institute for Research in Immunology and cancer
Chief Executive Officer

Montréal, October 23, 2019

Morag Park, Ph.D, FRSC, FCAHS
Director, Goodman Cancer Research Centre
Diane and Sal Guerrera Chair in Cancer Genetics
James McGill Professor
Departments Oncology, Biochemistry and Medicine
McGill University

Dear Morag,

I am writing to express my enthusiastic support for the transition of the Goodman Cancer Research Centre to Institute status within the Faculty of Medicine at McGill University. As you know, I have always been highly supportive of the GCRC's programs and I am proud of the strong history of collaboration and ongoing interactions of investigators based at the Institute for Research in Immunology and Cancer (IRIC) of the Université de Montréal with our colleagues at the McGill's Faculty of Medicine and the GCRC. Following my discussions with you on this topic, I am very confident that the establishment of the McGill Cancer Institute will allow these already productive collaborations to expand, leading to important new opportunities for both of our institutions.

IRIC and IRIC for Commercialization of Research (IRICoR) are dedicated to advancing personalized medicine for cancer by translating key ideas from fundamental research. This involves our development and use of innovative technology and approaches across disciplines. Overall, there is excellent complementarity between the goals and programs of our institution and your exciting plans for the technology-driven, interdisciplinary McGill Cancer Institute. This extends to our infrastructure, where we each have unique technological strengths. The opportunities for innovative collaborations and synergies are obvious and could build on ongoing projects along these themes, such as our ongoing work on the application of IRIC's drug screening technology and medicinal chemistry to patient-derived models (organoids and PDXsM) developed by the GCRC. With its pan-Canadian mission, IRICoR's project management and business development team could also support your efforts toward the maturation and commercialization of the ground-breaking discoveries of the McGill Cancer Institute.

As the Chief Executive Officer of IRIC and having led the establishment of IRICoR, as well as the Groupe de recherche universitaire sur le médicament (GRUM) and the Réseau Québécois de recherche sur les médicaments (RQRM), I have extensive experience in creating and leading biomedical and cancer research institutes and networks. I can therefore offer a very strong endorsement of the benefits of Institute status, which will allow your talented and diverse group of investigators to more effectively pursue their research and training objectives. The McGill Cancer Institute will occupy a prominent space in the cancer research landscape here in Montreal and in Québec. I already act as a collaborator

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of the Québec Cancer Consortium, the project of the MEI Fonds d'accélération des collaborations en santé (FACS) program that you lead, while I also lead a MEI FACS project at IRIC on which you are also a collaborator. We have planned for these two projects to synergize and, the transition of the GCRC to the McGill Cancer Institute will benefit these consortia significantly, as well as immediately linking your new Institute into major Québec cancer research networks. I firmly believe that the formation of the McGill Cancer Institute will also substantially increase your national and international recognition, enhancing opportunities for collaboration and strengthening your voice in the establishment of broader research and policy directions. It would be a welcome development with many positive repercussions for cancer research at all levels.

Therefore, in conclusion, I wholeheartedly support your project to establish the McGill Cancer Institute and I anticipate the continuation and growth of a strong and productive partnership between IRIC and the new institute that will ultimately deliver significant benefits for cancer patients.

Michel Bouvier, Ph.D., FCAHS, FRSC
Professor, Department of Biochemistry and Molecular Medicine
General Director and principal investigator, Institute for research in Immunology and Cancer (IRIC)
Canada Research Chair in Signal Transduction and Molecular Pharmacology
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Letter from Dr. Joan Brugge

LUDWIG CANCER RESEARCH

HARVARD MEDICAL SCHOOL

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October 18, 2019

Morag Park, Ph.D, FRSC, FCAHS
Director, Goodman Cancer Research Centre
Diane and Sal Guerrera Chair in Cancer Genetics
James McGill Professor
Departments Oncology, Biochemistry and Medicine
McGill University

Dear Dr. Park:

I am very happy to provide this letter expressing my strong support for your application to create the McGill Cancer Institute. It was a pleasure to discuss your ideas and plans for the new institute recently. Based on this and on the considerable achievements of the Goodman Cancer Research Centre, I am very confident that this new direction will build on the foundations you and your colleagues have put in place to continue McGill's strong tradition of groundbreaking cancer research.

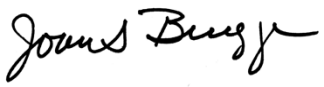
I am especially enthusiastic about the interdisciplinary and collaborative nature of the proposed McGill Cancer Institute. The centres and institutes at Harvard University that I am part of, including the Ludwig Center, the Blavatnik Institute, and the Dana Farber/Harvard Cancer Center, share this approach. In my experience, this has contributed directly to the productivity and innovation of their research programs. A key aspect of the vision of the Ludwig Center at Harvard Medical School, which I co-direct, is to foster engagement and collaboration among a broad group of faculty from across the Harvard community. Bringing different disciplines together and cultivating links to the clinic have led to cross-fertilization of ideas and unique, innovative ways of thinking about the most important problems in cancer research that have been key to our success. I believe that your vision of a similar model for the McGill Cancer Institute will be entirely appropriate for your group of investigators, with their shared interest in the biological mechanisms of and treatments for cancer, but a diverse range of backgrounds and expertise. The benefits of this approach apply not only to research but also extend to training young researchers, another key aspect of the mission of the McGill Cancer Institute. The opportunity to learn from leaders from a wide range of disciplines in a dynamic, collaborative environment will attract talented and motivated trainees and allow your program to excel in developing the next generation of leaders in cancer research.

Overall, providing an academic base for your interdisciplinary program and strengthening clinical connections through establishing the McGill Cancer Institute will lead to growth and

better integration that will enhance your scientific output, training programs and impact. I have no doubt that the new Institute will immediately be a leading institution in the Canadian cancer research community, continuing the success of the Goodman Cancer Research Center and its partners throughout McGill. The transition in status will also facilitate international collaborations involving the McGill Cancer Institute. Indeed, our groups of investigators share common scientific ground in a number of significant areas including oncometabolism, therapeutic resistance and the development and application of models derived directly from cancer patients. There would be considerable scope for collaborative projects and partnerships involving the Ludwig Center and other units at Harvard Medical School with the new McGill Cancer Institute that could catalyze further innovation and lead to important developments that can impact on patient care.

In summary, I am fully supportive of your efforts to transform the Goodman Cancer Research Centre, with its network of collaborators and partners across McGill University, into the McGill Cancer Institute. I look forward to following the progress of this initiative and I am eager to work closely with you and your colleagues in the future to advance fundamental and translational efforts in cancer research.

Sincerely,



Joan S. Brugge, Ph.D.

Letter from Dr. Margaret Frame

igmm
INSTITUTE OF GENETICS & MOLECULAR MEDICINE

Professor Margaret C Frame PhD FRSE FMedSci OBE

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23 October 2019

Morag Park, PhD, FRSC, FCAHS
Director, Goodman Cancer Research Centre
Diane and Sal Guerrera Chair in Cancer Genetics
James McGill Professor
Departments of Oncology, Biochemistry and Medicine
McGill University

Dear Morag,

I am delighted to provide you with this letter of support for the establishment of a new cancer research institute at the Faculty of Medicine, McGill University. As Director of both the Edinburgh Cancer Research Centre (Cancer Research UK-funded) and the MRC Institute of Genetics & Molecular Medicine (IGMM) at the University of Edinburgh, I lead diverse activities and centres engaged in broad-reaching, multidisciplinary cancer research and genomic medicine. From our many conversations and meetings, I know that the McGill Cancer Institute will follow a similar philosophy, advancing new technologies and applying approaches stemming from many different disciplines to accelerate biomedical science discovery and translation. The change in status to that of an Institute will surely unite the diverse investigators who contribute to your research at the Goodman Cancer Research Centre and facilitate the recruitment of outstanding new talent, including leaders in fundamental cancer biology, the physical and computational sciences and clinician scientists. In my opinion, this will allow McGill to build an exceptional scientific program based on state-of-the-art new technologies, the best available patient-derived cellular and animal models of cancer, and exploit 'big data', with a strong foundation in combined basic science, with translational focus on personalized medicine for cancer. Having done this, I am certain that your exciting and ambitious plans will have a major impact on knowledge of cancer biology and ultimate impact for patients, enhancing McGill's already impressive programs in these fields.

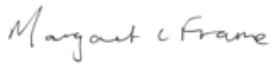
Beyond excellence in research, training the next generation of young scientists is, of course, a mission that we share. With recent transformational technological advances, data-driven innovation and the recent convergence of different fields not traditionally associated with cancer research, it is timely, and indeed crucial, to enhance the breadth and depth of the training of the next generation of cancer researchers to make them competitive in the modern world. The new environment you propose at McGill will undoubtedly facilitate multidisciplinary training, and the result will be students and post-doctoral fellows who develop into fearless investigators of the future.

As you know, there have been many important collaborations between Edinburgh-based investigators and colleagues at McGill. These international collaborations exemplify the type of interactions required for the exchange of ideas and discoveries that would not otherwise be possible. The establishment of the McGill Cancer Institute will provide an ideal partner for the Cancer Centre and the IGMM at the University of Edinburgh. We

look forward to working with you if your application is successful. We are like-minded and complementary institutes and great opportunities exist to create effective partnerships for cancer research, particularly in data-driven science and artificial intelligence through our links with the world-renowned Edinburgh School of Informatics. A recent successful example of such a partnership from a different field is the University of Edinburgh/McGill University Neuroscience Collaboration, in which McGill's Faculty of Medicine is a key participant.

In summary, I express my wholehearted support for your proposal to create the McGill Cancer Institute. Having brought three Centres/Units (Cancer, Human Genetics and Genomic Medicine) together to form an Institute of 500 people – the IGMM - I never underestimate the massive value of bringing together diverse disciplines and creating economies of scale and large researcher/training cohorts; it has been transformative for us and I believe it will be also for you at McGill. I wish you every success in these efforts and I look forward to continuing to collaborate with you and your colleagues as we work towards a better understanding of cancer biology and more effective precision medicine strategies that cancer patients are waiting for.

All best wishes,



Margaret C Frame

Professor of Cancer Research
Director: Cancer Research UK Edinburgh Centre
Director: MRC Institute of Genetics and Molecular Medicine
University of Edinburgh

Letter from Dr. Anne-Marie Mes-Masson

CRCHUM
CENTRE DE RECHERCHE
Centre hospitalier
de l'Université de Montréal

October 15, 2019

Morag Park, Ph.D, FRSC, FCAHS
Director, Goodman Cancer Research Centre
Diane and Sal Guerrera Chair in Cancer Genetics
James McGill Professor
Departments of Oncology, Biochemistry and Medicine
McGill University

Dear Morag,

It gives me great pleasure to write this letter expressing my full support for your initiative to establish the McGill Cancer Institute (MCI). As the Associate Scientific Director of Basic and Translational Research at CRCHUM and Director of the FRQS-funded Réseau de recherche sur le cancer, where you also play a leading role, I can attest to the tremendous value of building multidisciplinary cancer research programs with both fundamental and translational components. As such, it is my firm belief that the McGill Cancer Institute will be of great benefit to cancer researchers at McGill and beyond.

As we move forward, opportunities to achieve clinical impact in cancer research will develop from interdisciplinarity and collaboration. Over the years I have collaborated extensively with you and many other proposed members of the MCI, as have many of my colleagues at the CRCHUM. As such I am extremely familiar with the strength of the research program of the new institute and I look forward to the exciting developments to come. We have worked together for a number of years on establishing strength in biobanking for various cancers and in developing patient-derived models of cancer, as well as on multidisciplinary technological development projects such as "lab-on-a-chip" approaches. The new institute would allow the extension and expansion of these joint initiatives and would deepen the relationship between McGill and the CRCHUM, presenting further opportunities to collaborate in order to develop new technologies and approaches and bring effective personalized medicine strategies to the cancer clinic.

The CRCHUM and the Réseau de recherche sur le cancer also participate alongside the GCRC and many other partners at both McGill and Université de Montréal, including our affiliated hospital networks, in several large-scale initiatives such as the Montreal

Cancer Consortium and the Quebec Cancer Consortium, funded by the Terry Fox Foundation and the MEI, respectively. Building the new McGill Cancer Institute would serve to consolidate your and McGill's leadership within these vital consortia and networks and allow you to form stronger partnerships with the hospitals. This will be highly beneficial for the translational research pipelines that we are collectively building.

Our institutions share many values in common and we enjoy a number of very successful partnerships. I am very happy to express my enthusiasm and support for the McGill Cancer Institute and I anticipate the continuation of our close and productive relationship in the future.

Regards,

Anne-Marie Mes-Masson PhD, FCAHS, FRSC
Professor, Department of Medicine, University of Montreal
Associate Scientific Director Basic and Translational Research, CRCHUM

Letter from Dr. Benjamin Neel

NYU Langone Health

Benjamin G. Neel, MD, PhD
Professor of Medicine, NYU School of Medicine
Laura and Isaac Perlmutter Director
Laura and Isaac Perlmutter Cancer Center

October18, 2019

Morag Park, Ph.D, FRSC, FCAHS
Director, Goodman Cancer Research Centre
Diane and Sal Guerrera Chair in Cancer Genetics
James McGill Professor
Departments Oncology, Biochemistry and Medicine
McGill University

Dear Morag:

I am pleased to write in strong support of your efforts in building the McGill Cancer Institute. As the former Director of the Princess Margaret Cancer Center, I am very familiar with, and have great respect and admiration for, your work and that of your colleagues at the Goodman Cancer Research Centre. Our interactions have continued since my appointment as the Director of the Perlmutter Cancer Centre at NYU Langone Health. Through these interactions and our recent discussions, I have had the opportunity to hear about your plans for the new Institute. I am certain that the benefits of this transition will be very significant for cancer researchers based at the GCRC, throughout McGill, and in the broader cancer research community.

Among the most important keys to success for institutions engaged in cancer research are strong collaborations between basic researchers, clinicians, and clinician-scientists. These interactions are critical for the efficient advance of new therapies to the clinic and also brings the clinical perspective back to the laboratory, where fundamental research can address the key problems and opportunities identified by clinical research and observations. I am well-acquainted with the benefits of this approach through my previous directorship of PMCC and my current position as Director of the Perlmutter Cancer Center (PCC), an NCI–designated Comprehensive Cancer Center renowned for basic laboratory, translational, and clinical research.

The GCRC has already established important clinical links, and counts among its members some outstanding clinician-scientists as well as world leaders in fundamental cancer research. I am also aware of the major initiatives that you have led recently, including the Quebec Cancer Consortium and your participation in the Terry Fox Marathon of Hope Cancer Centres, which are building a translational and clinical cancer research network in Quebec and across Canada. As you've discussed with me recently, Institute status will help these projects immensely by integrating your researchers even more closely with the clinical oncology community at McGill. Furthermore, the inclusion of experts from a wide range of cancer-relevant fields as Institute members will build an exciting multidisciplinary research and training environment, creating opportunities unique at McGill and rare in Canada. I see the transition of GCRC to the McGill Cancer Institute as the logical next step for the program you've established with your colleagues, and I welcome and encourage these developments.

I also believe that cultivating strong links among research institutions is extremely important for the future of cancer research, allowing us to draw on each other's expertise to increase our understanding of cancer biology and accelerate the development of new approaches for diagnosis and treatment. I am certain that the McGill Cancer Institute will be well-positioned to grow its network of interactions and establish new and mutually beneficial relationships with PCC and other leading institutions across Canada and the United States. It therefore gives me great

NYU Langone Health

pleasure to express my support and endorsement for this important initiative. Please feel free to call on me anytime if I can provide any additional help or support.

Sincerely,

Benjamin G. Neel, M.D., Ph.D.

Letter from Dr. Bradly Wouters

Bradly G Wouters, Ph.D.
Executive Vice President, Science & Research, UHN

Senior Scientist, Hypoxia and Microenvironment Program
Princess Margaret Cancer Centre

Toronto General Hospital
190 Elizabeth St., R. Frasier Elliott Bld
Corporate Office, 1-S-407
Toronto, ON, M5G 2C4
Phone (416) 340-4407
Fax (416) 946-2287
Email brad.wouters@uhnresearch.ca

October 15, 2019

Morag Park, Ph.D, FRSC, FCAHS
Director, Goodman Cancer Research Centre
Diane and Sal Guerrera Chair in Cancer Genetics
James McGill Professor
Departments Oncology, Biochemistry and Medicine
McGill University

Dear Morag,

Following up on our recent conversations regarding your plans, I am delighted to offer this letter of support for the McGill Cancer Institute. The new institute will build on the tremendous success and growth of the Goodman Cancer Research Centre, under your directorship, and will become a major force and important partner in the Canadian cancer research community.

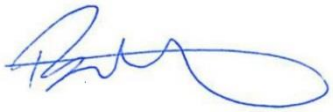
The current Goodman Cancer Research Centre (GCRC) is a key partner of the Princess Margaret Cancer Centre (PM) here at the University Health Network (UHN) and with our many faculty at the University of Toronto. Interactions and collaborations between members of our Centres are numerous and wide-ranging and our combined expertise has contributed to multiple team-led initiatives, including two programs funded by SU2C. These interactions are certain to strengthen once the Goodman Cancer Research Centre has achieved the status of an Institute and I anticipate the continuation of strong relationships between the new McGill Cancer Institute and both PM and UHN. Indeed, the McGill Cancer Institute is expected to be an important partner for all leading Canadian institutes and centres with shared and complementary interests in cancer research, as well as national networks such as the Terry Fox Marathon of Hope Network of Cancer Centres. Our pilot program for the Marathon of Hope Cancer Centres includes PM, BC Cancer and the GCRC who participates as part of the Quebec node through its joint leadership of the Montreal Cancer Consortium (MCC).

The work of my own research group and the broader mission of PM and of cancer research at UHN involves development and application of technologies and understanding from multiple disciplines, with the major goal of developing improved diagnostic and therapeutic approaches to deliver personalized medicine strategies for cancer patients. I was therefore very excited to learn about the strong, multidisciplinary research program of the MCI and its ability to link into McGill's hospital network, with a broad patient base and tremendous potential to energize translational cancer research in Montreal. I also applaud your commitment to excellence in training the next generation of cancer researchers by providing access to a range of cutting-edge technologies and faculty with diverse backgrounds, including physics, computer sciences and engineering as well as biology and medicine. We share this philosophy and have benefited from this approach to training graduate students, post-doctoral fellows and clinician-scientists. Indeed, I firmly believe that this is essential for us to develop the leaders of the future in cancer research.

As the Executive Vice-President of Research at UHN, I am involved in the direction and oversight of seven research institutes. At UHN this institute model has allowed each of our institutes the independence to create unique solutions and programs with tangible benefits to our scientists, clinicians, learners and patients. With this experience, I can see clearly that the formation of an institute is a natural progression for your talented and dynamic group of researchers. I strongly believe that gaining institute status will give you the flexibility needed to drive a shared vision for research vision, create unique training programs, strengthen your capacity for fundraising, enhance the recruitment of trainees and faculty and elevate your public profile locally, nationally and internationally.

Overall, I commend your plans for the McGill Cancer Institute. I can see the need for this institute in Montreal and within the larger national cancer research community in Canada and I am therefore very happy to express my enthusiastic support.

Sincerely,



Bradly G Wouters, Ph.D.
Executive Vice President, Science & Research
University Health Network

Appendix B – List of Stakeholder Consultations:

External to McGill

Dr. François Bénard, Associate Dean, Research, BC Cancer Agency; Professor, Department of Radiology, UBC Faculty of Medicine

Dr. Michel Bouvier, Chief Executive Officer and Principal Investigator, Molecular Pharmacology Research Unit, IRIC; Professor, Department of Biochemistry and Molecular Medicine, Faculty of Medicine, Université de Montréal

Dr. Joan Brugge, Director of the Ludwig Center, Louise Foote Pfeiffer Professor of Cell Biology, Harvard Medical School

Mr. Michael Corber, CPA, CA, Partner - Richter LLP; Chairman of the Advisory Board and Gala Fundraising Lead, Goodman Cancer Research Centre

Dr. Margaret Frame, Science Director, CRUK Edinburgh Centre; Director, MRC Institute of Genetics and Molecular Medicine (IGMM), University of Edinburgh (United Kingdom)

Dr. Anne-Marie Mes-Masson, Associate scientific director, Basic and translational research, CRCHUM; Full professor, Department of medicine, Université de Montréal; Director, Cancer research network, FRQS

The Morris and Rosalind Goodman Family Foundation (MRGFF)

Dr. Ben Neel, Professor of Medicine, NYU School of Medicine; Laura and Isaac Perlmutter Director, Laura and Isaac Perlmutter Cancer Center

Dr. Brad Wouters, Senior Investigator, OICR; Executive Vice-President, Science and Research at University Health Network; Professor, Department of Radiation Oncology, University of Toronto

Internal to McGill

Faculty of Medicine

Dr. Annmarie Adams, Professor and Chair, Department of Social Studies of Medicine; Stevenson Chair in the History and Philosophy of Science, including Medicine

Dr. Armen Aprikian, Head, Division of Urology and Professor, Department of Surgery; Director, Cancer Care Mission and Head, Department of Oncology, McGill University Health Centre; Urologist-in-Chief, McGill University Health Centre

Dr. Gerry Batist, Director, Segal Cancer Centre and McGill Centre for Translational Research in Cancer; Deputy Director and Senior Investigator, Lady Davis Institute, Jewish General Hospital; Minda de Gunzburg Professor of Oncology; Professor of Medicine

Dr. Albert Berghuis, Chair, Department of Biochemistry; Distinguished James McGill Professor, Departments of Biochemistry and Microbiology & Immunology

Deanery Executive Committee (DEC)

Dr. Lesley Fellows, Vice-Dean, Academic Affairs, Faculty of Medicine

Dr. Eduardo Franco, Chair and James McGill Professor, Gerald Bronfman Department of Oncology; Minda de Gunzburg Chair in Oncology

Dr. David Juncker, Professor and Chair, Department of Biomedical Engineering; Principal Investigator, McGill University & Genome Quebec Innovation Centre

Dr. Mark Lathrop, Scientific Director, McGill University and Génome Québec Innovation Centre; Professor, Department of Human Genetics

Dr. James Martin, Chair and Harry Webster Thorp Professor of Medicine; Physician-in-Chief, McGill University Health Centre

Dr. Bruce Mazer, Executive Director/Chief Scientific Officer (CSO) of the Research Institute of the McGill University Health Centre (RI-MUHC) (Interim); Head of Child Health Research at the Montreal Children's Hospital (MCH) of the MUHC; Professor - Department of Pediatrics

Dr. Rod McInnes, Director, Lady Davis Research Institute; Professor and Alva Chair in Human Genetics

Dr. Wilson Miller, Associate Director for Clinical Research, Lady Davis Institute for Medical Research; Clinical Lead, Rossy Cancer Network; Director, Clinical Research Unit, Jewish General Hospital; Director, Developmental Therapeutics, Department of Oncology, McGill University; James McGill Professor, Departments of Medicine and Oncology, McGill University

Dr. Gerhard Multhaup, Professor and Chair, Department of Pharmacology

Dr. Don Sheppard, Director, McGill Interdisciplinary Initiative in Infection and Immunity; Chair, Department of Microbiology & Immunology; Professor, Departments of Medicine, Microbiology & Immunology

Dr. Eric Shoubridge, James McGill Professor and Chair, Human Genetics; Professor and Isaac Walton Killam Chair in Neurology and Neurosurgery; Investigator, MNI

Dr. Josie Ursini-Siegel, Investigator, Lady Davis Institute; Associate Professor, Department of Oncology

Dr. John White, Joseph Morley Drake Professor and Chair, Department of Physiology

Goodman Cancer Research Centre

Dr. Nicole Beauchemin, Departments of Biochemistry, Oncology and Medicine

Dr. Maxime Bouchard, Departments of Oncology and Medicine

Dr. Josee Dostie, Department of Biochemistry

Dr. Thomas Duchaine, Department of Biochemistry

Dr. Imed Gallouzi, Department of Biochemistry

Dr. Vincent Giguere, Departments of Biochemistry, Oncology and Medicine

Dr. Philippe Gros, Department of Biochemistry

Dr. Sidong Huang, Department of Biochemistry

Dr. Lawrence Kazak, Department of Biochemistry

Dr. Luke McCaffrey, Department of Oncology

Dr. William Muller, Department of Biochemistry

Dr. Alain Nepveu, Departments of Medicine, Oncology, and Biochemistry

Dr. Arnim Pause, Department of Biochemistry

Dr. Jerry Pelletier, Department of Biochemistry

Dr. Daniela Quail, Department of Physiology

Dr. Peter Siegel, Departments of Medicine, Biochemistry, and Anatomy and Cell Biology

Dr. Nahum Sonenberg, Department of Biochemistry

Dr. Jose Teodoro, Department of Biochemistry

Dr. Michel Tremblay, Department of Biochemistry

Dr. Logan Walsh, Department of Human Genetics

Dr. Ian Watson, Department of Biochemistry

Dr. Yojiro Yamanaka, Department of Human Genetics

Dr. Xiang-Jiao Yang, Department of Medicine

Dr. George Zogopoulos, Departments of Surgery and Oncology

Outside the Faculty of Medicine

Dr. Timothy Geary, Director of the Institute of Parasitology

Dr. Bettina Kemme, Director and Associate Professor, School of Computer Science

Dr. Bruce Lennox, Dean, Faculty of Science; Tomlinson Professor of Chemistry

Dr. Jim Nicell, Professor and Dean of Engineering

Mr. Marc Weinstein, Vice-Principal, University Advancement

Appendix C: Proposed Faculty Members, Titles and Affiliations

Full Members of McGill Cancer Institute (25)	Titles	Affilitations
Nicole Beauchemin	Professor & Project Director GCRC	GCRC & Dept. of Oncology, Biochemistry and Medicine
Maxime Bouchard	Professor	GCRC & Dept. of Biochemistry & Medicine
Josée Dosties	Professor	GCRC & Dept. of Biochemistry
Thomas Duchaine	Professor & Associate Director GCRC	GCRC & Dept. of Biochemistry
Imed Gallouzi	Professor	GCRC &Dept. of Biochemistry
Vincent Giguere	Professor	GCRC & Dept. of Biochemistry, Medicine & Oncology
Philippe Gros	Professor	GCRC &Dept. of Biochemistry
Sidong Huang	Associate Professor	GCRC &Dept. of Biochemistry
Lawrence Kazak	Assistant Professor	GCRC & Dept. of Biochemistry
Luke McCaffrey	Associate Professor	GCRC & Dept. of Oncology
William Muller	Professor	GCRC & Dept. of Oncology & Medicine
Alain Nepveu	Professor	GCRC & Dept. of Biochemistry & Medicine
Morag Park	Professor & Director GCRC	GCRC & Dept. of Biochemistry, Medicine & Oncology
Arnim Pause	Professor	GCRC & Dept. of Biochemistry
Jerry Pelletier	Professor	GCRC & Dept. of Biochemistry & Oncology
Daniela Quail	Assistant Professor	GCRC & Dept. of Physiology
Peter Siegel	Professor	GCRC & Dept. of Biochemistry, Medicine & Anatomy
Nahum Sonenberg	Professor	GCRC & Dept. of Biochemistry
Jose Teodoro	Professor	GCRC & Dept. of Biochemistry
Michel Tremblay	Professor	GCRC & Dept. of Biochemistry, Medicine & Oncology
Logan Walsh	Assistant Professor	GCRC & Dept. of Human Genetics
Ian Watson	Assistant Professor	GCRC & Dept. of Biochemistry
Yojiro Yamanaka	Associate Professor	GCRC & Dept. of Human Genetics
Xiang-Jiao Yang	Professor	GCRC & Dept. of Medicine
George Zogopoulos	Associate Professor	GCRC & MUHC-RI & Dept. of Surgery & Oncology

Appendix C: Proposed Faculty Associate Members, Titles and Affiliations

Associate Members of McGill Cancer Institute (13)	Titles	Affiliations
Tal Arbel	Professor	Dept. Electrical and Computer Engineering, Centre for Intelligent M
Guillaume Bourque	Associate Professor	Genome Innovation Centre & Dept. of Human Genetics
Alberto Cambrosio	Professor	Social Studies of Medicine
David Dankort	Associate Professor	Dept. of Biology
Allen Ehrlicher	Assistant Professor	Dept. of Bioengineering
Lorenzo Ferri	Professor	MUHC-RI & Dept. of Surgery & Oncology
Alexandre Gregorieff	Assistant Professor	MUHC-RI & Dept. of Pathology
David Juncker	Professor and Chair	Dept. of Biomedical Engineering
Chris Moraes	Assistant Professor	Dept. of Chemical Engineering
Janusz Rak	Professor	MUHC-RI & Dept. of Pediatrics
Martin Richer	Assistant Professor	GCRC & Dept. of Microbiology & Immunology
Kaleem Siddiqi	Professor and Director	School of Computer Science, Centre for Intelligent Machines
Jonathan Spicer	Assistant Professor	MUHC-RI & Dept. of Surgery

Appendix D: Timeline of Milestones for Proposal Development

December 2017	Dr. M. Park (Director, GCRC) presents 'Cancer Centre Vision' at the Dean's retreat. The presentation includes content on transition to an Institute.
December 2018	Dr. M. Park presents a follow-on presentation from the Dean's retreat at the Dean's Town Hall. This presentation includes further detail on the creation of a McGill Cancer Institute.
February 2019	Discussions launched with Dean (Faculty of Medicine) to create the McGill Cancer Institute (MCI).
March – April 2019	Preliminary discussions held with senior leadership of Goodman Cancer Research Centre (GCRC) culminating in a final meeting with PIs on the transition to an Institute on 26 April 2019.
August 2019	Presentation of Cancer Research Strategic Plan (CRSI) to Dean of Medicine by Director of GCRC outlining broad concepts of transition to Institute.
23 September 2019	CRSI briefed to Dean at *Deanery Executive Committee.* Concept supported by the Dean of Medicine – mandate from the Dean issued to begin formal process of developing a detailed proposal.
September 2019	GCRC engages in meetings and discussions to develop possible new organizational structures to support an institute as well as an environmental scan of additional advocates/stakeholders **(listed in Appendix B)**.
18 October 2019	Draft proposal for the creation of the McGill Cancer Institute (MCI) completed and submitted to the Faculty of Medicine for further discussion.
18 November 2019	Final proposal for McGill Cancer Centre presented to Dean of Medicine and Associate Dean of Research for review at Dean's Executive meeting.
5 December 2019	Presentation to Faculty Council and formal submission of final proposal to create MCI.
January 2020 (Exact Date TBC)	Presentation at the Faculty of Medicine Town Hall and to Faculty Council, where the proposal to create an Institute would seek approval.

Appendix E: Visiting speakers

Date	Name	Institution	City	Prov/State	Country
10-Jul-19	Direna Alonso Curbelo	Memorial Sloan Kettering Cancer Center	New York	New York	USA
12-Jun-19	Andrea Schietinger	Memorial Sloan Kettering Cancer Center	New York	New York	USA
29-May-19	John Lazo	University of Virginia Cancer Center	Charlottesville	Virginia	USA
03-May-19	Rene Bernards	Netherlands Cancer Institute	Amsterdam		Netherlands
23-Apr-19	Issac Harris	Harvard Medical School	Boston	Massachusetts	USA
16-Apr-19	Connie Eaves	British Columbia Cancer Agency	Vancouver	British Columbia	Canada
03-Apr-19	Joann B. Sweasy	Yale University of Medicine	New Haven	Connecticut	USA
20-Mar-19	Trevor Pugh	Princess Margaret Cancer Centre	Toronto	Ontario	Canada
20-Feb-19	Victor Ambros	University of Massachusetts Medical School	Worchester	Massachusetts	USA
28-Nov-18	Kin Chan	University of Ottawa Faculty of Medicine	Ottawa	Ontario	Canada
26-Nov-18	Igor Staglijar	University of Toronto	Toronto	Ontario	Canada
05-Nov-18	Poul H. Sorensen	University of British Columbia	Vancouver	British Columbia	Canada
31-Oct-18	Lars Zender	University Hospital Tübingen	Tübingen		Germany
29-Oct-18	Jorge Ruas	Karolinska Institutet	Stockholm		Sweden
24-Oct-18	Charles Boone	Donnelly Centre, University of Toronto	Toronto	Ontario	Canada
22-Oct-18	Andre Marette	Laval University	Quebec City	Quebec	Canada
10-Sep-18	Shoukat Dedhar	University of British Columbia	Vancouver	British Columbia	Canada
05-Sep-18	Brian Ruffell	H. Lee Moffitt Cancer Center and Research Institute	Tampa	Florida	USA
23-Jul-18	Amanda Lund	Knight Cancer Centre	Portland	Oregon	USA
04-Jul-18	Kristi Baker	Cross Cancer Institute and University of Alberta	Edmonton	Alberta	Canada

28-May-18	Erik Sahai	The Francis Crick Institute	London		UK
28-May-18	Arvind Singh Mer	Princess Margaret Cancer Centre	Toronto	Ontario	Canada
03-May-18	Etienne Caron	ETH Zurich	Zurich		Switzerland
02-May-18	Scott Blanchard	Weill Cornell Medicine	New York	New York	USA
19-Apr-18	Santiago Ramón y Cajal	University of Barcelona	Barcelona		Spain
18-Apr-18	Thomas F. Gajewski	University of Chicago Comprehensive Cancer Center	Chicago	Illinois	USA
09-Apr-18	Scott W. Lowe	Memorial Sloan-Kettering Cancer Center,	New York	New York	USA
04-Apr-18	Pamela Ohashi	Ontario Cancer Institute Princess Margaret Cancer Centre	Toronto	Ontario	Canada
28-Mar-18	David Brooks	Princess Margaret Cancer Centre	Toronto	Ontario	Canada
27-Mar-18	Ola Larrson	Karolinska Institutet	Stockholm		Sweden
28-Feb-18	Eran R. Andrechek	Michigan State University	East Lansing	Michigan	USA
02-Feb-18	Travar Hart	The University of Texas MD Anderson Cancer Center	Houston	Texas	USA
24-Jan-18	Krista Heinonen	Institut national de la recherche scientifique INRS-Institut Armand-Frappier	Laval	Quebec	Canada
15-Nov-17	Ben Ho Park	The Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins	Baltimore	Maryland	USA
06-Nov-17	Sachdev Sidhu	University of Toronto	Toronto	Ontario	Canada
27-Oct-17	Rosa Puertollano	National Institutes of Health	Bethesda	Maryland	USA
04-Oct-17	Christopher Rudd	Université de Montréal	Montreal	Quebec	Canada
28-Jun-17	Jody Haigh	Australian Centre for Regenerative Medicine	Wellington Road	Clayton	Australia
22-Jun-17	Poul HB Sorensen	University of British Columbia	Vancouver	British Columbia	Canada
07-Jun-17	Neal Rosen	Memorial Sloan Kettering Cancer Centre	New York	New York	Canada

17-May-17	Afshin Raouf	University of Manitoba	Winnipeg	Manitoba	Canada
15-May-17	Reiko Sugiura	Kindai University	Osaka		Japan
10-May-17	Andrew Ewald	The Johns Hopkins University School of Medicine	Baltimore	Maryland	USA
10-May-17	Tadashi Yamamoto	RIKEN Center for Integrative Medical Sciences	Tokyo		Japan
12-Apr-17	Lawrence Kazak	Dana-Farber Cancer Institute	Boston	Massachusetts	USA
22-Mar-17	Robert Day	Institut de pharmacologie de Sherbrooke	Sherbrooke	Quebec	Canada
14-Mar-17	Robert G. Roeder	The Rockefeller University	New York	New York	USA
01-Mar-17	Maxim Artyomov	Washington University School of Medicine	St Louis	Missouri	USA
01-Feb-17	Adam Bass	Harvard Medical School	Boston	Massachusetts	USA
09-Jan-17	Hartland Jackson	University of Zurich	Zurich		Switzerland
09-Dec-16	Elaine Fuchs	Howard Hughes Medical Institute	New York	New York	USA
26-Oct-16	Luc Furic	Monash University	Clayton	Victoria	Australia
21-Oct-16	Nissim Hay	University of Illinois at Chicago	Chicago	Illinois	USA
07-Sep-16	Jean Zhao	Dana-Farber Cancer Institute	Boston	Massachusetts	USA
18-May-16	Nabeel Bardeesy	Harvard Medical School	Boston	Massachusetts	USA
20-Apr-16	Danny Reinberg	School of Medicine Smilow Research Center	Philadelphia	Pennsylvania	USA
20-Jan-16	Thomas Tuschl	Howard hughes Medical Institute	New York	New York	USA
30-Oct-15	Zena Werb	University of California	San Francisco	California	USA
14-Oct-15	Avrum Spira	Boston University	Boston	Massachusetts	USA
16-Sep-15	Sylvain Martel	Polytechnique Montreal	Montreal	Quebec	USA
17-Jun-15	Nabeel Bardeesy	Harvard Medical School	Boston	Massachusetts	USA
20-May-15	Channing Der	University of North Carolina Chapel Hill	Chapel Hill	North Carolina	USA
18-Mar-15	Ola Larsson	Karolinska Institutet	Stockholm		Sweden

18-Feb-15	James DeCaprio	Dana-Farber Canacer Institute	Boston	Massachusetts	USA
13-Nov-14	Brooke Emerling	Weill Cornell Medical College	New York	New York	USA
05-Nov-14	Gerald Karsenty	Columbia University	New York	New York	USA
16-Oct-14	Trevor Bivona	Universioty of California	San Francisco	California	USA
15-Oct-14	Javier M Di Noia	Universite de Montreal	Montreal	Quebec	Canada
25-Sep-14	Ian R. Watson	M.D. Anderson Cancer Centre	Houston	Texas	USA
24-Sep-14	Christian Jobin	University of Florida College of Medicine	Gainesville	Florida	USA
18-Sep-14	Eric Haura	Moffitt Cancer Center	Tampa	Florida	USA

Appendix F: Goodman Cancer Research Centre "Lecture Series"

September 2014 to July 2019

Date	Speaker, Affiliation, Title
10 July 2019	Direna Alonso Curbelo, Ph.D. Postdoctoral Researcher Memorial Sloan Kettering Cancer Center Sloan Kettering Institute New York, NY Title: Chromatin remodeling licenses mutant Kras-driven pancreatic transformation
12 June 2019	Andrea Schietinger, Ph.D. Principal Investigator, Assistant Member Memorial Sloan Kettering Cancer Center, Sloan Kettering Institute New York, NY Title: Molecular and epigenetic programs defining tumor-specific T cell dysfunction and therapeutic reprogrammability
29 May 2019	Dr. John Lazo Harrison Distinguished Teaching Professor Department of Pharmacology Department of Chemistry Director, Fiske Drug Discovery Laboratory Associate Director for Basic Research, University of Virginia Cancer Center Adjunct Professor, Virginia Tech Carilion Research Institute University of Virginia, School of Medicine Title: Next-Generation Cell-active Inhibitors of the Undrugged Oncogenic PTP4A3 Phosphatase
3 May 2019	*"Phil Gold Distinguished Lectureship in Cancer Research"* Rene Bernards, Ph.D. Professor of Molecular Carcinogenesis Netherlands Cancer Institute Amsterdam Title: New approaches to the treatment of cancer
23 April 2019	Isaac Harris Department of Cell Biology Harvard Medical School Title: Understanding the roles of antioxidants in disease
16 April 2019	Connie J. Eaves, Ph.D., FRS(Canada) FRS(Edinburgh) Distinguished Scientist, Terry Fox Laboratory British Columbia Cancer Agency

	Professor, Departments of Medical Genetics, Medicine, and Pathology & Laboratory Medicine University of British Columbia Title: Deconvoluting Human Breast Cancer with De Novo Human Models
3 April 2019	Joann B. Sweasy, Ph.D. The Ensign Professor Of Therapeutic Radiology Associate Director for Basic Science, Yale Comprehensive Cancer Center Professor and Vice Chair, Dept. of Therapeutic Radiology Professor, Dept. of Genetics Yale University School of Medicine New Haven, CT Title: Base Excision Repair and Autoimmunity
20 March 2019	Trevor Pugh, Ph.D. Senior Scientist, Princess Margaret Cancer Centre Associate Professor, Department of Medical Biophysics, University of Toronto Title: Towards precision medicine at single cell resolution: from brains to bone marrow
20 February 2019	Victor Ambros Silverman Professor of Natural Sciences Program in Molecular Medicine University of Massachusetts Medical School Worcester, MA Title: Developmental regulation and function of let-7 microRNA inC. elegans
28 November 2018	Kin Chan Assistant Professor, Department of Biochemistry, Microbiology and Immunology University of Ottawa Faculty of Medicine, Ottawa Institute of Systems Biology Title: A Mutational Signature from Endogenous Metabolism Closely Resembles a Ubiquitous Signature from Cancers
26 November 2018	Igor Staglijar Professor Donnelly Centre Department of Molecular Genetics Department of Biochemistry Faculty of Medicine, University of Toronto

	Title: Toward Precision Medicine With Next-Generation EGFR inhibitors In Non-Small-Cell Lung Cancer
05 November 2018	Poul H Sorensen, MD, Ph.D. Johal Chair in Childhood Cancer Research Professor, Department of Pathology, University of British Columbia Distinguished Scientist, BC Cancer Research Centre Vancouver, BC Title: Translational control of tumour adaptation to microenvironmental stress
31 October 2018	Lars Zender, MD Professor and Chairman Internal Medicine VIII University Department of Medicine University Hospital Tübingen & Department of Physiology I Institute of Physiology Eberhard Karls University Tübingen, Germany Title: Cell Plasticity and Lineage Commitment in Liver Tumorigenesis
29 October 2018	Jorge Ruas, Ph.D. Associate Professor of Molecular Physiology Karolinska Institutet, Stockholm, Sweden Title: Molecular mechanisms of muscle adaptation to exercise and their impact: from metabolism to mental health
24 October 2018	Charles Boone, Ph.D. Professor, Department of Molecular Genetics Anne and Max Tanenbaum Chair in Molecular Medicine, Canada Research Chair in Proteomics, Bioinformatics and Functional Genomics Donnelly Centre, University of Toronto Title: Mapping Genetic Networks in Yeast and Human Cells
22 October 2018	Andre Marette, Ph.D. Research Chair in the pathogenesis of insulin resistance and cardiovascular complications Professor, Department of Medicine Faculty of Medicine, Laval University Editor-in-Chief American Journal of Physiology: Endocrinology & Metabolism Title: Role of immuno-metabolic sensors and the gut microbiota in the pathogenesis and treatment of obesity-linked inflammatory diseases
10 September 2018	Shoukat Dedhar, Ph.D., FRSC Professor, Biochemistry and Molecular Biology University of British Columbia Distinguished Scientist, BC Cancer

	Vancouver, BC Title: Carbonic Anhydrase IX as a Cancer Therapeutic Target: Molecular Mechanisms, Translational Strategies and Clinical Trials
5 September 2018	Brian Ruffell, Ph.D. Assistant Member, Department of Immunology, H. Lee Moffitt Cancer Center and Research Institute Tampa, FL Title: TIM-3 regulates dendritic cell function and anti-tumor immunity
23 July 2018	Amanda Lund, Ph.D. Assistant Professor Cell, Developmental & Cancer Biology Molecular Microbiology & Immunology, Dermatology Knight Cancer Institute OHSU (Oregon Health & Science University) Portland, Oregon Title: Lymphatic Vessels Regulate Cytotoxic Immunity in Melanoma
04 July 2018	Kristi Baker, Ph.D. Assistant Professor, Department of Experimental Oncology, Cross Cancer Institute and U of Alberta Title: Defective DNA repair in colorectal cancer controls anti-tumor immunity
28 May 2018	Erik Sahai, Ph.D. Group Leader, Cell Biology of the Tumour Microenvironment, Cancer Research UK London Research Institute, The Francis Crick Institute, London, UK Title: The Tumour Microenvironment and Therapy Failure
28 May 2018	Arvind Singh Mer, Ph.D. Postdoctoral Research Fellow Princess Margaret Cancer Centre University Health Network Toronto, Ontario Title: Towards Precision Medicine in Oncology
3 May 2018	Etienne Caron, Ph.D. ETH Zurich Institute of Molecular Systems Biology Zurich, Switzerland Title: Decoding cancer antigenomes by SWATH-MS for effective immunotherapies
02 May 2018	Scott Blanchard, Ph.D. Professor, Department of Physiology and Biophysics, Weill Cornell Medicine (WCM),

	New York, NY Title: Single-molecule FRET reveals the rate-determining event in substrate translocation on the ribosome
19 April 2018	Santiago Ramón y Cajal Professor and Chair of Department of Pathology, Vall d'Hebron University Hospital Autonoma University of Barcelona Title: Clonal heterogeneity in tumor diagnosis and In tumor progression
18 April 2018	Thomas F. Gajewski, MD, Ph.D. Professor, Department of Pathology, The Ben May Department for Cancer Research Department of Medicine, Section of Hematology/Oncology, University of Chicago Comprehensive Cancer Center (UCCCC), University of Chicago, Chicago, IL Title: Tumor and host factors regulating anti-tumor immunity and immunotherapy efficacy
9 April 2018	The Phil Gold Distinguished Lectureship in Cancer Research Scott W. Lowe, Ph.D. Investigator, Howard Hughes Medical Institute, Member, Memorial Sloan-Kettering Cancer Center, New York, NY Title: Cancer drivers and dependencies
4 April 2018	Pamela Ohashi, Ph.D. Director, Immune Therapy Program, Co-Director, Campbell Family Institute for Breast Cancer Research, Senior Scientist, Ontario Cancer Institute Princess Margaret Cancer Centre, University Health Network. Professor, Department of Medical Biophysics Canada Research Chair in Autoimmunity and Tumour Immunity, University of Toronto Title: Insights in Immune Regula<on from the Tumor Microenvironment
28 March 2018	David Brooks, Ph.D. Senior Scientist, Princess Margaret Cancer Centre, University Health Network, Toronto, ON

	Title: Inflammaton and immunosuppression: unifying mechanisms of disease in chronic virus infectons and cancer
27 March 2018	Ola Larsson, Ph.D. Senior Researcher, Department of Oncology-Pathology Karolinska Institutet, Stockholm, Sweden Title: Estrogen receptor alpha coordinates homeostatic gene expression programs via translational buffering
28 February 2018	Eran R. Andrechek, Ph.D. Assistant Professor, Department of Physiology, Michigan State University, Institute for Intgrative Toxicology, East Lansing, MI Title: Modeling breast cancer in mice; testing bioinformatic driven predictions
02 February 2018	Travar Hart, Ph.D. Assistant Professor, Department of Bioinformatics and Computational Biology, The University of Texas MD Anderson Cancer Center, Houston, Texas Title: Where are all the essential genes? Lessons from 400 whole-genome CRISPR screens in cancer cells
24 January 2018	Krista Heinonen, Ph.D. Associate Professor, Institut national de la recherche scientifique INRS-Institut Armand-Frappier, Laval, QC Title: Wnt-polarity pathways in hematopoietic stem cell expansion
15 November 2017	Ben Ho Park, MD, Ph.D. Associate Director, Hematology/Oncology Fellowship Training Program and Research Training and Education, Professor of Oncology, Breast and Ovarian Cancer Program, The Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins, Baltimore, MD Title: Breast Cancer Mutations for Diagnostic and Therapeutic Applications
6 November 2017	Sachdev Sidhu, Ph.D. Professor, The Donnelly Centre, Department of Molecular Genetics, University of Toronto; Toronto, ON Title: From antibodies to Synthetic Proteins

27 October 2017	Rosa Puertollano, Ph.D. Senior Investigator, Cell Biology and Physiology Center, National Heart, Lung, & Blood Institute, National Institutes of Health, Bethesda, MD Title: Emerging new roles of lysosomes in health and disease
4 October 2017	Christopher Rudd, Ph.D., D.Sc., FRCPath Professor of Medicine, Université de Montréal, Head, Immunology and Cell Therapy Centre de Recherche, Hôpital Maisonneuve-Rosemont, Montréal, QC Title: T-cell signalling and co-receptor function in cancer immunotherapy
28 June 2017	Jody Haigh, Ph.D. Associate Professor Division of Blood Cancers Associate Professor, Division of Blood Cancers Mammalian Functional Genetics Lab Head Associate Professor, Australian Centre for Regenerative Medicine (ARMI) Title: Novel roles of EMT transcription factors in hematopoiesis and leukemic transformation
22 June 2017	Poul HB Sorensen, MD, Ph.D. Johal Chair in Childhood Cancer Research Professor, Department of Pathology, University of British Columbia Distinguished Scientist, BC Cancer Research Centre Title*:* Translational control of cancer associated cell stress responses
7 June 2017	Neal Rosen, MD, Ph.D. Medical Oncologist Memorial Sloan Kettering Cancer Centre New York, New York Title: Allele-specific functional activation and therapeutic inhibition of oncogenic BRAF mutants
17 May 2017	Afshin Raouf, Ph.D. Research Institute in Oncology and Hematology University of Manitoba Title: Breast tumours induce fibroblasts-derived TGFβ suppression of progenitor pool in adjacent normal-like tissue
15 May 2017	Reiko Sugiura, MD, Ph.D. Genetics, Molecular Biology, Cell Biology Kindai University, Osaka, Japan Title: A Chemical Genetics Approach for the Discovery of Anti-Cancer Compounds based on the Kinase-Phosphatase Interplay in Ca^{2+} Signaling

10 May 2017	Andrew Ewald, Ph.D. Associate Professor Principal Investigator The Johns Hopkins University School of Medicine Title: Cellular and molecular mechanisms of breast cancer metastasis
10 May 2017	Professor Tadashi Yamamoto Head of *Cell Signal Unit* Okinawa Institute of Science and Technology Graduate University, Japan Director, RIKEN Center for Integrative Medical Sciences, Japan Title: Physiology of mRNA poly(A) tail and CCR4-NOT
12 April 2017	Lawrence Kazak, Ph.D. Dana-Farber Cancer Institute Department of Cancer Biology Boston, MA Title: Mechanisms of mitochondrial energetics in health and disease
22 March 2017	Robert Day, Ph.D Professeur Institut de pharmacologie de Sherbrooke Department de chirurgie / Service d'urologie Title: A novel therapeutic approach for advanced prostate cancer
14 March 2017	Robert G. Roeder, Ph.D. Arnold and Mabel Beckman Professor Laboratory of Biochemistry and Molecular Biology The Rockefeller University New York, NY Title: Mechanistic Studies of the Cooperative Functions of Transcriptional Coactivators
01 March 2017	Maxim Artyomov, Ph.D. Assistant Professor of Pathology and Immunology Department of Pathology and Immunology Division of Immunobiology Washington University School of Medicine Title: Systems immunology approach to understanding metabolic regulation of macrophage activation
01 February 2017	Adam Bass, MD Harvard Cancer Centre Dana-Farber Cancer Institute Assistant Professor, Medicine, Harvard Medical School Assistant Professor Of Medicine, Division of Cellular and Molecular Oncology Title: Translating the Genome in Gastroesophageal Cancer: Barriers and Opportunities
9 January 2017	Hartland Jackson, Ph.D. Institute of Molecular Life Sciences

	University of Zurich Switzerland Title: Systematic analysis of cell phenotypes and their social networks in breast cancer by multiplexed image cytometry analysis toolbox (miCAT)
9 December 2016	Elaine Fuchs, Ph.D. Investigator, Howard Hughes Medical Institute Rebecca C. Lancefield Professor Robin Chemers Neustein Laboratory of Mammalian Cell Biology and Development Title: Stem Cells in Silence, Action and Cancer
26 October 2016	Luc Furic, Ph.D. Department of Anatomy and Developmental Biology Monash University Clayton, VIC Australia Title: Targeting ribosome biogenesis and function to treat prostate cancer
21 October 2016	Nissim Hay, Ph.D. Distinguished UIC Professor Department of Biochemistry and Molecular Genetics College of Medicine University of Illinois at Chicago Title: Akt, metabolism, and cancer therapy: Surprising lessons from Akt KO mice
7 September 2016	Jean Zhao, Ph.D. Professor, Department of Biological Chemistry & Molecular Pharmacology Harvard Medical School Department of Cancer Biology Dana-Farber Cancer Institute Title: Targeting therapeutic resistance in cancer: From mouse models to human therapy
18 May 2016	Nabeel Bardeesy, Ph.D. Associate Professor, Massachusetts General Hospital Cancer Center; Harvard Medical School; Cambridge, MA Research Interest: pancreatic ductal adenocarcinoma; pancreatic cancer and biliary cancer Title: N/A
20 April 2016	Danny Reinberg, Ph.D Professor, Department of Biochemistry & Molecular Pharmacology, NYU School of Medicine Smilow Research center; New York Research Interest: regulation of gene expression in higher eukaryotes Title: “Epigenetics: One Genome Multiple Phenotypes”
20 January 2016	Thomas Tuschl, Ph.D. Professor, Howard Hughes Medical Institute, Rockefeller University, New York, NY

	Research Interest: role of RNA-binding proteins (RBPs) and noncoding RNAs (ncRNAs) in post-transcriptional gene regulation in human cells; extracellular RNAs, ovarian and testicular piRNAs; RNA fluorescence in-situ hybridization Title: "Isolation of extracellular nucleic acid and their diagnostic and biomarker potential"
30 October 2015	*"Research Day"* Keynote Speaker: Zena Werb, Ph.D. Professor and Vice-Chair, Department of Anatomy, University of California, San Francisco; San Francisco, California Title: "A Stem Cell Program in Metastatic Human Breast Cancer
14 October 2015	Avrum Spira, M.D., M.Sc. Professor of Medicine, Pathology, Laboratory Medicine, and Bioinformatics, Boston University; Boston, MA Research Interest: lung cancer and COPD genomics; smoking and airway gene expression; bioinformatics Title: "Translating Airway Gene Expression into Biomarkers for Lung Cancer Detection and Prevention"
16 September 2015	Sylvain Martel, Ph.D. Professor, Department of Computer Engineering, Polytechnique Montreal; Montreal, QC Research Interest: micro and nanosystems; nanorobotics; development of novel medical interventional platforms Title: "Fighting Cancer Using Swarms of Nanorobots"
20 May 2015	Dr. Channing Der Kenan Distinguished Professor, Lineberger Comprehensive Cancer Centre, Department of Pharmacology, University of North Carolina Chapel Hill, NC, USA Research Area: Ras superfamily GTPases, oncogenes, signal transduction, and target-based anti-cancer drug discovery Title: N/A
18 March 2015	Dr. Ola Larsson Assistant Professor at the Department of Oncology-Pathology, Karolinska Institutet, Sweden Research Area: mRNA translation, oncogenes, translational control, breast cancer Title: N/A
18 February 2015	Dr. James DeCaprio Associate Professor of Medicine, Dana-Farber Cancer Institute, Harvard Medical School Boston, MA, USA Research Area: DNA Tumour Viruses & Retinoblastoma Family of Tumour suppressors Title: N/A

13 November 2014	Dr. Brooke Emerling Instructor of Cancer Biology, Department of Medicine, Weill Cornell Medical College, New York, NY, USA Title: PI5P4K and CDCP1: The Achilles' heel of cancers
5 November 2014	Dr. Gerald Karsenty Professor and Chair, Genetics and Development Columbia University New York, USA Title: The Contribution of Bone to Whole Organism Physiology
16 October 2014	Trevor Bivona Assistant Professor, Departments of Medicine, Surgery, University of California - San Francisco California, USA Title: Improving Mechanism-based Therapy of Lung Cancer
15 October 2014	Dr. Javier M Di Noia Professeur agrégé de recherche, IRCM and Département de médecine (accréditations en biochimie et en microbiologie et immunologie) Université de Montréal, Montreal, QC Title: Antibody diversification by the enzyme AID: taming the mutator
25 September 2014	Dr. Ian R. Watson Postdoctoral Fellow, Department of Genomic Medicine, University of Texas M. D. Anderson Cancer Center Houston, Texas Title: From Genomic Discoveries to Clinical Therapies in Melanoma
24 September 2014	Dr. Christian Jobin Professor of Medicine, Division of Gastroenterology, Hepatology, and Nutrition University of Florida College of Medicine Gainesville, FL Title: Microbial activities and colorectal cancer: toward the development of novel therapeutics?
18 September 2014	Dr. Eric Haura Senior Member, Department of Thoracic Oncology, Chemical Biology and Molecular Medicine Program, Moffitt Cancer Center, Tampa, Florida Title: Targeting Kinases in Lung Cancer: Towards Proteome Informed Clinical Medicine

Appendix G: GCRC Funding 2014-2019

	Funding Agency	Project Title	Term	Total Grant ($)	Total Received GCRC	All Contributors
Arbel	Fonds Québécois de la Recherche sur la Nature et les Technologies (FQRNT)	REPARTI - Regroupement stratégique pour l'etude des Environnements Partages Intelligents	2019/04-2023/04	$ 1,800,000	$ 54,000	Gosselin C, Arbel T + 21 others from McGill University, École Polytechnique, U. de Montréal, U. de Sherbrooke
	Fonds Québécois de la Recherche sur la Nature et les Technologies (FQRNT)	UNIQUE - Union Neurosciences et Intelligence Artificielle Québec	2019/04-2021/04	$ 1,800,000	$ 54,000	Jerbi K, Arbel T + 46 other co-investigators from McGill, ETS, Polytechnique, UdeM, U.Laval,U.Sherbrooke
	Fonds Québécois de la Recherche sur la Nature et les Technologies (FQRNT)	Apprentissage automatique pour l'imagerie médicale interventionnelle	2018/04-2021/03	$ 180,000	$ 180,000	Siddiqi K, Lombaert H, Arbel T
	International Progressive MS Alliance	Identifying a biomarker of disability progression for use in clinical trials	2016/10-2020/09	$ 5,569,936	$ 1,113,987	Arnold D, Barkhof F, Chard D, Ciccarelli O, Collins DL, Cutter G, Guttmann C, Narayanan S, Precup D, Sormani MP, Hauser S, Henry R, Kappos L, Simon J, Uitdehaag B, Wolinsky J, Arbel T
	Natural Sciences and Engineering Research Council of Canada	Probabilistic Inference in Computer Vision and Medical Imaging	2015/04-2020/03	$ 215,000	$ 215,000	Arbel T
	Natural Sciences and Engineering Research Council of Canada	Automatic Segmentation of Healthy Tissues and Tumours in Patient Brain Images using 3D Fully Convolutional Neural Networks	2017/05-2019/05	$ 168,000	$ 168,000	Arbel T, Precup D
	Fonds Québécois de la Recherche sur la Nature et les Technologies (FQRNT)	REPARTI - Regroupement stratégique pour l'etude des Environnements Partages Intelligents	2013/04-2019/03	$ 2,159,658	$ 64,789	Laurendeau D, Arbel T + 34 others from Univerity of Laval, McGill University, Ecole Polytechnique
	Natural Sciences and Engineering Research Council of Canada	University-Industry CREATE Program in Medical Image Analysis	2012/04-2018/03	$ 1,650,000	$ 264,000	Siddiqi K, Arbel T, Collins DL, Descoteaux M, Laporte C, Pike B, Shmuel A, Arnold D, Bernasconi A, Cheriet F, Comeau R, Dagher A, DiRaddo R, Frey S, Goulet B, Grova C, Henri C, Jodin PM, Kry P, Lachaine M, Langer M, Mathieu P, Neelin P, Petrecca K, Pineau J, Precup D, Rosa-Neto P
	Natural Sciences and Engineering Research Council of Canada	Probabilistic Inference in Computer Vision and Medical Imaging	2010/04-2015/03	$ 215,000	$ 215,000	Arbel T
	McGill University	Computer Vision, Medical Imaging and Perceptual Modelling Lab	2014/04-2015/03	$ 54,640	$ 54,640	Arbel T
	Natural Sciences and Engineering Research Council of Canada	Probabilistic Segmentation of Multiple Sclerosis Lesions in Brain Images	2011/09-2014/12	$ 260,764	$ 234,687	Arbel T, Collins DL, Precup D
Beauchemin	Prostate Cancer Canada	Translational procedures and interventional platforms for optimal delivery of therapeutics to prostate cancer based on magneto-aerotactic MC-1 agents	2017/04-2020/03	$ 1,488,000	$ 50,000	Martel S, Beauchemin N, Radzioch D, Gaboury L, Pollak M, Lafleur M
	Cancer Research Society (CRS)	Susceptibility to immune-mediated colitis-associated colorectal cancer	2019/09-2021/08	$ 120,000	$ 50,000	Beauchemin N, Gros P, Greenwood C
	Cancer Research Society (CRS)	Genetic control of susceptibility to colon cancer development	2016/09-2018/08	$ 120,000	$ 60,000	Beauchemin N, Gros P, Greenwood C, Jothy S
	Canadian Institutes of Health Research (CIHR)	Metabolic functions of the PTPase SHP-1 in insulin target tissues	2012-2017	$ 766,905	$ 125,000	Marette A, Beauchemin N, Siminovitch K
	Canadian Institutes of Health Research (CIHR)	CEACAM1 in colon cancer progression and metastasis	2012/04-2017/03	$ 834,100	$ 834,100	Beauchemin N, Jothy S, Metrakos P
	Cancer Research Society (CRS)	Genetic control of susceptibility to colon cancer development	2014/08-2016/08	$ 120,000	$ 70,000	Beauchemin N, Gros P, Jothy S

	Terry Fox Research Institute (TFRI)	Metabolic control pathways in cancer: Control of the Warburg effect by AMPK	2011/07-2015/06	**See Team Grants**		
	Canadian Cancer Society Research Institute (CCSRI)	Host genetic determinants of colon cancer metastasis	2012/01-2014/12	$ 200,000	$ 10,000	Saleh M, Siegel P, Vidal S, Beauchemin N
	Cancer Research Society (CRS)	Genetic control of susceptibility to colon cancer development	2012/09-2014/08	$ 120,000	$ 60,000	Beauchemin N, Gros P, Jothy S
	Québec Consortium for Drug Discovery (CQDM)	SN38 drug encapsulation in liposomes transported by magnetotactic bacteria for localized colorectal cancer treatment	2011/09-2014/08	$ 1,900,000	$ 100,000	Martel S, Beauchemin N, Atkin M, Batist G, Gaboury L, Radzioch D, Vuong T
Bouchard	Natural Sciences and Engineering Research Council of Canada (NSERC)	Morphogenetic apoptosis in urinary tract development	2017/04-2022/03	$ 140,000	$ 140,000	Bouchard M
	Cancer Research Society (CRS)	Apoptosis resistance of prostate cancer stem cells	2017/09-2019/08	$ 120,000	$ 120,000	Bouchard M
	Canadian Institutes of Health Research (CIHR)	Apoptotic control of urinary tract morphogenesis by the IAP pathway (Bridge funding)	2018/07-2019/06	$ 100,000	$ 100,000	Bouchard M
	Canadian Institutes of Health Research (CIHR)	Role of Gata3 in prostate stem cells and cancer	2013/10-2018/09	$ 767,270	$ 767,270	Bouchard M
	Canadian Institutes of Health Research (CIHR)	Specification and morphogenesis of the urogenital system primordium	2013/10-2018/09	$ 767,265	$ 767,265	Bouchard M
	Kidney Foundation of Canada (KFOC)	Apoptotic control of distal ureter maturation	2014/07-2016/06	$ 100,000	$ 100,000	Bouchard M
	Kidney Foundation of Canada (KFOC)	Mouse models of urogenital developmental diseases	2012/07-2014/06	$ 100,000	$ 100,000	Bouchard M
Bourque	Canadian Institutes of Health Research (CIHR)	Integrated Human data repositories for infectious disease-related international cohorts to facilitate personalized medicine approaches to infectious disease research (CAN-SHARE)	2019/01-2023/12	$ 800,000	$ 156,000	Emerson C, Bourque G
	Canadian Institutes of Health Research (CIHR)	Common Infrastructure for National Cohorts in Europe, Canada, and Africa (CINECA)	2019/01-2023/12	$ 800,000	$ 180,000	Brinkman F, Bourque G
	Genome Canada	Tackling Childhood Brain Cancer at the root to improve survival and quality of life	2018/04-2022/03	$ 12,997,397	$ 319,760	Jabado N, Bourque G
	Genome Canada	Canadian Center for Computational Genomics (C3G)	2017/04-2022/03	$ 7,053,000	$ 3,473,267	Bourque G, Goldenberg A, Brudno M, Jacques P-E, Morris Q
	Genome Canada	McGill University and Génome Québec Innovation Center	2017/04-2022/03	$ 9,176,000	$ 805,037	Lathrop M, Bourque G, Ragoussis I
	Canadian Institutes of Health Research (CIHR)	Multidimensional Epigenomics Mapping Centre (EMC) at McGill	2017/04-2022/03	$ 4,400,000	$ 4,400,000	Bourque G, Barreiro L, Lathrop M
	Genome Canada	An integrative platform for metabolomics and systems biology	2018/10-2021/09	$ 1,094,607	$ 50,000	Xia J, Bourque G
	Genome Canada	Development and Validation of a Web-Based Platform for Environmental Omics and Toxicology	2018/10-2021/09	$ 999,019	$ 50,000	Xia J, Bourque G
	Canada Foundation for Innovation (CFI)	The Cancer Genome Collaboratory	2018/10-2021/09	$ 1,000,000	$ 567,745	Bourque G, Yann J
	Terry Fox Foundation (The)	Montreal Cancer Consortium (MCC)	2018/10-2020/09	$ 2,000,000	$ 150,000	Watson J, Stagg J, Bourque G…
	CANARIE Inc	Generalization of GenAP toward the growing single-cell and metabolomic communities	2018/07-2020/09	$ 244,626	$ 27,467	Jacques PE, Bourque G
	Canada Foundation for Innovation (CFI)	Treatment Outcomes in Mood Disorders	2015/04-2020/03	$ 2,893,000	$ 30,000	Meany M, Bourque G
	Canada Foundation for Innovation (CFI)	Canada's Genomics Enterprise (CGEn): A national genomic tools network for transforming life science research	2015/04-2020/03	$ 54,435,000	$ 5,000,000	Jones S, Ragoussis I, Marra M, Lathrop M, Brudno M, Scherer S, Bourque G

	Canadian Institutes of Health Research (CIHR)	Accessing chromatin interactions by high-resolution analyses of correlated regulatory element variation	2017/07-2020/03	$ 800,000	$ 800,000	Bourque G
	Canadian Foundation for Innovation	CanDIG: Canadian Distributed cyber-Infrastructure for Genomics	2016/04-2020/03	$ 5,000,000	$ 2,000,000	Brudno M, Virtanen C, Jacques P-E, Jones S, Bourque G
	Canadian Institutes of Health Research (CIHR)	Integrative Epigenomics of Obesity and Metabolic Complications-The Obesity Epigenomic Trilateral Project	2016/04-2020/03	$ 646,000	$ 646,000	Grundberg ELL, Chernof A, Lathrop M, Vohl M-C, Bourque G
	Canadian Institutes of Health Research (CIHR)	Canadian Epigenetics, Environment and Health Research Consortium Network	2016/04-2020/03	$ 2,000,000	$ 140,000	Hirst M, Arrowsmith C, Foster L, Pastinen T, Bourque G
	Natural Sciences and Engineering Research Council of Canada	The Cancer Genome Collaboratory	2014/04-2018/03	$ 6,000,000	$ 420,000	Stein L, Bourque G
	Genome Canada	Canadian Center for Computational Genomics (Technology Development)	2015/10-2017/09	$ 526,895	$ 265,000	Bourque G, Brudno M
	Canadian Institutes of Health Research (CIHR)	Multidimensional Epigenomics Mapping Centre (EMC) at McGill	2012/01-2016/12	$ 5,665,000	$ 280,000	Lathrop M, Meany M, Pastinen T, Bourque G
	Genome Quebec	Multidimensional Epigenomics Mapping Centre (EMC) at McGill	2012/01-2016/12	$ 320,000	$ 16,000	Lathrop M, Meany M, Pastinen T, Bourque G
	Genome Canada	Canadian Center for Computational Genomics	2015/04-2017/03	$ 1,000,050	$ 500,000	Bourque G, Brudno M
	Genome Quebec	Integrative Epigenomic Data Coordination Centre (EDCC) at McGill	2012/01-2016/12	$ 80,000	$ 80,000	Bourque G, Evans A, Lathrop M, Blanchette M, Hallett M, Joly Y
	Canadian Institutes of Health Research (CIHR)	Integrative Epigenomic Data Coordination Centre (EDCC) at McGill	2012/01-2016/12	$ 1,390,533	$ 1,390,533	Bourque G, Evans A, Lathrop M, Blanchette M, Hallett M, Joly Y
	Genome Canada	McGill University and Génome Québec Innovation Center	2015/04-2017/03	$ 2,000,000	$ 200,000	Lathrop M, Ragoussis I, Pastinen T, Bourque G
	W. Garfield Weston Foundation	Epigenetics and Mental Health	2013/04-2016/03	$ 1,494,900	$ 15,000	Meany M, Bourque G
	Canadian Institutes of Health Research (CIHR)	Genomic determinants of common long-term treatment effects in childhood acute lymphoblastic leukemia survivors	2011/04-2016/03	$ 2,445,045	$ 25,000	Sinnett D, Bourque G
	CANARIE Inc (Ottawa, ON)	Genetics and Genomics Analysis Platform (GenAP)	2014/01-2015/03	$ 771,000	$ 682,539	Bourque G
	Canadian Institutes of Health Research (CIHR)	Functional characterization of the endogenous retrovirus HERV-H family in human embryonic stem cells	2011/10-2015/09	$ 426,482	$ 426,482	Bourque G
Cambrosio	Institut National du Cancer (France)	Espaces d'Actionnabilité des Données en Oncologie (Landscapes of data and actionability in oncology)	2019/11-2023/12	Euros 393,201	$ 572,754	Cambrosio A
	Canadian Institutes of Health Research (CIHR)	Reshaping the cancer clinic: Genomics-driven clinical trials and the evanescent boundary between research and treatment	2019/04-2023/03	$ 566,100	$ 566,100	Cambrosio A
	Canadian Institutes of Health Research (CIHR)	Oncology's metaknowledge networks: an investigation of the collective dynamics of bioclinical innovation	2015/07-2019/06	$ 640,576	$ 500,000	Cambrosio A, Evans JA, Cointret JP, Bourret P, Keating P
	Institut National du Cancer (France)	Les thérapies ciblées à l'essai: une exploration sociologique de la médecine personnalisée en action (PERSONA)	2014/11-2017/10	Euros 259,376	$ 150,000	Bourret P, Canbrosio A, Bergeron, H, Castel P
	Canadian Institutes of Health Research (CIHR)	Genomic medicine enters the clinic: translational research, actionable mutations, clinical utility, and the reframing of oncology	2014/04-2018/03	$ 324,676	$ 275,000	Cambrosio A, Keating P
	Fonds Québécois de la Recherche sur la Société et la Culture (FQRSC)	Production et globalisation des savoirs et des pratiques dans le domaine biomédical: une approche interdisciplinaire et comparative	2012/04-2016/03	$ 359,320	$ 100,000	Cambrosio A, Keating P, Rees, T, Schlich T, Weisz G
Dankort	Canadian Institutes of Health Research (CIHR)	The role of oncogene induced senescence in BrafV600E-induced lung cancer progression	2017/06-2022/05	$ 654,000	$ 654,000	Dankort D
	Canadian Cancer Society Research Institute (CCSRI)	Targeting lung cancer stem cells in vivo	2016/02-2019/01	$ 200,000	$ 120,000	Dankort D
	Cancer Research Society	Identifying and targeting critical Pten proximal genes in BRafV600E malignant melanoma	2014/09-2016/08	$ 120,000	$ 120,000	Dankort D

	Canadian Institutes of Health Research (CIHR)	Identification of Critical Lung Cancer Targets Using Genetically Engineered KRas and Braf Mice	2009/10-2014/09	$ 689,165	$ 689,165	Dankort D
	Melanoma Research Alliance	Targeting critical Pten/PI3K pathway targets in BRaf600E malignant melanoma	2011/06-2014/06	$ 125,000	$ 125,000	Dankort D
	Canadian Cancer Society Research Institute (CCSRI)	Targeting the PTEN/PI3K signaling cascade in BrafV600E-induced malignant melanoma	2011/07-2014/06	$ 336,760	$ 336,760	Dankort D
	Canada Foundation for Innovation (CFI)	Identification of critical targets in melanoma and lung cancer initiation and progression	2009/06-2014/06	$ 446,312	$ 443,312	Dankort D
Dostie	Natural Sciences and Engineering Research Council of Canada (NSERC)	Linking RNA to chromatin landscape and organization	2019/04-2024/03	$ 210,000	$ 210,000	Dostie J
	Canadian Institutes of Health Research (CIHR)	Discovering Spatial Epigenetics	2015/07-2020/06	$ 889,506	$ 889,506	Dostie J
	Canadian Institutes of Health Research (CIHR)	Defining regulatory landscapes within Hox clusters (extended by maternity leave of coapplicant)	2011/07-2016/06	$ 189,600	$ 189,600	Kmita MT, Dostie J
	RIKEN Yokohama Institute	Temporal dynamics of promoter/enhancer contacts	2015/02-2017/08	$ 14,000	$ 14,000	Dostie J
	Canadian Cancer Society Research Institute (CCSRI)	Classifying leukemia with chromatin conformation signatures	2014/09-2017/08	$ 450,000	$ 450,000	Dostie J
	McGill University	Temporal dynamics of promoter/enhancer contacts	2014/08-2015/07	$ 14,992	$ 14,992	Dostie J
Duchaine	Canadian Institutes of Health Research (CIHR)	Functional genomics of microRNA polycistrons	2019/10-2024/09	$ 983,026	$ 983,026	Duchaine T
	Canadian Institutes of Health Research (CIHR)	MicroRNA cooperativity in mRNA translation repression and deadenylation, from genome edition to single-molecule imaging	2017/04-2022/03	$ 585,225	$ 585,225	Duchaine T
	Natural Sciences and Engineering Research Council of Canada (NSERCj	The NIP proteins: Inhibitors of nuclear RNA interference	2017/04-2022/03	$ 200,000	$ 200,000	Duchaine T
	International Human Frontier Science Program Organization	RNAi memories: functional genomics of small RNA-mediated epimutations in C. elegans	2015/09-2019/08	$ 1,166,664	$ 388,888	Duchaine T, Miska E, Sarov M
	Cancer Research Society (CRS)	Moving targets: Differential regulation of PTEN 3'UTR isoforms by microRNAs in cancer	2014/09-2016/08	$ 120,000	$ 120,000	Duchaine T
	Canadian Institutes of Health Research (CIHR)	Synergistic miRNA-binding sites, and 3' untranslated regions: a dialogue of silence	2012/10-2017/09	$ 663,400	$ 663,400	Duchaine T
	Natural Sciences and Engineering Research Council of Canada (NSERC)	Making sense of antisense: the activities of RNA-dependent RNA polymerases in endogenous RNAi	2012/04-2017/03	$ 170,000	$ 170,000	Duchaine T
	Susan G Komen Breast Cancer Foundation	Impact of miR-26 family of miRNAs on the stromal-epithelial dialogue in breast cancer	2011/09-2014/08	$ 180,000	$ 180,000	Duchaine T
	Canadian Institutes of Health Research (CIHR)	Mechanism of microRNA action in translation and mRNA decay	2009/04-2014/03	$ 784,635	$ 156,927	Sonenberg N, Duchaine T
Ehrlicher	Canadian Institutes of Health Research (CIHR)	Mechanotransduction in the actin cytoskeleton	2016/10-2021/09	$ 300,000	$ 300,000	Ehrlicher A
	Prostate Cancer Canada	Mechanical Asymmetries in Metastasis	2019/04-2021/04	$ 200,000	$ 200,000	Ehrlicher A
	Canadian Institutes of Health Research (CIHR)	Cellular mechanotransduction in the actin cytoskeleton	2015/07-2020/06	$ 685,000	$ 685,000	Ehrlicher A
	Canada Foundation for Innovation (CFI)	CFI 8: Integrated Quantitative Biosciences Initiative (IQBI)	2015/12-2020/05	$ 12,549,600	$ 125,496	Vogel J, Abouheif E, Brouhard G, Cosa G, Larsson H, Oeffinger M, Lasko P, Lamother RR, Michnick S, Ehrlicher A
	Canada Foundation for Innovation (CFI)	Active Biological Mechanics	2014/04-2019/04	$ 700,000	$ 700,000	Ehrlicher A

	Natural Sciences and Engineering Research Council of Canada	Regulated dissipation in active mechanobiology	2014/04-2019/03	$	150,000	$ 150,000	Ehrlicher A
	Natural Sciences and Engineering Research Council of Canada	Bioengineering Facility for UV Photomanipulation	2018/04-2019/03	$	150,000	$ 150,000	Ehrlicher A
	CIHR/NSERC	Biophysical Tools for the Characterization of Breast Cancer Cell Migration and Invasion	2016/04-2019/03	$	545,000	$ 50,000	Brown C, McCaffrey L, Siegel P, Ehrlicher A
	Canadian Cancer Society Research Institute (CCSRI)	Braking metastasis: characterizing and targeting mechanical changes in cancer migration	2015/08-2018/07	$	200,000	$ 200,000	Ehrlicher A, Park M, Siegel P, Sangwan V
	Fonds de recherche du Québec - Nature et technologies (FRQNT)	Optimization, fabrication, and evaluation of new three-dimensional composite materials inspired by nacre	2015/05-2018/05	$	229,777	$ 76,592	Barthelat F, Barret C, Ehrlicher A
	McGill University	Bionegineering department startup funding	2013/08-2016/07	$	50,000	$ 50,000	Ehrlicher A
	Natural Sciences and Engineering Research Council of Canada	NSERC Research Tools and Instruments Grants Program: Bioengineering Facility for Confocal Rheology	2015/04-2016/03	$	15,000	$ 150,000	Ehrlicher A, Hendricks A, Barett C, Brown C, Nicolau D, Barthela F, Vogel J, Mongeau L, Lamother RR, Nazhat S
	Natural Sciences and Engineering Research Council of Canada	Soft-tissue diagnostic instrumentation based on simultaneous viscoelastic and fluid-flow measurements	2014/07-2015/01	$	25,000	$ 25,000	Ehrlicher A.
Ferri	Cancer Research UK	STrOmal ReprograMing (STORMing) Provides New Directions to Prevent and Revert Chronic Inflammation-Associated Cancers	2019/01-2024/05	$	34,000,000	$ 1,878,000	Tlsty T, Park M, Ingber D, Winton D, Nolan G, Goldenring J, Roybal K, Ferri L, McDonald S, Huang S, Alon U
	Cancer Research Society (The)	Preclinical testing of personalized therapy in esophago-gastric adenocarcinoma	2019/09-2021/08	$	120,000	$ 60,000	Sangwan V, Ferri L
	Cancer Research Society (The)	Identifying somatically acquired molecular events promoting the progression of esophagogastric adenocarcinoma to peritoneal metastasis	2019/09-2021/08	$	120,000	$ 60,000	Balley S, Ferri L
	Canadian Institutes of Health Research (CIHR)	Investigating the Role of Neutrophil Extracellular Traps in Cancer Metastasis	2014/04-2019/03	$	707,201	$ 707,201	Ferri L
	Rossy Cancer Network	Streamlining the Trajectory for Oesophago-gastric Patients with Cancer within the Rossy Cancer Network and Beyond	2014/10-2016/10	$	100,000	$ 100,000	Ferri L
	Canadian Institutes of Health Research (CIHR)	Acute bacterial infection promotes cancer metastasis through toll like receptor signal transduction	2011/09-2015/08	$	497,572	$ 497,572	Ferri L
Gallouzi	Natural Sciences and Engineering Research Council of Canada (NSERC)	The role of posttranslational modifications on the function of RNA binding proteins during muscle fiber formation	2019/04-2020/03	$	32,000	$ 32,000	Gallouzi I
	Canadian Institutes of Health Research (CIHR)	The role of the RNase G3BP1 in Senescence	2018/10-2023/09	$	814,726	$ 814,726	Gallouzi I
	Canadian Institutes of Health Research (CIHR)	Delineating the Mechanisms Underlying Nitric Oxide Induced Muscle Wasting During Cachexia	2018/10-2023/09	$	804,780	$ 804,780	Gallouzi I
	Canadian Institutes of Health Research (CIHR)	Elucidation of regulatory mechanisms modulating STAT3 expression during cancer-induced muscle atrophy	2015/07-2020/06	$	698,090	$ 698,090	Gallouzi I
	Natural Sciences and Engineering Research Council of Canada (NSERC)	The role of alternative polyadenylation on the expression of the alarmin HMGB1	2014/04-2019/03	$	205,000	$ 205,000	Gallouzi I
	Canadian Institutes of Health Research (CIHR)	The role of trans- and cis-acting factors in the regulation of mRNA encoding modulators of senescence and the Senescence- Associated Secretory Phenotype	2012/04-2017/03	$	803,945	$ 803,945	Gallouzi I
	Prostate Cancer Canada	Elucidation of regulatory mechanisms mediating STAT3 function during cancer-induced muscle wasting	2014/05-2016/04	$	200,000	$ 200,000	Gallouzi I
	Canadian Cancer Society Research Institute (CCSRI)	Role of stress granules in preventing cancer-induced muscle wasting	2014/02-2016/01	$	197,074	$ 197,074	Gallouzi I
	Canadian Institutes of Health Research (CIHR)	2nd International Cancer Cachexia Conference: Evolving Mechanisms and Therapies	2014/03-2014/10	$	10,000	$ 10,000	Gallouzi I

	Natural Sciences and Engineering Research Council of Canada (NSERC)	Identification of the posttranscriptional regulatory network of the pro-inflammatory cytokine HMGB1	2009/07-2014/06	$ 280,000	$ 280,000	Gallouzi I
Giguère	Canadian Institutes of Health Research (CIHR)	Transcriptional control of cancer metabolism	2018/07-2025/06	$ 3,587,401	$ 3,587,401	Giguère V
	Canadian Institutes of Health Research (CIHR)	Transcriptional control of energy metabolism by the nuclear receptor ERRa: implications in the development and treatment of metabolic diseases	2018/04-2018/06	$ 47,812	$ 47,812	Giguère V
	Terry Fox Research Institute (TFRI)	Oncometabolism and the molecular pathways that fuel cancer	2015/07-2019/06	**See Team Grants**		Giguère V, Pause A, Topisirovic I, St-Pierre J, Pollak M, Sonenberg N, Siegel P, Jones R, Muller W (+ co-applicants)
	Canadian Cancer Society Research Institute (CCSRI)	mTOR interaction with DNA-PK: a novel complex on chromatin and its impact on the progression of prostate cancer	2017/02-2019/01	$ 196,000	$ 196,000	Giguère V
	Consortium Québécois sur la découverte du médicament	Zebrafish HTS platforms for nuclear receptor related drug discovery and pathway elucidation	2015/07-2018/06	$ 500,000	$ 175,000	Krause H, Giguère V
	Canadian Institutes of Health Research (CIHR)	The ERR pathway: control of energy metabolism and its implication in metabolic disorders	2013/04-2018/03	$ 802,290	$ 802,290	Giguère V
	Canadian Institutes of Health Research (CIHR)	Role of epigenetic modulation in breast cancer etiology and drug resistance	2013/04-2018/03	$ 1,250,000	$ 250,000	Muller W, Giguère V
	Cancer Research Society (CRS)	RUNX1 as a key determinant of nuclear receptor signaling in poor outcome triple negative breast cancer	2015/09-2017/08	$ 120,000	$ 120,000	Giguère V
	Canadian Institutes of Health Research (CIHR)	Molecular and genetic analysis of ERR function in breast cancer	2011/10-2016/09	$ 826,080	$ 826,080	Giguère V
	Consortium Québécois de la Découverte des Médicaments	A platform for in vivo nuclear receptor (NR) drug screening and the discovery of new pathways in metabolic disease and cancer	2013/09-2016/08	$ 270,000	$ 270,000	Krause H, Giguère V
	Canadian Institutes of Health Research (CIHR)	Transcriptional control of metabolism by estrogen related receptors (ERRs)	2011/04-2016/03	$ 863,140	$ 863,140	Giguère V
	CIHR/TFRI	Defining and Applying Oncometabolism	2011/07-2014/06	**See Team Grants**		Tremblay M, Beauchemin N, Jones R, Pause A, Pollak M, Sonenberg N, St-Pierre J, Topisirovic I, Beaudry S
	Canadian Institutes of Health Research (CIHR)	Preclinical models and therapeutic targets for metastatic breast disease	2009/07-2014/06	**See Team Grants**		Muller W, Giguère V, Park M, Siegel P, Hallett M, Ursini-Siegel J
Gregorieff	McGill University, Department of Pathology	Generation of an ex vivo organoid-based model of colorectal cancer liver metastasis	2018/05-2019/05	$ 15,000	$ 15,000	Gregorieff A
	Canadian Institutes of Health Research (CIHR)	Role of Hippo signaling in myofibroblasts during gut regeneration and tumorigenesis	2018/04-2023/03	$ 650,250	$ 650,250	Gregorieff A
	Cancer Research Society (The)	Dissecting the role of Yap-regulated Clusterin in colorectal cancer	2018/09-2020/09	$ 120,000	$ 120,000	Gregorieff A
	Research Institute of the McGill University Health Centre	Start up funds	2017/04-2020/04	$ 300,000	$ 300,000	Gregorieff A
Gros	Canadian Institutes of Health Research (CIHR)	Genetic analyses of susceptibility to infections and inflammation	2016/07-2023/06	$ 2,170,000	$ 2,170,000	Gros P
	Cancer Research Society (CRS)	Susceptibility to immune-mediated colitis-associated colorectal cancer	2019/09-2021/08	$ 120,000	$ 70,000	Beauchemin N, Gros P, Greenwood C
	Canadian Institute for Advanced Research (CIFAR)	Senior Fellow of the Canadian Institute for Advanced Research Program: Humans and the Microbiome	2015/03-2019/07	$ 60,000	$ 60,000	Gros P
	Canadian Institutes of Health Research (CIHR)	Immunopathogenesis of Inflammatory Diseases: genetic, cellular and molecular pathways regulating acute and chronic inflammation	2014/04-2019/03	$ 750,000	$ 210,000	Vidal S, Gros P
	Corbin Therapeutics	Development of pharamacological modulators of USP15 for use in multiple sclerosis	2017/01-2018/12	$ 559,000	$ 401,000	Gros P

	Cancer Research Society (CRS)	Genetic Control of Susceptibility to Colon Cancer Development	2016/09-2018/08	$ 120,000	$ 60,000	Beauchemin N, Gros P
	Inception Science Inc.	Epigenetic based discovery and validation of novel targets inflammatory diseases	2016/05-2018/05	$ 169,784	$ 121,274	Gros P
	Blueline Bioscience	Characterization of pharmacological targets in the CCDC88B-defined inflammatory pathway	2014/12-2016/12	$ 208,950	$ 149,250	Gros P
	Cancer Research Society (CRS)	Genetic control to susceptibility to colon cancer	2014/09-2016/08	$ 120,000	$ 40,000	Beauchemin N, Gros P, Jothy S
	Canadian Institutes of Health Research (CIHR)	Genetic studies of blood stage malaria: from mouse models to human disease	2012/04-2017/03	$ 711,115	$ 711,115	Gros P
	AmorChem	The validation and role of USP15 in neuroinflammation and identification and partial optimization of small molecules modulators	2013/12-2016/09	$ 1,269,476	$ 906,476	Gros P
	Canadian Institutes of Health Research (CIHR)	Role of Vangl proteins in normal development and in neural tube defects	2011/10-2016/09	$ 730,740	$ 730,740	Gros P
	National Institutes of Health (NIH) (USA)	Genetic determinants of susceptbility to mycobacterial infections	2011/04-2016/12	$ 903,795	$ 903,795	Gros P
	Raptor Pharmaceuticals	Pre-clinical development of cysteamine-artemisinin combination therapy for malaria	2013/07-2015/07	$ 141,000	$ 101,000	Gros P
	Cancer Research Society (CRS)	Genetic control to susceptibility to colon cancer	2012/09-2014/08	$ 120,000	$ 50,000	Beauchemin N, Gros P, Jothy S
	Canada Foundation for Innovation (CFI)	McGill University Life Sciences Complex: Disease to Therapy Initiative	2009/06-2014/06	$ 26,600,000	$ 230,000	Thomas D, Shore G, Matlashewski G, Pelletier J, Hanrahan J, Gehring K, Hallett M, Sonenberg N, Gros P, Roy R
Huang	Alex's Lemonade Stand Foundation	Identifying targeted treatments for DICER1 - associated sarcomas	2019/10-2021/09	$ 250,000	$ 166,250	Foulkes W, Huang S
	CRS	Uncovering tumor-intrinsic effectors and regulators of PD-L1 in triple-negative breast cancer	2018/09-2020/08	$ 120,000	$ 120,000	Huang S
	CIHR	Innovative pre-clinical models to overcome drug resistance in triple negative breast cancer	2016/04-2021/03	$ 952,425	$ 138,000	Basik M, Greenwood C, Park M, Huang S
	CIHR	Targeting vulnerabilities in SMARCA4-deficient lung cancers	2018/04-2019/03	$ 25,000	$ 25,000	Huang S
	CIHR	Targeting vulnerabilities in SMARCA4-deficient lung cancers	2018/04-2019/03	$ 845,325	$ 845,325	Huang S
	CCSRI	Targeting tyrosine kinase signaling networks to reverse STAT family-driven breast cancer immune suppression	2017/02-2020/01	$ 441,000	$ 55,000	Ursini-Siegel J, Huang S
	FRQS	COSMET (COmbination and Screening of Multidimensional biomarkers in melanoma and lung carcinoma to advance immunoTherapy)	2016/08-2019/08	$ 375,000	$ 30,000	Spatz A, Haddad E, Batist G, Watson I, van Kempen L, Lapointe R, Huang S
	CFI	Using functional genomics to guide targeted cancer therapy	2014/03-2019/03	$ 330,000	$ 330,000	Huang S
	CIHR	Drug resistance driven by SWI/SNF chromatin remodelers in lung cancer	2013/10-2018/09	$ 815,192	$ 815,192	Huang S
	CCSRI	Targeting c-Kit mutated melanomas with inhibitors of Mink 1/2	2015/08-2018/07	$ 198,609	$ 47,500	Miller W, Huang S
Juncker	Canadian Institutes of Health Research (CIHR)	Microfiltration of Circulating and Disseminated Tumor Cells in Ovarian Cancer: From Monitoring Therapeutic Response Towards Predicting Disease Outcome	2019/01-2022/12	$ 382,500	$ 382,500	Juncker D, Mes-Masson A-M, Veres T
	Genome Canada	Digital Omics of Single Exosomes	2018/07-2021/06	$ 2,001,438	$ 1,401,007	Juncker D, Rak J, Metrakos P, Siegel P, Akavia UD

	Canada Foundation for Innovation (CFI)	Ontario-Quebec Center for Organ-on-a-Chip Engineering	2017/04-2021/03	$	10,587,979	$ 635,278	Radisic M, Juncker D
	Natural Sciences and Engineering Research Council of Canada	Elements and systems for ultrasensitive protein analysis	2016/04-2021/03	$	540,000	$ 535,000	Juncker D
	Canada Foundation for Innovation (CFI)	Targeting the Tumour Microenvironment: Bridging Basic Science and Therapy	2015/03-2017/12	**See Team Grants**			Park M, Huang S,Jones R, Juncker D, Mes-Masson A-M, Pelletier J, Pollak M, Siegel P, Sonenberg N, Tremblay M
	Fonds Québécois de la Recherche sur la Nature et les Technologies (FQRNT)	Imagerie de sécrétome sur les tissus vivants/Imaging the secretome of living tissues	2017/04-2020/03	$	228,866	$ 113,400	Juncker D, Wiseman P
	Fonds Québécois de la Recherche sur la Nature et les Technologies (FQRNT)	Microfluidique de transformation: Théorie et application du camouflage de matière et d'énergie dans les fluides/ Microfluidics of transformation: Theory and applications of energy and mass cloaking in fluids	2017/04-2020/03	$	229,198	$ 48,600	Gervais T, Juncker D, Mes Masson A-M, Robert E, Masson JF, Prudhomme S
	Natural Sciences and Engineering Research Council of Canada	Zetasizer Ultra for Advanced Characterization of Microplastics, Nanomaterials and Biocolloids	2019/04-2020/03	$	121,145	$ -	Tufenkji N, Juncker D
	Natural Sciences and Engineering Research Council of Canada	Colocalization-by-linkage assay on microparticles (CLAMP): A multiplex immunoassay platform for quantitative proteomics	2018/07-2019/06	$	125,000	$ 125,000	Juncker D
	Canadian First Research Excellence Fund	Developing vascularized brain organoids on chip for high throughput screening	2018/01-2019/12	$	170,000	$ 85,000	Kennedy TE, Barrett CJ, Juncker D
	Natural Sciences and Engineering Research Council of Canada	Aptamer-based enrichment system and capillary chip for low-abundance water contaminant detection to ensure aquaculture safety and quality	2016/11-2019/10	$	552,000	$ 331,200	Juncker D, Siaj M
	Natural Sciences and Engineering Research Council of Canada	Additive manufacturing of organs-on-a-chip using biodegradable elastomeric polymers	2017/10-2019/09	$	545,244	$ 163,573	Radisic M, Juncker D
	Natural Sciences and Engineering Research Council of Canada	Development of novel devices for assessing drugs promoting neuronal regeneration	2018/07-2019/06	$	25,000	$ 25,000	Juncker D
	Natural Sciences and Engineering Research Council of Canada	Rapid two-stage test for diagnosis of bacterial urinary tract infection and antibiotic resistance determination	2017/04-2020/03	$	552,000	$ 331,200	Juncker D, Ward B
	Canada Foundation for Innovation (CFI)	Tools for Nanoscience and Technology upgrade ('Nanotools 2')	2013/12-2018/11	$	11,300,371	$ -	Grutter P, Juncker D
	Genome Canada	Single Exosome Multi-Omic Analysis	2016/07-2018/06	$	250,000	$ 175,000	Juncker D, Akavia UD, Rak J
	C-IMPACTS	Development of a low-cost water monitoring kit for multiplex heavy metal detection based on aptamer sensors	2015/04-2018/03	$	229,320	$ 160,524	Juncker D, Srivastava R
	Canadian Institutes of Health Research (CIHR)	Generating innovation through the use of common data: Improving the diagnosis and treatment of youth mild traumatic brain injury in Canada	2013/04-2018/03	$	1,312,995	$ -	Gagnon I, Juncker D
	Quebec Breast Cancer Foundation	High-throughput in silico and in vitro platforms to target tumor-stroma codependencies	2015/03-2018/02	$	499,580	$ 74,978	Park M, Juncker D
	Natural Sciences and Engineering Research Council of Canada	High throughput microscopy system for ultrasensitive and multiplexed nano array analysis	2016/11-2017/10	$	148,945	$ 148,945	Juncker D, Kennedy, Wiseman
	Natural Sciences and Engineering Research Council of Canada	NSERC CREATE training program in Neuroengineering	2011/04-2017/03	$	1,750,500	$ 87,525	Lennox B, Kirk AG, Barrett C, Colman D, Mauzeroll J, Grutter P, Wiseman P, Constantino S, Juncker D
	Fonds Québécois de la Recherche sur la Nature et les Technologies (FQRNT)	Conception, la fabrication et le développement d'un système gastro-intestinal microfluidique miniaturisé dans un laboratoire sur puce (GITOC)	2014/01-2016/12	$	180,000	$ 90,000	Prakash S, Juncker D
	Ministère de l'Enseignement Supérieur Recherche Science	Plateforme de criblage d'appariement d'anticorps et d'analyse de protéines	2013/10-2016/09	$	250,000	$ 180,000	Juncker D, Unlu S
	Natural Sciences and Engineering Research Council of Canada	Visualizing and Directing Dynamic DNA Nanostructure Synthesis With Single-Molecule Resolution	2015/06-2016/05	$	150,000	$ -	Leslie S, Sleiman H, Wiseman P, Juncker D

	Canadian Institutes of Health Research (CIHR)	Multidimensional Separation Isolation and Characterization of Circulating Tumor Cells	2013/04-2016/05	$	552,250	$ 330,000	Juncker D, Mihalcioiu C, Park M, Veres T
	Natural Sciences and Engineering Research Council of Canada	New approaches to multiplexed protein profiling of complex samples with ultrahigh sensitivity	2011/04-2016/03	$	225,000	$ 225,000	Juncker D
	Natural Sciences and Engineering Research Council of Canada	NSERC CREATE training program in integrated sensor systems	2010/03-2016/02	$	1,650,000	$ 165,000	Kirk A, Chaker M, Chodavarapu V, Desjardins P, Drouin P, Frechette L, Grutter P, Juncker D
	Canadian Cancer Society	Novel role of the 06-methylguanine-DNA methyltransferase (MGMT) in glioblastoma angiogenesis and invasion: Biological and clinical significance	2013/08-2015/07	$	200,000	$ 20,000	Sabri S, Abdulkarim B, Jean-Claude B, Rak J, Juncker D
	Canadian Institutes of Health Research (CIHR)	Blood-based protein test for early detection of breast cancer using antibody colocalization microarrays	2012/09-2015/08	$	210,140	$ 160,000	Juncker D, Hallett M, Park M
	Rosalind and Morris Goodman Cancer Research Centre - Townshend/Lamarre Innovative Research Award	A microfluidics approach to analyzing novel protein interactions in DNA replication in normal and cancer cells	2013/12-2014/11	$	20,000	$ 2,000	Zannis-Hadjopoulos M, Edwards B, Juncker D
Kazak	Canadian Institutes of Health Research (CIHR)	Physiology and mechanisms of adipocyte creatine energetics	2018/10-2023/09	$	883,850	$ 883,850	Kazak L
	Canadian Institutes of Health Research (CIHR)	Investigating LKB1-mediated inflammation as a mediator of tumour	2018/07-2023/06	$	837,675	$ 350,000	Jones R, Kazak L
	Natural Sciences and Engineering Research Council of Canada (NSERC)	Mechanisms of mitochondrial proteostasis in mammals	2019/04-2024/03	$	205,000	$ 205,000	Kazak L
	McGill - GCRC	New Investigator Recruitment Package	2018/01-2020/12	$	300,000	$ 300,000	Kazak L
	McGill - FoM	New Investigator Recruitment Package	2018/01-2020/12	$	300,000	$ 300,000	Kazak L
	National Institutes of Health (NIH) (USA)	Creatine metabolism in obesity and diabetes	2017/07-2022/06	$	924,000	$ 90,000	Kazak L
McCaffrey	Cancer Research Society (The)	Targeting novel cancer-promoting pathways in breast cancer	2019/09-2021/08	$	120,000	$ 120,000	McCaffrey L
	Canadian Institutes of Health Research (CIHR)	Distinct roles for the Par6 polarity protein in development of low- and high-grade breast cancers	2018/04-2023/03	$	898,000	$ 898,000	McCaffrey L
	Department of Defense (USA)	Detecting and preventing progression of high-risk pre-cancerous breast lesions	2017/12-2020/12	$	375,000	$ 375,000	McCaffrey L
	Quebec Breast Cancer Foundation	Molecular mechanisms of the transition from a normal to malignant epithelial state in early breast cancer	2015/01-2018/12	$	452,000	$ 452,000	McCaffrey L
	Susan G. Komen Breast Cancer Foundation (The)	Mechanisms of normal-to-malignant transformation in the breast	2015/10-2018/10	$	450,000	$ 450,000	McCaffrey L
	Canadian Cancer Society Research Institute (CCSRI)	Early-stage breast cancer mechanics: novel tools to predict disease progression	2016/02-2018/01	$	200,000	$ 40,000	Moraes C, McCaffrey L
	FRQS	Polarité des cellules épithéliales dans le développement des glandes mammaires et du cancer du sein	2013/10-2016/09	$	45,000	$ 45,000	McCaffrey L
	Roses of Hope Foundation	Predicting Breast Cancer Progression	2016/06-2017/05	$	10,000	$ 10,000	McCaffrey L
	Pink in the City	Understanding Breast Cancer Initiation	2016/04-2017/03	$	30,000	$ 30,000	McCaffrey L
	Canadian Institutes of Health Research (CIHR)	Cell polarity in mammary morphogenesis and cancer	2012/04-2017/03	$	734,255	$ 734,255	McCaffrey L
	CIHR/NSERC	Biophysical Tools for the Characterization of Breast Cancer Cell Migration and Invasion	2016/04-2019/03	$	545,000	$ 20,000	McCaffrey L

	Cancer Research Society (The)	Understanding the benign-to-malignant transition in breast cancer	2014/09-2016/08	$ 120,000	$ 120,000	McCaffrey L
	Terry Fox Foundation (The)	Epithelial polarity in tumor invasion and metastasis	2011/10-2014/09	$ 439,115	$ 439,115	McCaffrey L
Moraes	Québec Consortium for Drug Discovery (CQDM)	Development of a high throughput 3D microphysiological platform for rapid automated assessment of human brain organoids response to drugs targeting neurological disorders	2020/01-2023/01	$ 1,600,000	$ 650,000	Moraes C, Durcan T, Healy L, Magdesian M, Fon T
	Québec Consortium for Drug Discovery (CQDM)	Heating up the fight against cancer – The development of a physiologically-relevant high throughput bioprinted 3D human tumour microenvironment assay that recreates immune “hot” and “cold” tumours	2019/01-2021/12	$ 1,639,200	$ 25,000	Wadsworth S, Park M, Moraes C, Richer M
	Canadian Cancer Society Research Institute (CCSRI)	Reconceptualizing cancer metastasis as a balance of intra-tumoral mechanical forces	2018/08-2021/08	$ 200,000	$ 200,000	Moraes C
	McGill University	Nature-inspired nanostructures: designing next generation antimicrobial biomaterials	2019/01-2020/07	$ 150,000	$ 25,000	Nguyen D, Tufenkji N, Moraes C
	Canada Foundation for Innovation (CFI)	Cellular Microenvironment Design Lab	2015/10-2020/05	$ 300,000	$ 300,000	Moraes C
	Natural Sciences and Engineering Research Council of Canada	Single-cell mechanobiology: microengineered tools to study cell-matrix remodelling	2015/05-2020/05	$ 175,000	$ 175,000	Moraes C
	Canada Foundation for Innovation (CFI)	Ontario-Quebec Center for Organ-on-a-Chip Engineering	2017/05-2020/05	$ 10,370,000	$ 300,000	Radisic M, Moraes C, Wheeler A, McGuigan A, Guenther A, Simmons C, Juncker D, Young E, Selvaganapathy R, Tsai S
	Canada Foundation for Innovation (CFI)	Soft Tissue Characterization and Processing Facility	2017/05-2020/05	$ 1,450,000	$ 500,000	Mongrain R, Leask R, Moraes C
	Fonds de recherche du Québec - Nature et technologies (FRQNT)	Placenta-on-a-chip to mimic mother-fetus transfer: tools for high-throughput screening of drugs and environmental contaminants	2017/04-2020/04	$ 135,000	$ 135,000	Moraes C
	Fonds de la Recherche en Santé du Québec (FRSQ)	Multimodal strategies for the targeted treament of high-risk cancers	2016/08-2019/08	$ 476,250	$ 75,000	Park M, Zhang N, Gervais T, Mes-Masson AM, Moraes C
	Natural Sciences and Engineering Research Council of Canada	Imaging system for live 3D tissue engineered constructs	2019/05-2019/05	$ 150,000	$ -	Hoesli C, Kinsella M, Mongeau L, Moraes C
	Canadian Cancer Society Research Institute (CCSRI)	Early-stage breast cancer mechanics: novel tools to predict disease progression	2016/02-2019/02	$ 200,000	$ 160,000	Moraes C, McCaffrey L
	Natural Sciences and Engineering Research Council of Canada	Bioengineering Facility for UV Structured Substrate Patterning	2018/09-2018/09	$ 150,000	$ 10,000	Ehrlicher A, Moraes C, Bub G, Juncker D, Hendricks A, Nazhat S, Siegel P, Kinsella M
	McGill University	Startup Funds	2014/08-2017/08	$ 115,000	$ 115,000	Moraes C
	Saint-Gobain Recherche	Interactions between biomaterials and monocytes	2014/09-2016/09	$ 261,800	$ 800	Hoesli C, Moraes C, Tufenkji N, Leask R
	Natural Sciences and Engineering Research Council of Canada	A unique bioplotter for the printing of cellular dense collagen and other biopolymer gels	2016/04-2016/04	$ 150,000	$ 50,000	Nazhat S, Cerruti M, Li N, Moraes C
	Montreal Children's Hospital	A new strategy to preserve fertility in girls with cancer	2016/05-2017/05	$ 50,000	$ 10,000	Clarke H, Moraes C
	Natural Sciences and Engineering Research Council of Canada	Developing mechanically realistic high-throughput lung tissue culture platforms	2016/11-2017/05	$ 25,000	$ 25,000	Moraes C
	Natural Sciences and Engineering Research Council of Canada	Applying dynamic mechanical forces to cells cultured in three-dimensional matrices	2016/03-2016/09	$ 25,000	$ 25,000	Moraes C
Muller	Canadian Cancer Society Research Institute (CCSRI)	Evaluating the role of integrin signalling in breast cancer dormancy	2019/07-2021/06	$ 200,000	$ 200,000	Muller W
	Canadian Institutes of Health Research (CIHR)	Oncogene-mediated signal transduction in transgenic mouse models of human breast cancer	2016/07-2023/06	$ 3,769,080	$ 3,769,080	Muller W

	National Institutes of Health (NIH) (USA)	Mechanism-based strategies to target ER-mutant endocrine resistant breast cancer	2018/04-2023/03	$ 306,479	$ 306,479	Osterreich S, Muller W
	Canadian Institutes of Health Research (CIHR)	Role of epigenetic modulation in breast cancer etiology and drug resistance	2017/10-2020/09	$ 600,000	$ 600,000	Muller W, McCaffrey L
	Cancer Research Society (The)	Role of an alternative splice isoform of ErbB2 in tumor progression	2018/09-2020/08	$ 120,000	$ 120,000	Muller W
	Terry Fox Research Institute (TFRI)	Oncometabolism and the Molecular Pathways that Fuel Cancer	2015/07-2019/06		**See Team Grants**	Giguère V….
	Cancer Research Society (The)	The role of an alternative ErbB2 splice isoform in lung and breast cancer progression	2016/09-2018/08	$ 120,000	$ 120,000	Muller W
	Canadian Institutes of Health Research (CIHR)	Role of epigenetic modulation in breast cancer etiology and drug resistance	2013/04-2018/03	$ 1,250,000	$ 1,250,000	Muller W, Giguère V
	Canadian Institutes of Health Research (CIHR)	Identification of PI-3K coupled signalling pathways involved in mammary tumour progression: Implication for resistance to targeted therapy	2014/04-2016/06	$ 378,551	$ 378,551	Muller W
	Canadian Institutes of Health Research (CIHR)	Oncogene-mediated signal transduction in ErbB2 transgenic models of mammary tumour progression	2013/10-2016/06	$ 423,473	$ 423,473	Muller W
	Canadian Cancer Society Research Institute (CCSRI)	Targeting canonical Wnt/ß-catenin signalling in ErbB2 mammary tumour progression	2014/02-2016/01	$ 195,000	$ 195,000	Muller W
	Canadian Institutes of Health Research (CIHR)	The role of ErbB2-14-3-3 sigma signaling axis in cancer and development	2010/10-2015/09	$ 778,470	$ 778,470	Muller W
	Terry Fox Research Institute (TFRI)	Oncometabolism in Poor Outcome Breast Cancer: Unravelling metabolic adaptations	2014/07-2015/06	**See Team Grants**		Park M, Jones R…
	Cancer Research Society (The)	Integrin-mediated signal transduction in transgenic mouse models of human breast cancer	2012/01-2014/12	$ 449,661	$ 449,661	Muller W
	National Institutes of Health (NIH) (USA)	Mechanisms of breast cancer progression	2009/09-2014/08	$ 726,047	$ 726,047	Chodosh LA, Condeelis J, Cardiff RD, Muller W
	Canadian Cancer Society Research Institute (CCSRI)	Preclinical models and therapeutic targets for metastatic breast disease	2009/07-2014/06	**See Team Grants**		Muller W…
	Canadian Institutes of Health Research (CIHR)	The role of Epidermal Growth Factor Receptor Family in mammary tumorigenesis and metastasis	2009/04-2014/03	$ 775,265	$ 775,265	Muller W
Nepveu	CCS/CQDM/Neomed Institute	CUX1 and PARG As Therapeutic Targets for Hard-To-Treat Breast Cancers	2019/04-2022/03	$ 1,500,000	$ 604,954	Nepveu A, Witcher M, Payza K
	Canadian Cancer Society Research Institute (CCSRI)	DNA repair properties and vulnerability of triple negative breast cancer cells	2019/07-2021/06	$ 200,000	$ 200,000	Nepveu A
	Canadian Institutes of Health Research (CIHR)	Base Excision Repair in Cancer- New Mechanisms, Dependencies and Vulnerabilities	2018/04-2023/03	$ 826,000	$ 826,000	Nepveu A
	Natural Sciences and Engineering Research Council of Canada	Accessory Factors in DNA Repair	2016/04-2021/03	$ 190,000	$ 190,000	Nepveu A
	Fonds de la Recherche en Santé du Québec (FRSQ)	Stratégies exploitant les voies de signalisation et reparation de l'ADN pour la médecine personnalisée et le cancer	2017/12-2020/12	$ 247,650	$ 39,000	Masson JY, Nepveu A
	Cancer Research Society (The)	Effects of DNA pol β Modulation on the Response to Treatments	2017/09-2019/08	$ 120,000	$ 120,000	Nepveu A
	Cancer Research Society (The)	Resistance of Cancer Cells to Mono-Alkylating Chemotherapies	2015/09-2017/08	$ 120,000	$ 120,000	Nepveu A
	Canadian Institutes of Health Research (CIHR)	Structure/Function Analysis of Cut Repeat Domains in Base Excision Repair	2014/10-2019/09	$ 604,954	$ 604,954	Nepveu A
	Canadian Cancer Society Research Institute (CCSRI)	Exploiting DNA Repair Properties of Cancer Cells	2014/09-2016/08	$ 199,262	$ 199,262	Nepveu A

	Canadian Institutes of Health Research (CIHR)	Transcription and Translesion Synthesis	2009/09-2014/08	$ 699,675	$ 699,675	Nepveu A
Park	Cancer Research UK	A new way to tackle cancers caused by inflammattion	2019/01-2024/05	$ 34,000,000	$ 1,000,000	Tlsty T, Park M, Ingber D, Winton D, Nolan G, Goldenring J, Roybal K, Ferri L, McDonald S, Huang S, Alon U
	CIHR	Mechanism of Met activation in cancer and therapeutic intervention	2015/09-2022/08	$ 3,507,282	$ 3,507,282	Park M
	CIHR	Innovative pre-clinical models to overcome drug resistance in triple negative breast cancer	2017/07-2022/06	$ 952,425	$ 130,000	Basik M, Park M, Greenwood C, Huang S
	Ministère de l'Économie et de l'Innovation	Quebec Cancer Consortium	2019/04-2023/03	$ 27,900,000	$ 325,000	Park M, Roy D-C, Saad F, Zogopoulos G, Batist G.
	Fonds de la Recherche en Santé du Québec (FRSQ)	Banque de tumeurs	2017/04-2022/03	$ 500,000	$ 250,000	Mes-Masson, Park M
	CQDM	Heating up the fight against cancer: The development of a physiologically-relevant high throughput bioprinted 3D human tumor microenvironment assay that recreates immune "hot" and "cold" tumours	2019/01-2021/12	$ 1,639,200	$ 885,168	Wadsworth S, Park M, Moraes C, Richer M
	FRQS-Oncopole	Vulnérabilités ciblées pour vaincre la pharmacorésistance dans les cancers du sein (Targetable vulnerabilities to overcome drug resistance in poor outcome breast cancers)	2018/10-2021/09	$ 1,500,000	$ 300,000	Park M, Kleinman C, Ferbeyre G, Ursini-Siegel J, Basik M, Pollak M, Witcher M, Hassan S, Mader S
	SU2C	Translational development of novel drugs targeting cancer vulnerabilities	2016/04-2021/03	$ 9,000,000	$ 1,198,300	Aparicio S, Mak T, Park M, Gelmon K, Pritchard K
	Fonds de la Recherche en Santé du Québec (FRSQ)	Multimodal strategies towards precision treatment for high burden cancers	2016/08-2019/07	$ 476,250	$ 476,250	Park M, Zhang N, Gervais T, Mes-Masson AM, Moraes C
	Worldwide Cancer Research	KIBRA: A tumor suppressor for triple negative breast cancer	2016/01-2018/12	$ 397,430	$ 397,430	Park M
	QBCF-CRS	High-throughput in silico and in vitro platforms to target tumor-stroma codependencies	2015/01-2018/12	$ 499,580	$ 424,602	Park M, Juncker D
	Cancer Research Society (The)	Inference of tumor microenvironment interactions as a new drug	2016/09-2018/08	$ 120,000	$ 30,000	Haibe-Kaines B, Juncker D, Park M
	Canadian Foundation for Innovation	Targeting the Tumor Microenvironment: Bridging Basic Science and Therapy	2015/03-2017/12	$ 5,900,000	$ 5,900,000	Park M, Huang S, Jones R, Juncker D, Mes-Masson AM, Pelletier J, Pollak M, Siegel P, Sonenberg N, Tremblay M
	Cancer Research Society (The)	Modeling poor outcome Triple Negative Breast Cancer	2015/09-2017/08	$ 120,000	$ 120,000	Park M
	National Institutes of Health (NIH) (USA)	Genetic analysis of the breast tumor microenvironment	2012/06-2017/05	$ 783,450	$ 783,450	Ostrowski M, Leone G, Hallett M, Park M
	Fonds de la Recherche en Santé du Québec (FRSQ)	Banque de tumeurs	2011/04-2017/03	$ 300,000	$ 300,000	Mes-Masson, Park M
	Canadian Cancer Society Research Institute (CCSRI)	Gastric cancer, mechanisms for intervention	2014/02-2016/01	$ 200,000	$ 200,000	Park M
	Canadian Institutes of Health Research (CIHR)	Mechanisms of oncogenic activation of the met RTK in human cancer	2013/04-2015/08	$ 445,420	$ 445,420	Park M
	Canadian Institutes of Health Research (CIHR)	Role of Gab family signal amplifiers in tumorigenesis and invasion	2010/10-2015/08	$ 733,786	$ 733,786	Park M
	Canadian Institutes of Health Research (CIHR)	Role of Crk adapter proteins in cell invasion and metastasis	2008/08-2014/07	$ 900,000	$ 900,000	Park M
	Québec Consortium for Drug Discovery (CQDM)	Development of integrated tumor-microenvironmental classifiers for personalized therapy targeting	2011/09-2014/08	$ 1,312,501	$ 888,055	Park M, Hallett M, Omergoglu A

Pause	Canadian Institutes of Health Research (CIHR)	Interplay of AMPK and mTOR pathways at the lysosomes: starvation, nutrient availability and metabolic disease	2019/10-2024/09	$ 956,250	$ 956,250	Pause A
	Canadian Institutes of Health Research (CIHR)	Haploinsufficient loss of ESCRT components as new drivers of cancer	2017/04-2022/03	$ 956,250	$ 956,250	Pause A
	Cancer Research Society (The)	Role of FLCN/AMPK/TFEB axis in breast cancer metabolic adaptation and metastatic	2018/07-2020/06	$ 120,000	$ 120,000	Pause A
	Canadian Cancer Society Research Institute (CCSRI)	Haploinsufficient loss of ESCRT compotents as new drivers of cancer	2017/02-2020/01	$ 300,000	$ 300,000	Pause A
	Terry Fox Research Institute (TFRI)	Oncometabolism and the Molecular Pathways that Fuel Cancer: Metabolic checkpoints and cancer metabolism	2015/07-2019/06	**See Team Grants**		
	Kidney Foundation of Canada (KFC)	Role of FLCN in RCC metastatic progression and drug resistance	2016/07-2018/06	$ 100,000	$ 100,000	Pause A
	Canadian Cancer Society Research Institute (CCSRI)	Investigation of tumour suppressive mechanism of ESCRT-dependent receptor degradation	2014/02-2016/01	$ 200,000	$ 200,000	Pause A
	Kidney Foundation of Canada (KFC)	Investigation of VHL and p53 cooperation in HIF activation, metabolism and tumorigenesis	2013/07-2015/06	$ 100,000	$ 100,000	Pause A
	WIS-GCRC	Characterization of the FLCN/AMPK/GABARAP in cancer metabolism	2013/04-2014/03	$ 40,000	$ 40,000	Pause A
	McGill University	Characterization of HD-PTP in metastatic tumor progression	2013/04-2014/03	$ 20,000	$ 20,000	Pause A
	Canadian Institutes of Health Research (CIHR)	Defining and Applying Oncometabolism	2011/07-2015/06	**see Team Grants**		
Pelletier	Canadian Institutes of Health Research (CIHR)	Targeting Deregulated Translational Control in Cancer	2016/07-2023/03	$ 2,571,989	$ 2,571,989	Pelletier J
	CFI	Targeting the Tumour Microenvironment: Bridging Basic Science and Therapy	2015/09-2022/08	**See Team Grants**		Park M, Juncker D, Pelletier J, Tremblay M, Sonenberg N, Siegel P, Jones R, Huang S
	Genome Canada	The Center for Phenogenomics	2017/04-2022/03	$ 8,750,000	$ 127,859	McKerlie C, Vidal S, Pelletier J
	Canadian Cancer Society Research Institute (CCSRI)	Direct inhibition of mRNA translation for treatment of pancreatic cancer	2017/02-2019/01	$ 196,000	$ 30,000	Pollak M, Pelletier J, Topisirovic I
	The Richard and Edith Strauss Canada Foundation	McGill University Gene and Cell Therapy Center	2018/07-2019/06	$ 500,000	$ 180,000	Pelletier J, Tremblay M, Laneuville P
	The Richard and Edith Strauss Canada Foundation	McGill University Gene and Cell Therapy Center	2017/07-2018/06	$ 500,000	$ 180,000	Pelletier J, Tremblay M, Laneuville P
	The Richard and Edith Strauss Canada Foundation	McGill University Gene and Cell Therapy Center	2016/07-2017/06	$ 500,000	$ 180,000	Pelletier J, Tremblay M, Laneuville P
	The Richard and Edith Strauss Canada Foundation	McGill University Gene and Cell Therapy Center	2013/10-2016/09	$ 300,000	$ 150,000	Pelletier J, Tremblay M
	Cancer Research Society (The)	Engineering Chromosome Translocations to Recapitulate Primary Events of Human Cancer	2014/09-2016/08	$ 120,000	$ 120,000	Pelletier J, Laneuville P
	McGill University	Conditional Genome Engineering in Mice	2014/09-2016/08	$ 150,140	$ 150,140	Pelletier J, Johnson N
	Canadian Institutes of Health Research (CIHR)	Modeling Translation Inhibition as Cancer Therapy	2010/10-2015/09	$ 797,050	$ 797,050	Pelletier J
	CCSRI	Chemical Dissection of Translation Initiation	2009/07-2014/06	$ 690,000	$ 690,000	Pelletier J
	Lilly	Identifying “first-in-class” eIF4E inhibitors using 4E-CLIP - a novel cell-based assay system	2012/07-2014/06	$ 300,000	$ 300,000	Pelletier J
	Canadian Institutes of Health Research (CIHR)	RNA Helicases in Tumorigenesis	2011/10-2016/09	$ 770,226	$ 770,226	Pelletier J

	NIH	Targeting the DHX9 Helicase for Small Molecule Probe Discovery	2012/08-2015/07	$	517,696	$ 517,696	Pelletier J
	Canadian Cancer Society Research Institute (CCSRI)	DHX9 – Evaluating a Novel Anti-Neoplastic Drug Target In Vivo	2012/08-2014/07	$	200,000	$ 200,000	Pelletier J
	Canadian Cancer Society Research Institute (CCSRI)	Functional analysis of cancer genomes using a Cas9-based engineering platform	2014/08-2016/07	$	200,000	$ 200,000	Pelletier J
	Blueline Biosciences	Structure-Activity Studies on Hippuristanol – A first-in-class anti-neoplastic targeting deregulated translational control	2015/02-2016/09	$	176,000	$ 148,354	Pelletier J, Deslongchamps P
Quail	Brain Tumor Funders' Collaborative	Harnessing the brain tumor-immune microenvironment to therapeutic efficacy	2019/01-2021/12	$	986,841	$ 328,947	Quail D, Walsh L, Akkari L; Collaborators: Brandsma D, Borst G, Westerga J, Petrecca K, Guiot M-C
	Canadian Institutes of Health Research (CIHR)	Impact of obesity-associated inflammation on cancer progression. Objectives: Define how mTORC1 & the IL5-GMCSF cytokine axis regulate mRNA translation in neutrophils during obesity; how diet content impacts liver inflammation and metastasis	2018/10-2023/09	$	944,776	$ 944,776	Quail D; Collaborators: Dannenberg AJ, Walsh L, Park M, Sonenberg N, Larsson O, Siegel P, Muller W
	Canada Foundation for Innovation (CFI)	Tier II Canada Research Chair in Tumor Microenvironment & Canada Foundation for Innovation (CRC-CFI)	2018/04-2023/03	$	350,000	$ 350,000	Quail D
	Susan G. Komen Breast Cancer Foundation (The)	Impact of obesity-associated inflammation on breast cancer metastasis	2018/06-2021/05	$	476,445	$ 381,156	Quail D; Collaborators: Sonenberg N, Muller W; Decision makers: Dannenberg AJ, Park M, Beauchemin N, Siegel P
	Goodman Cancer Research Centre, McGill University	New Investigator Recruitment Package	2017/08-2020/07	$	300,000	$ 300,000	Quail D
	Faculty of Medicine, McGill University	New Investigator Recruitment Package	2017/08-2019/07	$	200,000	$ 200,000	Quail D
Rak	Canadian Institutes of Health Research (CIHR)	OSMR signalling in glioblastoma	2019/04-2024/03	$	750,000	$ 100,000	Arezu JA, Rak J
	Canadian Institutes of Health Research (CIHR)	Targeting vascular mechanisms of cancer progression	2015/09-2022/09	$	3,313,788	$ 3,313,788	Rak J
	Canadian Institutes of Health Research (CIHR)	Molecular hallmarks of breast cancer sensitivity to ErbB2-targeted therapies	2018/04-2023/03	$	684,675	$ 5,000	Rosen K, Rak J
	Genome Canada	Single Exosome Proteomics Technology for Biomedical Research and Clinical Applications	2018/08-2021/08	$	667,157	$ 60,000	Rak J
	New Frontiers in Research Fund (NFRF)	Photonically Active Nanofluidic Platform for Noninvasive Cancer Diagnosis via Isolation and Analysis of Single Exosomes	2019/06-2021/06	$	200,000	$ 200,000	Mahshid S, Rak J
	Cancer Research Society (The)	KDM5C mutations as determinants of sex-dependent therapy in renal cell carcinoma	2017/09-2019/09	$	120,000	$ 5,000	Riazalhosseini Y, Rak J
	Canadian Institutes of Health Research (CIHR)	Coagulation system effectors as regulators of tumour dormancy and therapeutic targets	2014/01-2019/01	$	710,000	$ 710,000	Rak J, Zadeh G, Weitz J, Jabado N, Foster P, Croul S, Nakano I, Majewski J, Aldape K, Mackman N
	Quebec Breast Cancer Foundation	New Generation Diagnostics in Breast Cancer	2014/10-2010/10	$	500,000	$ -	Basik M, Majewski J, Rak J
	Canadian Cancer Society Research Institute (CCSRI)	Exosomal Perp emission in response to targeted breast cancer therapy: diagnostic implications	2016/04-2018/03	$	200,000	$ -	Rosen K, Rak J
	Canadian Cancer Society Research Institute (CCSRI)	Age-specific antiangiogenic therapy in metastatic cancer	2015/04-2017/03	$	450,000	$ 450,000	Rak J, Platt R, Tanguay S, Emmenegger U, Riazalhosseini Y
	Genome Canada	Single Exosome Multi-Omic Analysis	2016/06-2018/06	$	250,000	$ 25,000	Juncker D, Rak J
	Genome Canada	Biomarkers in pediatric glioblastoma through genomics and epigenomics - iCHANGE – Integrated childhood astrocytoma integrated genomics and epigenomics	2013/01-2017/01	$	5,000,000	$ 50,000	Jabado N, Majewski J, Pastenin T, Barlett-Esquilant G, Bouffet E, Bourque G, Fernandez C, Kislinger T, Lachaine J, Montpetit A, Rak J, Tremblay M, Zadeh G

	Canadian Institutes of Health Research (CIHR)	Oncogene-containing microvesicles as mediators and messengers of tumor progression	2011/07-2016/07	$ 774,560	$ 774,560	Rak J, Guha A
	Canadian Cancer Society Research Institute (CCSRI)	An integrated fluidic chip for exosome analysis	2014/04-2016/03	$ 200,000	$ 200,000	Kelley S, Rak J
	Canadian Cancer Society Research Institute (CCSRI)	Novel role of the O6-methylguanine-DNA methyltransferase (MGMT) in glioblastoma	2014/04-2016/04	$ 200,000	$ -	Sabri S, Rak J
	Cancer Research Society (The)	MicroRNA networks as regulators of the tumor-vascular interface	2013/10-2015/09	$ 120,000	$ 120,000	Rak J
	Cancer Research Society (The)	Monitoring MGMT status as a blood-based biomarker	2014/04-2016/03	$ 120,000	$ 1	Sabri S, Rak J
	Canadian Institutes of Health Research (CIHR)	Tissue factor in tumour progression and angiogenesis	2010/04-2015/03	$ 744,120	$ 744,120	Rak J, Guha A, Weitz J
Richer	Canadian Institutes of Health Research (CIHR)	Host and viral determinants of ZIKV fitness and the immune response to infection	2019/04-2024/03	$ 830,025	$ 166,005	Sagan S, Richer M
	Canadian Institutes of Health Research (CIHR)	The impact of host-pathogen interactions on cell-mediated immunity	2017/04-2022/03	$ 757,350	$ 757,350	Richer M
	Natural Sciences and Engineering Research Council of Canada	Regulation of CD4 T cell antigen sensitivity by cytokines	2016/07-2021/06	$ 145,000	$ 145,000	Richer M
	McGill University	Start-up Funds	2014/10-2017/10	$ 190,000	$ 190,000	Richer M
	Canada Foundation for Innovation (CFI)	Laboratory to study the regulation of CD8 T cell function in health and disease	2015/07-2020/06	$ 250,000	$ 250,000	Richer M
	Fonds de recherche du Québec - Santé (FRQS)	Régulation de la function des cellules T CD8 par les cytokines	2016/07-2019/06	$ 60,000	$ 60,000	Richer M
	Fonds de recherche du Québec - Santé (FRQS)	Starting Grant for Young Investigators	2016/07-2019/06	$ 60,000	$ 60,000	Richer M
	McGill University Microbiology and Immunology Department	Host and viral determinants of ZIKV fetal pathogenesis	2017/04-2018/03	$ 10,000	$ 5,000	Richer M, Sagan S
	McGill University	Regulation of CD8 T cell Antigen Sensitivity by Inflammatory Cues	2015/09-2016/08	$ 25,000	$ 25,000	Richer M
	McGill Microbiome and Disease Tolerance Centre	Intestinal Microbiota Influences Susceptibility To CD8 T Cell-Mediated Autoimmune Peripheral Neuropathy	2015/02-2016/02	$ 20,000	$ 1,000	Fournier S, King I, Dewar K, Richer M
	McGill University Microbiology and immunology Department	Inflammatory cytokines regulate the antigen sensitivity of CD8 T cells by modulating the expression of microRNAs	2015/01-2016/01	$ 20,000	$ 10,000	Sagan S, Richer M
Siddiqi	Natural Sciences and Engineering Research Council of Canada	Diffusion and Geometry in Modelling Biological Tissue	2018/04-2023/03	$ 320,000	$ 320,000	Siddiqi K
	Fonds de recherche du Québec - Nature et technologies (FRQNT)	Machine Learning for Interventional Medical Imaging	2018/05-2021/04	$ 162,000	$ 54,000	Siddiqi K, Lombaert H, Arbel T
	Fonds de recherche du Québec - Nature et technologies (FRQNT)	Machine Learning for Interventional Medical Imaging	2018/05-2021/04	$ 15,000	$ 5,000	Siddiqi K, Lombaert H, Arbel T
	Natural Sciences and Engineering Research Council of Canada	Diffusion and Geometry in Modelling Biological Tissue	2018/04-2021/03	$ 120,000	$ 120,000	Siddiqi K
	Fonds Québécois de la Recherche sur la Nature et les	Regroupement stratégique pour l'étude des environnements partagés intelligents répartis	2013/04-2019/03	$ 359,943	$ 64,789	Siddiqi K
	Natural Sciences and Engineering Research Council of Canada	Minimal Surfaces in the Heart	2012/04-2017/03	$ 180,000	$ 180,000	Siddiqi K
	Natural Sciences and Engineering Research Council of Canada	NSERC CREATE Program in Medical Image Analysis	2012/04-2017/03	$ 1,650,000	$ 235,715	Siddiqi K, Shmuel A, Pike B, Laporte C, Collins L, Descoteaux M, Arbel T
	McGill University	Fessenden Professorship	2015/04-2016/06	$ 50,000	$ 50,000	Siddiqi K

	Natural Sciences and Engineering Research Council of Canada	Modeling Heart Wall Fibers	2015/04-2016/03	$ 125,000	$ 125,000	Siddiqi K
Siegel	Canadian Institutes of Health Research (CIHR)	The impact of mitochondrial dynamics on breast cancer metastasis	2019/04-2024/03	$ 971,550	$ 185,000	St-Pierre J, Siegel P
	Canadian Institutes of Health Research (CIHR)	Optimizing Combination Strategies for GPNMB-expressing Triple Negative Breast Cancers	2017/04-2022/06	$ 860,625	$ 860,625	Siegel P
	Genome Canada	Digital Omics of Single Exosomes	2018/10-2021/09	$ 2,001,438	$ 95,403	Juncker D, Rak J, Metrakos P, Siegel P, Akavia UD
	Canadian Cancer Society Research Institute (CCSRI)	Deciphering mechanisms that control focal adhesion dynamics and invadopodia formation in metastatic breast cancer	2018/08-2021/07	$ 450,000	$ 300,000	Siegel P, Ehrlicher A, Brown C
	Canadian Institutes of Health Research (CIHR)	Metabolic Adaptations During Breast Cancer Metastasis	2016/07-2021/06	$ 840,950	$ 580,000	St-Pierre J, Jones R, Siegel P
	CIHR/NSERC	Biophysical Tools for the Characterization of Breast Cancer Cell Migration and Invasion	2016/04-2019/03	$ 545,000	$ 120,000	Brown C, Ehrlicher A, McCaffrey L, Siegel P
	Canadian Institutes of Health Research (CIHR)	Claudin-2 as a Prognostic and Therapeutic Target in Breast Cancer Liver Metastasis	2014/10-2019/09	$ 761,594	$ 761,594	Siegel P
	TFRI	Oncometabolism and the Molecular Pathways that Fuel Cancer	2015/07-2019/06	**See team grants**		Giguère V, Arnim Pause, Guillaume Bourque, Ivan Topisirovic, Julie St-Pierre, Michael Pollak, Sonenberg N, Larsson O, Nadon R, Jones R, Akavia UD, Muller W
	Cancer Research Society (The)	Role of the PGC-1 transcriptional coactivators in breast cancer progression	2015/09-2017/08	$ 120,000	$ 60,000	St-Pierre J, Siegel P
	Department of Defense (USA)	Development of Rational Combination Therapy Strategies for the Treatment of Metastatic Melanoma	2015/09-2017/08	$ 300,000	$ 200,000	Siegel P, Flaherty K, Keler T
	Cancer Research Society (The)	Deciphering cancer cell/neutrophil interactions during breast cancer liver metastasis	2015/09-2017/08	$ 120,000	$ 120,000	Siegel P
	Canadian Cancer Society Research Institute (CCSRI)	Control of Focal Adhesion Dynamics in Metastatic Breast Cancer	2014/08-2017/07	$ 200,000	$ 150,000	Siegel P, Brown C
	Canadian Institutes of Health Research (CIHR)	GPNMB as an emerging therapeutic target in metastatic breast cancer	2012/04-2017/03	$ 737,870	$ 737,870	Siegel P
	Canadian Cancer Society Research Institute (CCSRI)	Bone Scaffolds as Delivery Systems for Local and Controlled Release of Anti-Resorptives in Bone Metastasis Treatment	2014/02-2016/01	$ 199,710	$ 15,000	Weber M, Barralet J, Siegel P
	Prostate Cancer Canada	CCN3 as a Prognostic and Therapeutic Target in Prostate Cancer	2013/07-2015/06	$ 197,000	$ 197,000	Siegel P
	Canadian Cancer Society Research Institute (CCSRI)	ShcA-dependent mechanisms driving breast cancer migration and invasion	2011/07-2014/06	$ 449,520	$ 449,520	Siegel P
Sonenberg	Canadian Institutes of Health Research (CIHR)	Investigating mRNA translational control in the quest to cure human disease	2016/07-2023/06	$ 7,050,000	$ 7,050,000	Sonenberg N
	Terry Fox Research Institute (TFRI)	Characterizing and optimizing tumor infection and spread	2017/07-2022/06	$ 240,000	$ 240,000	Diallo JS, Bell J, Alain T, Sonenberg N
	Canadian Institutes of Health Research (CIHR)	Altered mRNA translation as a pathogenic mechanism across neurodegenerative diseases	2017/11-2020/10	$ 500,000	$ 500,000	Sonenberg N, Stokerbaum E, Schuman E, Mallucci G, Rosenblum K, Chartier-Harlin MC
	Terry Fox Research Institute (TFRI)	Translational control of metabolism: the role of eIF4E and mTOR and MAPK signaling pathways	2015/07-2020/06	**See Team Grants**		
	Alzheimer Society of Canada	Targeting mRNA translation initiation in Alezheimer's disease, via translational control modulators	2018/07-2020/06	$ 150,000	$ 150,000	Sonenberg N, Ferreira ST
	Azrieli Foundation	Treatment strategies for Autism Spectrum Disorders and Fragile-X Syndrome using mouse models	2014/04-2019/03	$ 1,235,000	$ 940,196	Sonenberg N, Adamantidis A, Lacaille JC, Mogil JS, Buxbaum J, Hagerman P, Hagerman RJ
	CCSRI	Targeting Cancer through Translational Control , via translational control modulators	2014/02-2019/01	$ 1,141,235	$ 1,141,235	Sonenberg N

	International Development Research Centre (IDRC)	Identification of the mechanisms by which eIF2α-dependent mRNA translation controls synaptic plasticity and memory consolidation	2015/12-2018/11	$ 669,937	$ 567,686	Sonenberg N, Nair D, Rosenblum K
	Fraxa Research Foundation	The effect of metformin in Fmr1 knockout mouse model of Fragile X syndrome	2015/09-2017/08	$ 200,000	$ 200,000	Sonenberg N
	Howard Hughes Medical Institute	Senior International Research Scholar: Translation Control in Health and Disease	2012/10-2017/09	$ 462,905	$ 462,905	Sonenberg N
	Brain and Behavior Research Foundation	Mechanisms of eIF4E-dependent translational control in autism	2016/03-2017/02	$ 100,000	$ 100,000	Sonenberg N
	CIHR	Mechanisms of Translational Control in Higher Eukaryotes	2012/10-2017/03	$ 849,454	$ 849,454	Sonenberg N
	CIHR/TFF	The Terry Fox New Frontiers Program Project in Cancer Research: Canadian Oncolytic Virus Consortium. Sub-project: Viral sensitizers and translation control for tumour selective augmentation of oncolytic virus activity	2012/07-2017/06	$ 7,443,080	$ 700,000	Bell J, Sonenberg N, Lichty B, Diallo JS, Bramson J, Lee P, Alain T
	CIHR	eIF4E phosphorylation and breast cancer: regulating tumor-host interactions and metastasis	2012/10-2017/09	$ 822,877	$ 822,877	Sonenberg N
	SG Komen	Targeting eIF4E phosphorylation to inhibit breast cancer development	2012/12-2016/12	$ 749,996	$ 749,996	Sonenberg N
	CIHR	Novel pharmacogenetic strategies to reverse autism-like phenotypes in mouse models of ASD	2014/10-2016/06	$ 365,104	$ 365,104	Sonenberg N, Lacaille J-C
	CIHR	Insights into mRNA translational repression and decay by mammalian miRNAs	2014/04-2016/06	$ 346,759	$ 346,759	Sonenberg N
	CIHR	The role of mTOR pathway in translational regulation of synaptic plasticity, memory formation and disease	2011/10-2016/06	$ 450,698	$ 450,698	Sonenberg N, Gkogkas C
	CRS	mTOR signaling and eIF4E phosphorylation as targets to augment pancreatic neuroendocrine tumor therapeutics	2013/09-2015/08	$ 120,000	$ 120,000	Sonenberg N
	CIHR	Defining and Applying "Oncometabolism": A team approach in understanding and translating the Warburg effect from oncogenic and tumour suppressing activities	2011/07-2015/06	**see Group Grants**		Sonenberg N
	TFRI	The Terry Fox New Frontiers Program Project Grant in "Unraveling metabolic adaptations associated with disease progression and therapeutic response in metastatic breast cancer"	2014/07-2015/06	**see Group Grants**		Park M, Jones R, …
	CIHR	Michael Smith Prize in Health Research	2009/07-2014/06	$ 500,000	$ 500,000	Sonenberg N
Spicer	Bristol-Myers Squibb (New York, USA)	A neoadjuvant study of nivolumab plus ipilimumab or nivolumab plus chemotherapy versus chemotherapy alone in early stage non-small cell lung cancer (Checkmate816)	2017/03-2020/01	$ 542,278	$ 542,278	Spicer J
	Merck & Co. Inc	Phase 2 randomized controlled trial of neoadjuvant pembrolizumab or pembrolizumab with histology specific chemotherapy for operable stage IB and IIA non-small cell carcinoma	2020/01-2022/01	$ 1,000,000	$ 10,000	Spicer J
	Ministère de l'économie, science et innovation	Quebec Cancer Consortium	2019/04-2023/03	$ 10,000,000	$ 100,000	Spicer J
	Exactis	Personalize my treatment	2018/11-2023/06	$ 260,000	$ 65,000	Spicer J
	American Surgical Association (ASA)	American Surgial Association Fellowship Award	2019/07-2021/06	$ 150,000	$ 150,000	Spicer J
	Cancer Research Society (The)	Immune consequences of CXCR2-mediated neutrophil recruitment to non-small cell lung cancer: Paving the way to neutrophil-based therapeutic combinations	2018/09-2020/08	$ 120,000	$ 120,000	Spicer J
	Montreal General Hospital Foundation	Dr. Ray Chiu Distinguished Scientist in Surgical Research Award - Start up funding	2051/07-2018/06	$ 225,000	$ 225,000	Spicer J

	Rossy Cancer Network	Rossy Cancer Network Quality and Innovation Research Grant "Establishing Quality of Care for Patients with Malignant Pleural Mesothelioma	2016/09-2017/08	$ 100,000	$ 100,000	Spicer J
	Cedars Cancer Institute (The)	Henry Shibata Cedars Cancer Foundation "The role of Neutrophil Extracellular Traps in cancer metastasis	216/07-2017/06	$ 20,000	$ 20,000	Spicer J
	McGill University	Tomlinson Award	2015/07-2016/06	$ 45,000	$ 45,000	Spicer J
	Rossy Cancer Network	Rossy Cancer Network Quality and Innovation Research Grant "Lung Cancer in Nunavik: how are we doing?"	2016/09-2018/08	$ 95,800	$ 95,800	Spicer J
Teodoro	Canadian Institutes of Health Research (CIHR)	Deregulation of the anaphase promoting complex in human cancer	2018/03-2023/02	$ 1,002,150	$ 901,935	Teodoro J, Foulkes W
	Natural Sciences and Engineering Research Council of Canada	Biology of Circoviruses	2016/03-2021/02	$ 155,000	$ 155,000	Teodoro J
	Cancer Research Society (The)	Role of triglyceride metabolism in colitis and colorectal cancer progression	2018/09-2020/08	$ 120,000	$ 120,000	Teodoro J
	Prostate Cancer Canada	The vaculoar ATPase complex as a therapeutic target in prostate cancer	2017/09-2019/08	$ 200,000	$ 200,000	Teodoro J, Day R
	Canadian Institutes of Health Research (CIHR)	Levels of serum Arresten as a risk factor for the development and progression of high fatality cancers	2017/04-2018/03	$ 75,000	$ 75,000	Teodoro J, Joubert P
	Canadian Institutes of Health Research (CIHR)	Arresten as a biomarker and therapeutic for Pancreatic cancer	2016/03-2017/02	$ 100,000	$ 100,000	Teodoro J
	Cancer Research Society (The)	Role of the G0S2 gene in cancer cachexia	2014/10-2016/09	$ 120,000	$ 120,000	Teodoro J
	Canadian Institutes of Health Research (CIHR)	Role of the Pro-Renin Receptor in the progression and diagnosis of Prostate Cancer	2014/07-2016/06	$ 200,000	$ 200,000	Teodoro J
	Natural Sciences and Engineering Research Council of Canada	Biology of Circoviruses	2009/04-2015/03	$ 210,000	$ 210,000	Teodoro J
	McGill-Weizmann Joint Research Program	Non-Cell Autonomous Effects of the p53 Tumour Suppressor	2013/04-2015/03	$ 160,000	$ 80,000	Teodoro J, Oren M
	Cancer Research Society (The)	Assessment of PTEN-regulated Secreted Factors as Prostate Cancer Biomarkers	2012/10-2014/09	$ 120,000	$ 120,000	Teodoro J
	Canadian Institutes of Health Research (CIHR)	Tumour suppressor mediated mechanisms of angiogenesis inhibition	2011/10-2014/09	$ 382,530	$ 382,530	Teodoro J
	Canadian Institutes of Health Research (CIHR)	Mechanism of Action of the Adenovirus Death Protein E4orf4	2009/04-2014/03	$ 729,245	$ 45,000	Branton P, Teodoro J, Vogel J
Tremblay	Canadian Institutes of Health Research (CIHR)	Molecular and physiological understanding of the protein tyrosine phosphatome towards clinical applications	2018/07-2025/06	$ 3,010,120	$ 3,010,120	Tremblay M
	Merck (Oncopole), CRS, CQDM	Développement de vaccins thérapeutiques contre les leucémies aiguës myéloides et lymphoides	2018/09-2021/08	$ 80,000	$ 80,000	Tremblay M
	International Development Research Centre (IDRC)	Improving macrophage innate immunity by modulating protein tyrosine phosphatases: the complete mouse and human PTPomes	2016/09-2019/08	$ 669,831	$ 620,000	Tremblay M, Elson A
	CRS	Lessons from PTP-PEST interactome: towards novel therapeutic approaches for pancreatic cancer	2016/09-2018/08	$ 120,000	$ 120,000	Tremblay M
	Canadian Institutes of Health Research (CIHR)	The PRL-CNNM-Magnesium cascade, a new paradigm in oncogenesis	2015/07-2018/06	$ 468,239	$ 468,239	Tremblay M
	Canadian Institutes of Health Research (CIHR)	Regulation of T cell Activation by Stomatin-Like Protein 2	2017/09-2018/03	$ 148,337	$ 148,337	Madrenas J, Tremblay M
	Canadian Institutes of Health Research (CIHR)	New understanding and targets from the human phosphatome: towards the treatment of castration-resistant prostate cancer	2017/04-2018/03	$ 100,000	$ 100,000	Tremblay M

	Prostate Cancer Canada	Characterization and Prognostic potential of the prostate cancer genetic-susceptibility amplicon on chormosome 20q13 during tumour progression	2015/07-2017/06	$ 197,322	$ 197,322	Tremblay M
	Canadian Institutes of Health Research (CIHR)	Generation of a new therapeutic approach against advanced pancreatic cancer by modulating protein tyrosine	2016/03-2017/02	$ 99,997	$ 84,997	Tremblay M, Zogopoulos G
	Richard and Edith Strauss Canadian Foundation	McGill University Centre for Gene and Cell Therapy	2018/07-2019/06	$ 500,000	$ 180,000	Tremblay M, Pelletier J, Laneuville P
	Richard and Edith Strauss Canadian Foundation	McGill University Centre for Gene and Cell Therapy	2017/07-2018/06	$ 500,000	$ 180,000	Tremblay M, Pelletier J, Laneuville P
	Richard and Edith Strauss Canadian Foundation	McGill University Centre for Gene and Cell Therapy	2016/07-2017/06	$ 500,000	$ 180,000	Tremblay M, Pelletier J, Laneuville P
	Richard and Edith Strauss Canadian Foundation	McGill University Centre for Gene and Cell Therapy	2013/08-2016/07	$ 300,000	$ 150,000	Tremblay M, Pelletier J
	Canadian Institutes of Health Research (CIHR)	PTP-1b as a target in human cancer	2011/04-2016/03	$ 771,945	$ 771,945	Tremblay M
	Canadian Cancer Society Research Institute (CCSRI)	Modulating T cell protein tyrosine phosphatase expression for T cell based cancer immunotherapy	2013/02-2016/01	$ 200,000	$ 200,000	Tremblay M
	Prostate Cancer Canada	Deciphering the metabolic role of protein tyrosine phosphatase 1B towards improving prostate cancer prognosis and therapeutics	2013/07-2015/06	$ 198,496	$ 132,236	Tremblay M
	Leukemia & Lymphoma Society of Canada (The) (LLSC)	TC-PTP: a modulator of early T cell development and suppressor of T-ALL	2013/07-2015/06	$ 119,954	$ 119,954	Tremblay M, Pike KA
	Quebec Breast Cancer Foundation/CBCRA	Role of the protein tyrosine phosphatase PRL-2 in breast cancer development and metastasis	2009/01-2014/06	$ 658,346	$ 658,346	Tremblay M
	Canadian Cancer Society Research Institute (CCSRI)	Understanding and targeting TC-PTP in immune diseases and cancer	2011/07-2014/06	$ 336,268	$ 336,268	Tremblay M
Walsh	CIHR	Drivers of breast cancer progression identified within arm-level SCNAs	2019/04-2024/03	$ 883,575	$ 883,575	Walsh L
	Brain Tumor Funders' Collaborative (BTFC)	Harnessing the brain tumor immune microenvironment to enhance therapeutic efficacy	2019/01-2021/12	$ 986,841	$ 328,947	Walsh L, Quail D, Akkari L
	McGill - GCRC	Startup Funding	2017/08-2020/07	$ 600,000	$ 600,000	Walsh L
	McGill - FoM	Startup Funding	2017/08-2019/07	$ 200,000	$ 200,000	Walsh L
Watson	Canadian Institutes of Health Research (CIHR)	Dissecting NF1 signaling in melanoma	2017/04-2022/03	$ 916,315	$ 916,315	Watson I
	Canada Foundation for Innovation (CFI)	John R. Evans Leaders Fund	2016/12-2021/11	$ 295,606	$ 295,606	Watson I
	Terry Fox Research Institute (TFRI)	Montreal Cancer Consortium (MCC)	2018/10-2020/09	$ 2,000,000	$ 100,000	Watson J, Stagg J, Spatz A, Mes-Masson AM, Meguerditchian A, Wang B, Mihalcioiu C, Borchers C, Rudd C, Perreault C, Ferrario C, Quail D, Mitchell D, Rodier F, Mercier F, Patenaude F, Zogopoulos G, Batist G, Bourque G, Agulnik J, Delisle JS, Friedman J, Spicer J, Hébert J, Bélanger K, Watters K, Busque L, Walsh L, Basik M, Bouvier M, Liberman M, Park M, Blais N, Siegel P, Jamal R, Jamal R, Lapointe R, Sassan S, Assouline S, Meterissian S, Turcotte S, Cellot S, del Rincon SV, Gervais T, Miller W.

	Fonds de recherche du Québec - Santé (FRQS)	COSMET (COmbination and Screening of Multidimensional biomarkers in melanoma and lung carcinoma to advance immunotherapy)	2016/08-2019/07	$ 75,000	$ 25,000	Watson I
	Melanoma Research Alliance	Identification of therapeutic strategies to target NF1 mutant melanomas	2016/05-2019/05	$ 284,289	$ 284,289	Watson I
	V Foundation for Cancer Research (The) (USA)	Functional characterization of novel melanoma oncogenes and tumor suppressors utilizing a CRISPR/CAS9 mouse model	2016/11-2018/10	$ 200,000	$ 200,000	Watson I
	Canadian Institutes of Health Research (CIHR)	Role of BAP1 in Tumorigenesis and Metastasis in Uveal and Cutaneous Melanoma	2011/07-2014/06	$ 150,000	$ 150,000	Watson I
Yamanaka	Canadian Cancer Society Research Institute (CCSRI)	Developing detection strategies and elucidating mechanisms controlling peritoneal	2019/08-2022/07	$ 450,000	$ 450,000	Yamanaka Y
	Cancer Research Society (The)	Live cell extrusion and high-grade serous ovarian cancer (HGSOC) tumorigenesis in the oviduct epithelium	2018/09-2020/08	$ 120,000	$ 120,000	Yamanaka Y
	Canadian Cancer Society Research Institute (CCSRI)	Generation of the platinum-resistant ovarian cancer mouse model to study susceptible cell populations in the fallopian tube epithelium	2018/08-2020/07	$ 200,000	$ 200,000	Yamanaka Y
	Canadian Cancer Society Research Institute (CCSRI)	Elucidating epithelial homeostasis in the oviduct/Fallopian tube as cells of origin in high-grade serous ovarian cancer	2016/08-2018/07	$ 200,000	$ 200,000	Yamanaka Y
	Natural Sciences and Engineering Research Council of Canada	Investigating the transition from head to trunk formation in vertebrate development	2012/04-2018/03	$ 180,000	$ 180,000	Yamanaka Y
	CIHR	Cell polarity and generation of the first distinct lineages in the mouse embryo	2011/04-2016/03	$ 744,545	$ 744,545	Yamanaka Y
Yang	Canadian Institutes of Health Research (CIHR)	Roles of the chromatin regulator Brpf1 in mouse embryogenesis and hematopoietic stem cells	2015/04-2020/03	$ 690,201	$ 690,201	Yang, XJ
	Cancer Research Society (The)	Roles of the MEF2B transcription factor in development of B-cell lymphoma	2017/09-2019/08	$ 120,000	$ 120,000	Yang, XJ
	Natural Sciences and Engineering Research Council of Canada	Roles of chromatin regulators in governing histone acylation and mouse development	2018/04-2019/03	$ 28,000	$ 28,000	Yang, XJ
	NSERC	Role of the sumoylation machinery in generating induced pluripotent stem cells	2012/04-2017/03	$ 170,000	$ 170,000	Yang XJ
	CIHR	Roles of a kinase-HDAC-MEF2 signaling axis in normal and oncogenic cellular programs	2009/10-2014/09	$ 677,385	$ 677,385	Yang XJ
Zogopoulos	Terry Fox Research Institute (TFRI)	Enhanced pancreatic cancer profiling for individualized care (EPPIC)	2018/01-2022/12	$ 4,984,557	$ 503,300	Renouf D, Schaeffer D, Bathe O, Gallinger S, Zogopoulos G
	National Pancreas Foundation	The Pancreatic Canadian Oncology Network (PancOne)™	2018/12-2021/11	$ 2,628,297	$ 560,833	Renouf D, Gallinger S, Zogopoulos G
	Cancer Research Society (The)	Elucidating the genetics of pancreatic cancer	2017/09-2019/08	$ 120,000	$ 120,000	Zogopoulos G
	Canadian Cancer Society Research Institute (CCSRI)	Hallmarks and therapeutic implications of "BRCAness" in pancreatic cancer	2014/02-2019/01	$ 1,229,504	$ 335,924	Gallinger S, Hedley D, Akbari M, Dhani N, Bristow R, Serra S, Zogopoulos G
	Celgene Corporation	Genetics of Pancreas Cancer	2017/09-2018/12	$ 30,000	$ 30,000	Zogopoulos G
	Pancreatic Cancer Canada Foundation	Pancreatic Canadian Oncology Network (PANC One): a pan-Canadian integrative pancreatic cancer profiling initiative	2017/09-2018/08	$ 745,000	$ 150,000	Renouf D, Gallinger S, Zogopoulos G
	Canadian Association of General Surgeons (The)	Using platinum-based chemotherapy to induce sensitivity to PD-1 checkpoint blockade in BRCA associated pancreas cancer	2017/10-2018/09	$ 10,000	$ 10,000	Wang Y, Zogopoulos G
	Cancer Research Society (The)	Preclinical trial evaluation of the poly(ADP-ribose) polymerase inhibitor 1/2 BMN 673 in pancreatic cancer associated with homology-directed DNA repair defects	2015/09-2018/08	$ 120,000	$ 120,000	Zogopoulos G

	McGill University Health Centre (MUHC)	The Quebec Pancreas Cancer Study	2013/01-2015/12	$	150,000	$ 150,000	Zogopoulos G
	Cancer Research Society (The)	Elucidating the Genetics of Pancreatic Cancer	2014/09-2017/08	$	120,000	$ 120,000	Zogopoulos G
	Diazon Pharmaceuticals Inc	Sensitivity of a novel agent in pancreatic cancer using patient derived xenografts	2014/07-2016/06	$	33,000	$ 33,000	Zogopoulos G
	Royal Victoria Hospital Foundation	Hereditary aspects of colon and pancreas cancer	2014/09-2015/08	$	60,000	$ 60,000	Zogopoulos G
	Canadian Institutes of Health Research (CIHR)	The Genetics of Hereditary Upper Gastrointestinal Cancers: Beyond CDH1 Germline Mutations	2012/10-2017/09	$	932,334	$ 99,000	Huntsman D, Schaeffer DF, Schrader KA, Shoh PS, Gallinger S, Zogopoulos G
	Fonds de recherche du Québec - Santé (FRQS)	Changements génétiques et épigénétiques des cellules germinales, tumorales et du stroma dans les adénomes pancréatiques	2012/07-2015/06	$	30,000	$ 30,000	Zogopoulos G
	McGill University Health Centre Research Institute	New Investigator Start-up Operating Funds	2011/07-2020/06	$	225,000	$ 225,000	Zogopoulos G
	McGill Cancer Centre (MCC)	New Investigator Start-up Operating Funds	2011/07-2014/06	$	20,000	$ 20,000	Zogopoulos G
	McGill University	Pancreatic Cancer: From transcriptomics to therapies	2013/07-2014/06	$	20,000	$ 20,000	Zogopoulos G, Pelletier J, Tremblay M, Huang S

GCRC Funding 2014-2019: Salary Awards

	Funding Agency	Project Title	Term	Total Grant ($)	Total Received GCRC
Bouchard	Fonds de recherche du Québec - Santé (FRQS)	Chercheur-boursier Senior	2014/07-2018/06	$ 325,328	$ 325,328
Bourque	Fonds de recherche du Québec - Santé (FRQS)	Chercheur-boursier Senior	2017/06-2020/05	$ 250,000	$ 250,000
Bourque	Fonds de recherche du Québec - Santé (FRQS)	Chercheur-boursier Junior 2	2012/09-2016/06	$ 286,986	$ 286,986
Dostie	Fonds de recherche du Québec - Santé (FRQS)	Chercheur-boursier Senior	2019/07-2021/06	$ 105,774	$ 105,774
Dostie	Fonds de recherche du Québec - Santé (FRQS)	Chercheur-boursier Junior 2	2013/07-2016/06	$ 233,053	$ 233,053
Duchaine	Fonds de recherche du Québec - Santé (FRQS)	FRSQ Chercheur-Boursier Senior	2016/07-2019/06	$ 234,867	$ 234,867
Duchaine	Fonds de recherche du Québec - Santé (FRQS)	Chercheur-boursier Junior 2	2011/07-2015/06	$ 277,526	$ 277,526
Ehrlicher	Natural Sciences and Engineering Research Council of Canada (NSERC)	Canada Research Chair	2018/11-2023/11	$ 500,000	$ 500,000
Ehrlicher	Canadian Institutes of Health Research (CIHR)	New Investigator Award	2016/09-2021/09	$ 300,000	$ 300,000
Ehrlicher	Fonds de recherche du Québec - Nature et technologies (FRQNT)	FRQNT Nouveau Chercheur	2015/04-2017/04	$ 76,353	$ 76,353
Ferri	Fonds de recherche du Québec - Santé (FRQS)	Chercheur-boursier clinicien Senior	2016/07-2020/06	$ 158,502	$ 158,502
Ferri	Fonds de recherche du Québec - Santé (FRQS)	Chercheur-boursier clinicien Junior 2	2012/07-2016/06	$ 148,772	$ 148,772
Gros	McGill University	James McGill Professor	2010/01-2024/01	$ 210,000	$ 210,000
Huang	Canadian Institutes of Health Research	Canada Research Chair (CRC) Award, Tier2	2018/10-2023/09	$ 500,000	$ 500,000
Huang	Canadian Institutes of Health Research	Canada Research Chair (CRC) Award, Tier2	2013/10-2018/09	$ 500,000	$ 500,000
Juncker	Natural Sciences and Engineering Research Council of Canada	Canada Research Chair in Integrative and Translational Bioengineering	2018/10-2025/09	$ 200,000	$ 200,000
Juncker	Canada Research Chairs (CRC)	Canada Research Chair in Micro and Nanobioengineering	2011/06-2016/05	$ 125,000	$ 125,000
Juncker	Canada Research Chairs (CRC)	Canada Research Chair in Micro and Nanobioengineering	2006/04-2016/04	$ 500,000	$ 500,000
Kazak	Canadian Institutes of Health Research	CRC Tier 2	2019/04-2024/03	$ 520,000	$ 520,000
McCaffrey	Fonds de recherche du Québec - Santé (FRQS)	Chercheur-boursier Junior 2	2017/07-2021/06	$ 300,000	$ 300,000
McCaffrey	Fonds de recherche du Québec - Santé (FRQS)	Chercheur-boursier Junior 1	2013/07-2017/06	$ 267,401	$ 267,401
Moraes	Natural Sciences and Engineering Research Council of Canada	Canada Research Chair (Tier 2) in Advanced Cellular Microenvironments	2015/10-2021/01	$ 500,000	$ 500,000
Moraes	Fonds de recherche du Québec - Nature et technologies (FRQNT)	Nouveaux chercheurs program "Control of microenvironmental mechanics in high-throughput drug discovery systems"	2015/02-2017/02	$ 90,000	$ 90,000
Muller	Canadian Institutes of Health Research	CRC Chair in Molecular Oncology	2002/04-2023/03	$ 4,200,000	$ 4,200,000
Nepveu	McGill University	James McGill Professor	2006/06-2018/06	$ 180,000	$ 180,000

Park	McGill University	James McGill Professor	2006/06-2020/06	$ 238,000	$ 238,000
Pelletier	McGill University	James McGill Professor	2005/07-2019/06	$ 210,000	$ 210,000
Quail	Canadian Institutes of Health Research	Canada Research Chair Tier 2	2018/04-2023/03	$ 500,000	$ 500,000
Richer	Canadian Institutes of Health Research	CIHR New Investigator Award	2017/07-2022/06	$ 75,000	$ 75,000
Richer	Fonds de recherche du Québec - Santé (FRQS)	Chercheurs-boursier Junior 1	2016/07-2020/07	$ 31,959	$ 31,959
Siddiqi	McGill University	William Dawson Scholar	2010/01-2014/12	$ 75,000	$ 75,000
Siegel	McGill University	William Dawson Scholar	2014/05-2019/04	$ 125,000	$ 125,000
Sonenberg	McGill University	James McGill Professor	2009/07-2015/06	$ 70,000	$ 70,000
Spicer	Fonds de recherche du Québec - Santé (FRQS)	Chercheurs-boursier clinicien Junior 1	2017/07-2021/06	$ 196,363	$ 196,363
Spicer	Montreal General Hospital Foundation, MUHC	Dr. Ray Chiu Distinguished Scientist in Surgical Research Award, Research Chair	2018/07-2021/06	$ 150,000	$ 150,000
Spicer	American Association for Thoracic Surgery	Third Alton Ochsner Research Scholarship "The role of Neutrophil Extracellular Traps in cancer metastasis"	2015/07-2017/06	$ 160,000	$ 160,000
Spicer	McGill University Health Centre Research Institute	F. Ann Birks Fellowship	2016/07-2017/06	$ 10,000	$ 10,000
Spicer	Montreal General Hospital Foundation	Montreal General Hospital Foundation Award, Recruitment Award	2016/07-2017/06	$ 10,000	$ 10,000
Spicer	Montreal General Hospital Foundation	Montreal General Hospital Foundation Award, Recruitment Award	2015/07-2016/06	$ 10,000	$ 10,000
Tremblay	McGill University	James McGill Professor	2011/01-2015/12	$ 50,000	$ 50,000
Walsh	Goodman Cancer Research Centre, McGill University	Rosalind Goodman Chair in Lung Cancer	2018/06-2023/05	$ 150,000	$ 150,000
Watson	Canadian Institutes of Health Research	Canada Research Chair Tier 2	2016/10-2021/09	$ 500,000	$ 500,000
Zogopoulos	Fonds de recherche du Québec - Santé (FRQS)	Chercheurs-boursier clinicien Junior 2	2016/07-2020/06	$ 128,089	$ 128,089
Zogopoulos	Fonds de recherche du Québec - Santé (FRQS)	Chercheurs-boursier clinicien Junior 1	2012/07-2016/06	$ 158,089	$ 158,089

**** William Dawson Scholar equivalent to CRC Tier II***

**** James McGill Professor equivalent to CRC Tier I***

GCRC Funding 2014-2019:Team Grants

Funding Agency	Project Title	Term	Total Grant ($)	Total Received GCRC	All Contributors
TFRI/QBCF (TFNFPPG)	Oncometabolism and the molecular pathways that fuel cancer	2015/07-2019/6	$ 5,317,448	$ 5,317,448	Giguère V, St-Pierre J, Muller W, Sonenberg N, Bourque G, Jones R, Pause A, Topisirovic I, Pollak M, Siegel P, Nadon R, Akavia UD + co-applicants
Terry Fox Foundation (The)	Unravelling metabolic adaptations associated with disease progression	2014/07-2015/06	$ 750,000	$ 750,000	Park M, Jones R, Pause A, Avizonis D, Topisirovic I, St-Pierre J, McCaffrey L, Pollak M, Tremblay M, Sonenberg N, Bertos N, Akavia UD, Giguere V, Muller W
TFRI (TFNFPPG)	Oncometabolism in Poor Outcome Breast Cancer	2014/07-2015/06	$ 750,000	$ 750,000	Park M, Jones R, Sonenberg N, Giguère V, Muller W, Siegel P
CIHR/TFF	Defining and Applying "Oncometabolism": A team approach in understanding and translating the Warburg effect from oncogenic and tumour suppressing activities	2011/07-2014/06	$ 3,831,303	$ 3,831,303	**Tremblay M, Miller W,** Jones R, Pause A, Sonenberg N, St-Pierre J, Avizonis D, Beauchemin N, Giguère V, Hardy S, Nadon R, Pollak M, Topisirovic I
Canadian Cancer Society Research Institute (CCSRI)	Preclinical models and therapeutic targets for metastatic breast disease	2009/07-2014/06	$ 5,153,424	$ 5,153,424	Muller W, Giguere V, Hallett M, Siegel P, Park M

GCRC Funding 2014-2019: Centre grants

Funding Agency	Project Title	Term	Total Grant ($)	Total Received GCRC	All Contributors
CFI Infrastructure Grant	Targeting the Tumor Microenvironment: Bridging Basic Science and Therapy	2015/06-2017/12	$ 5,974,599	$ 5,974,599	Park M, Huang S, Jones R, Juncker D, Mes-Masson AM, Pelletier J, Pollak M, Siegel P, Sonenberg N, Tremblay M
CIHR/FRSQ	The CIHR/FRSQ Training Program in Cancer Research at McGill (The McGill Integrated Cancer Research Training Program aka MICRTP)	2009/04-2016/03	$ 1,965,385	$ 1,965,385	Tremblay M, Miller W, Beauchemin N, Bouchard M, Duchaine T, Giguère V + 40 others (GCRC, Segal Cancer Centre and MUHC-RI)
FRSQ	Groupe de recherche sur le cancer de McGill	2011/04-2015/03	$ 1,700,000	$ 1,700,000	Tremblay M,...
CIHR	Integrative Approaches to Human Health	2009/04-2015/03	$ 1,766,127	$ 1,766,127	Hallett M, Gros P, Muller W, Park M, Pelletier J, Siegel P + 46 others

Appendix H: Proposed Organizational Chart for New institute