McGill

Report of the Academic Policy Committee
D21-49

511th REPORT OF THE ACADEMIC POLICY COMMITTEE TO SENATE – PART B
on the APC meeting held on April 14th, 2022

I. TO BE APPROVED BY SENATE

(A) NEW TEACHING PROGRAMS REQUIRING SENATE APPROVAL

FACULTY OF ARTS
B.A.; Faculty Program in Population and Global Health (54 cr.) – *appendix a*

At a meeting on April 14th, 2022, APC reviewed and approved a proposal to create a new B.A.; Faculty Program in Population and Global Health (54 cr.). The new program is an interdisciplinary program with a competency-based approach that focuses on values, skills and approaches that are foundational to improving health equity and population health. It responds to the need for an undergraduate program that fosters a global state of mind and to provide training for students to have the skills to tackle complex health-related challenges both locally and globally. There is an emphasis on team-based, problem-focused and community engaged experiential learning. Blended learning will be used for some courses, which includes synchronous and asynchronous activities.

> *Be it resolved that Senate approve the creation of the proposed B.A.; Faculty Program in Population and Global Health (54 cr.).*

SCHOOL OF CONTINUING STUDIES
Certificate in STEM Foundations (Science, Technology, Engineering and Mathematics) (30 cr.)
– appendix b

At a meeting on April 14th, 2022, APC reviewed and approved a proposal to create a new Certificate in STEM Foundations (Science, Technology, Engineering and Mathematics) (30 cr.). This new program will be offered on campus and as in-community distance in northern communities, and perhaps with international partners. It is intended to help students who wish to apply for a university degree program but do not have the appropriate academic background, or for mature students who may need refresher courses. The courses and their contents for this program were decided by the Faculty of Dental Medicine and Oral Health Sciences, Faculty of Medicine and Health Sciences, Faculty of Engineering and the Ingram School of Nursing. They have determined a need for this type of training to increase opportunities for admission into their degree programs. Completion of this program does not guarantee admittance into, nor does it give students advanced standing in a McGill degree program. The courses in this program would be considered at the pre-U0 university level, although some of the content may be similar to some existing U0 courses offered at the University.

> *Be it resolved that Senate approve the creation of the proposed Certificate in STEM Foundations (Science, Technology, Engineering and Mathematics) (30 cr.).*

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

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

Faculty of Medicine and Health Sciences
Creation of the McGill Institute of Genomic Medicine – *appendix c*

At a meeting on April 14th, 2022, APC reviewed and approved the creation of the McGill Institute of Genomic Medicine. The Institute will harness the University's diverse scientific expertise, research infrastructures and medical resources to achieve rapid advances in large-scale biology and "big data" science through interdisciplinary, convergence research, with the ultimate goals of improving human health and diminishing disease burden across lifespan. Creation of the Institute will further the multidisciplinary research culture that has grown at McGill around genomic medicine, promote innovation and position McGill to benefit from new, emerging funding opportunities.

The Institute's strong cross-institutional and interdisciplinary culture will empower McGill investigators to work together to tackle major challenges that are beyond the reach of individual research laboratories.

Be it resolved that Senate approve and recommend to the Board of Governors the proposed creation of the McGill Institute of Genomic Medicine.

Desautels Faculty of Management
Creation of the Centre for Business Ethics – *appendix d*

At a meeting of April 14th, 2022, APC reviewed and approved the creation of the Centre for Business Ethics. The Centre, named after Mr. David Laidley (BCom 1967), Chairman Emeritus of Deloitte LLP, will be the University's central hub for the support of teaching, academic research and community engagement for ethical behaviour in business. It will foster the multi-disciplinary research in areas of business, law, public policy, economics, engineering, religion and psychology. A multi-disciplinary approach will extend to course and program development for undergraduate and graduate students and to its offering of activities to professionals and other learners. On March 24, 2022, the Executive Committee of the Board of Governors approved to name the Centre for Business Ethics within the Desautels Faculty of Management, as the "Laidley Centre for Business Ethics / Centre Laidley pour l'éthique des affaires", subject to the approval of the creation of the Centre by Senate and the Board of Governors.

Be it resolved that Senate approve and recommend to the Board of Governors the proposed creation of the Centre for Business Ethics.

(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 - *none*

(C) OTHER - *none*

IV. FOR THE INFORMATION OF SENATE

I. ACADEMIC UNIT REVIEWS - *none*

II. APPROVAL OF COURSES AND TEACHING PROGRAMS

1. Programs

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

i. New Programs

Faculty of Education

M.A. in Second Language Education; Non-Thesis - Project (45 cr.)

ii. Major Revisions of Existing Programs - *none*

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 March 3rd, 2022 and reported to APC on April 14th, 2022

Faculty of Agricultural and Environmental Sciences
B.Sc.(Ag.Env.Sc.); Honours in Agro-Environmental Sciences (54 cr.)
B.Sc.(Ag.Env.Sc.); Honours in Environmental Biology (54 cr.)
B.Sc.(Ag.Env.Sc.); Honours in Life Sciences (Biological and Agricultural) (54 cr.)

Faculty of Engineering
B.Eng. in Chemical Engineering (143 cr.)
B.Eng.; Minor in Applied Artificial Intelligence (22-25 cr.)
B.Eng.; Co-op in Materials Engineering (147-148 cr.)
B.Eng. in Materials Engineering (147-148 cr.)
B.Eng. in Mechanical Engineering (142 cr.)
B.Eng.; Honours in Mechanical Engineering (142 cr.)
B.Eng.; Co-op in Mining Engineering (150-151 cr.)
B.Eng. in Mining Engineering (144-145 cr.)

Graduate and Postdoctoral Studies
School of Continuing Studies
Graduate Diploma in Legal Translation (30 cr.)
Graduate Certificate in Public Relations and Communications Management Practice (15 cr.)
Graduate Certificate in Strategic Public Relations and Communications Management (15 cr.)

Faculty of Education
Certificat d'études supérieures en pédagogie de l'immersion française (15 cr.)
M.A. in Second Language Education; Non-Thesis – Course Work (45 cr.)

Faculty of Medicine and Health Sciences
M.Sc. in Experimental Medicine; Digital Health Innovation (45 cr.)
M.Sc.(A.) in Occupational Therapy; Non-Thesis (63 cr.)

Desautels Faculty of Management
B.Com.; Joint Honours in Economics and Finance (81 cr.)

ii. Program Retirements
Approved by SCTP on March 3rd, 2022 and reported to APC on April 14th, 2022

Graduate and Postdoctoral Studies
School of Continuing Studies
Graduate Certificate in Public Relations Management (15 cr.)
Diploma in Public Relations and Communications Management (30 cr)

Faculty of Education
M.A. in Second Language Education; Non-Thesis (45 cr.)

2. Courses

a) New Courses
Reported as having been approved by SCTP on March 3rd, 2022: 54
Faculty of Agricultural and Environmental Sciences: 12
Faculty of Arts: 10
School of Continuing Education: 9
Faculty of Education: 15
Faculty of Engineering: 7
Faculty of Science: 1

b) Course Revisions
Reported as having been approved by SCTP on March 3rd, 2022: 61
Faculty of Agricultural and Environmental Sciences: 15
Faculty of Arts: 15
School of Continuing Education: 26
Faculty of Engineering: 5

c) Course Retirements
Reported as having been approved by SCTP on March 3rd, 2022: 30
School of Continuing Education: 30

III. OTHER

Graduate and Postdoctoral Studies
Addition of a new section to the eCalendar

At a meeting of April 14th, 2022, APC reviewed and approved the addition of a new section about courses taken as an admission requirement to the eCalendar. Students admitted to graduate programs may, at the discretion of the Admissions Committee, be required to complete one or more undergraduate courses to gain missing background knowledge in their field. This is increasingly common for students admitted into interdisciplinary programs which have gained popularity over the years. The addition of the new section is subject to confirmation of the technical feasibility of this designation.

APPENDIX A

New Program/Concentration Proposal Form

(2019)

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

B.A.

2.0 Administering Faculty or GPS

Faculty of Arts

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

Population and Global Health

Offering Faculty & Department

Medicine & Health Sci./School of Population & Global Health

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

3.0 Effective Term of Implementation
(Ex. Sept. 2019 or 201909)
Term

202309

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

B.A.; Faculty Program in Population and Global Health

4.0 Rationale and Admission Requirements for New Program/Concentration

The global interdependency that characterizes 21st century health challenges, ranging from pandemics to climate change to mental health, requires new ways of thinking. We need a next generation of leaders who embody diversity, and are wired to listen, collaborate and innovate solutions across disciplines, sectors, and social divides. McGill's School of Population and Global Health (SPGH) responds to this imperative by offering a state-of-the-art Bachelor of Arts Program that fosters a global state of mind and the skill-sets needed to tackle complex health-related challenges both locally and globally. The Inter-Faculty Program aims to help students frame the big picture while equipping them to embrace context as the bedrock of grounded learning. Firmly rooted in the values of equity and social justice, this Faculty Program embodies this commitment in the diverse students it trains, [continued next page]

5.0 Program Information

Indicate an "x" as appropriate

5.1 **Program Type**

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

5.2 **Category**

- X 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**

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

5.4 **Requires Centrally-Funded Resources**

Yes _X_ No ___

6.0 Total Credits or CEUs (if latter, indicate "CEUs" in box)

54

7.0 Consultation with

Related Units	X Yes	No
Financial Consult	X Yes	No

Attach list of consultations.

Rationale Continued

[continued] and the competencies it nurtures. Modelling the School of Social Work admissions process, entry into the program will have explicit diversity criteria recognizing the need to reflect socio-demographic realities and the enriched learning environment that diversity presents. Students will be required to respond to three short essay questions when applying to the program. This program is excluded from the Arts multi-track program. Students in the program will complete the remaining credits as electives in order to meet degree requirements.

8.0 Program Description (Maximum 150 words)

The B.A.; Faculty Program in Population and Global Health is an interdisciplinary program with a competency-based approach that focuses on values, skills and approaches foundational to improving health equity and population health both locally and globally. The key issues in population, global and Indigenous health are complemented by ethical principles, data literacy, research methods and knowledge translation. Areas of specialization include the following streams: Environment and Health; Culture, Society and Health; Diet, Lifestyle and The Life Course; Systems, Policy and Government; and Innovation and Leadership. There is an emphasis on team-based, problem-focused and communityengaged experiential learning. Blended learning will be used for some courses, which includes synchronous and asynchronous activities.

9.0 List of proposed new Program/Concentration

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

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

B.A.; Faculty Program in Population and Global Health (54 credits)

Required Courses (33 credits)
GPHL 200 Foundations in Population and Global Health (3 credits)
GPHL 201 Population and Global Health Ethics (3 credits)
GPHL 300 Data Literacy (3 credits)
GPHL 301 Introduction to Research Methods (3 credits)
GPHL 302 Knowledge Translation (3 credits)
GPHL 303 Community Engaged Learning (3 credits)
GPHL 400 Critical Perspectives in Global Health (3 credits)
GPHL 401 Experiential Learning (12 credits)

Complementary Courses (21 credits)
21 credits are chosen from one of the following five streams, among which a maximum of 9 credits from the 200 level, and a minimum of 12 credits at the 300 level or above should be selected. Other courses may be used to fulfil each stream with permission of the program adviser:

STREAM 1: Environment and Health*
AGRI 411 Global Issues on Development, Food and Agriculture (3 credits)
ENVR 200 The Global Environment (3 credits)
ENVR 201 Society, Environment and Sustainability (3 credits)
ENVR 202 The Evolving Earth (3 credits)
ENVR 203 Knowledge, Ethics and Environment (3 credits)
ENVR 400 Environmental Thought (3 credits)
ENVR 401 Environmental Research (3 credits)
GEOG 221 Environment and Health (3 credits)
GEOG 303 Health Geography (3 credits)
GEOG 310 Development and Livelihoods (3 credits)
GEOG 408 Geography of Development (3 credits)
GEOG 409 Geographies of Developing Asia (3 credits)
GEOG 410 Geography of Underdevelopment: Current Problems (3 credits)
GEOG 503 Advanced Topics in Health Geography (3 credits)
PARA 410 Environment and Infection (3 credits)
PARA 515 Water, Health and Sanitation (3 credits)
SOCI 331 Population and Environment (3 credits)
*Note that some courses have prerequisites and/or limited seating for Population and Global Health students.

PLEASE SEE APPENDED PAGES

Program Requirements for the B.A.; Faculty Program in Population and Global Health
Complementary Courses [continued]

STREAM 2: Culture, Society and Health

ANSC 555 The Use and Welfare of Animals (3 credits)
ANTH 202 Socio-Cultural Anthropology (3 credits)
ANTH 206 Environment and Culture (3 credits)
ANTH 209 Anthropology of Religion (3 credits)
ANTH 227 Medical Anthropology (3 credits)
ANTH 302 New Horizons in Medical Anthropology (3 credits)
ANTH 314 Psychological Anthropology 01 (3 credits)
ANTH 322 Social Change in Modern Africa (3 credits)
ANTH 325 Anthropology of the Self (3 credits)
ANTH 407 Anthropology of the Body (3 credits)
ECON 208 Microeconomic Analysis and Applications (3 credits)
ECON 313 Economic Development 1 (3 credits)
EDEC 233 Indigenous Education (3 credits)
EDEC 248 Equity and Education (3 credits)
EDEC 249 Global Education and Social Justice (3 credits)
HIST 238 Histories of Science (3 credits)
HIST 249 Health and the Healer in Western History (3 credits)
HIST 292 History and the Environment (3 credits)
HIST 319 The Scientific Revolution (3 credits)
HIST 335 Science and Medicine in Canada (3 credits)
HIST 350 Science and the Enlightenment (3 credits)
HIST 356 Medicine in the Medieval West (3 credits)
HIST 374 History of Sexuality in Canada (3 credits)
HIST 412 Women and Gender in Modern Britain (3 credits)
HIST 420 Gender and Sexuality in Modern China (3 credits)
HIST 424 Gender, Sexuality, and Medicine (3 credits)
HIST 425 Global Food History (3 credits)
HIST 430 Topics in Modern Medicine (3 credits)
HIST 449 Medicine in the Ancient World (3 credits)
HSEL 308 Issues in Women's Health (3 credits)
HSEL 309 Women's Reproductive Health (3 credits)
ISLA 200 Islamic Civilization (3 credits)
ISLA 210 Muslim Societies (3 credits)
ISLA 310 Women in Islam (3 credits)
ISLA 345 Science and Civilization in Islam (3 credits)
ISLA 355 Modern History of the Middle East (3 credits)
ISLA 360 Islam and Politics (3 credits)
ISLA 421 Islamic Culture - Indian Subcontinent (3 credits)
SOCI 234 Population and Society (3 credits)
SOCI 270 Sociology of Gender (3 credits)
SOCI 309 Health and Illness (3 credits)
SOCI 310 Sociology of Mental Disorder (3 credits)
SOCI 331 Population and Environment (3 credits)
SOCI 335 Sociology of Aging and the Life Course (3 credits)
SOCI 365 Health and Development (3 credits)
SOCI 370 Sociology: Gender and Development (3 credits)
SOCI 385 Sociology of Human Sexuality (3 credits)
SOCI 390 Gender and Health (3 credits)
SOCI 405 Families over the Life Couse (3 credits)
SOCI 502 Sociology of Fertility (3 credits)
SOCI 519 Gender and Globalization (3 credits)
SOCI 545 Sociology of Population (3 credits)

*Note that some courses have prerequisites and/or limited seating for Population and Global Health students.

STREAM 3: Diet, Lifestyle and The Life Course

ECON 208 Microeconomic Analysis and Applications (3 credits)
ECON 310 Introduction to Behavioural Economics (3 credits)
EDKP 261 Motor Development (3 credits)
EDKP 292 Nutrition and Wellness (3 credits)
EDKP 330 Physical Activity and Public Health (3 credits)
EDKP 395 Exercise Physiology (3 credits)
EDKP 405 Sport in Society (3 credits)
EDKP 448 Exercise and Health Psychology (3 credits)
ENVB 305 Population and Community Ecology (3 credits)
ENVR 202 The Evolving Earth (3 credits)
ENVR 203 Knowledge, Ethics and Environment (3 credits)
NUTR 307 Metabolism and Human Nutrition (3 credits)
NUTR 337 Nutrition Through Life (3 credits)
NUTR 341 Global Food Security (3 credits)

Program Requirements for the B.A.; Faculty Program in Population and Global Health
Complementary Courses [continued]

NUTR 450 Research Methods: Human Nutrition (3 credits)
NUTR 501 Nutrition in Developing Countries (3 credits)
NUTR 505 Public Health Nutrition (3 credits)
NUTR 512 Herbs, Foods and Phytochemicals (3 credits)
PARA 410 Environment and Infection (3 credits)
PARA 515 Water, Health and Sanitation (3 credits)
SOCI 335 Sociology of Aging and the Life Course (3 credits)
SOCI 405 Families over the Life Course (3 credits)
SOCI 588 Biosociology/Biodemography (3 credits)
*Note that some courses have prerequisites and/or limited seating for Population and Global Health students.

STREAM 4: Systems, Policy and Government

ECON 208 Microeconomic Analysis and Application (3 credits)
ECON 223 Political Economy of Trade Policy (3 credits)
ENVR 201 Society, Environment and Sustainability (3 credits)
GEOG 210 Global Places and Peoples (3 credits)
GEOG 216 Geography of the World Economy (3 credits)
GEOG 310 Development and Livelihoods (3 credits)
GEOG 403 Global Health and Environmental Change (3 credits)
GEOG 408 Geography of Development (3 credits)
GEOG 409 Geographies of Developing Asia (3 credits)
HIST 201 Modern African History (3 credits)
HIST 202 Survey: Canada to 1867 (3 credits)
HIST 203 Survey: Canada since 1867 (3 credits)
HIST 211 American History to 1865 (3 credits)
HIST 215 Modern Europe (3 credits)
HIST 218 Modern East Asian History (3 credits)
HIST 221 United States since 1865 (3 credits)
HIST 223 Indigenous Peoples and Empires (3 credits)
HIST 309 History of Latin America to 1825 (3 credits)
HIST 326 History of the Soviet Union (3 credits)
HIST 338 Twentieth-Century China (3 credits)
HIST 360 Latin America Since 1825 (3 credits)
HIST 361 Topics in Canadian Regional History (3 credits)
HIST 363 Canada 1870-1914 (3 credits)
POLI 212 Government and Politics - Developed World (3 credits)
POLI 221 Government of Canada (3 credits)
POLI 222 Political Process and Behaviour in Canada (3 credits)
POLI 227 Developing Areas/Introduction (3 credits)
POLI 243 International Politics of Economic Relations (3 credits)
POLI 244 International Politics: State Behaviour (3 credits)
POLI 319 Politics of Latin America (3 credits)
POLI 322 Political Change in South Asia (3 credits)
POLI 324 Developing Areas/Africa (3 credits)
POLI 340 Developing Areas/Middle East (3 credits)
POLI 341 Foreign Policy: The Middle East (3 credits)
POLI 345 International Organizations (3 credits)
POLI 347 Arab-Israel Conflict, Crisis, Peace (3 credits)
POLI 349 Foreign Policy: Asia (3 credits)
POLI 359 Topics in International Politics 1 (3 credits)
POLI 369 Politics of Southeast Asia (3 credits)
POLI 372 Indigenous Peoples and the Canadian State (3 credits)
POLI 422 Developing Areas/Topics 2 (3 credits)
POLI 423 Politics of Ethno-Nationalism (3 credits)
POLI 435 Identity and Inequality (3 credits)
POLI 441 IPE: Trade (3 credits)
POLI 445 International Political Economy: Monetary Relations (3 credits)
POLI 450 Peacebuilding (3 credits)
POLI 474 Inequality and Development (3 credits)
SOCI 254 Development and Underdevelopment (3 credits)
SOCI 307 Globalization (3 credits)
SOCI 515 Medicine and Society (3 credits)
SOCI 526 Indigenous Women's Health and Healthcare (3 credits)
*Note that some courses have prerequisites and/or limited seating for Population and Global Health students.

STREAM 5: Innovation and Leadership

ECON 209 Macroeconomic Analysis and Applications (3 credits)
ECON 230D1 Microeconomic Theory (3 credits)**
ECON 230D2 Microeconomic Theory (3 credits)**
ECON 310 Introduction to Behavioural Economics (3 credits)
ECON 447 Economics of Information and Uncertainty (3 credits)
INTG 201 Integrated Management Essentials 1 (3 credits)***+
INTG 202 Integrated Management Essentials 2 (3 credits)***+
MGCR 211 Introduction to Financial Accounting (3 credits)
MGCR 352 Principles of Marketing (3 credits)***
MGCR 382 International Business (3 credits)
MGCR 423 Strategic Management (3 credits)***
MGPO 362 Fundamentals of Entrepreneurship (3 credits)
MGPO 364 Entrepreneurship in Practice (3 credits)

Program Requirements for the B.A.; Faculty Program in Population and Global Health
Complementary Courses [continued]

MGPO 383 International Business Policy (3 credits)
MSUS 402 Systems Thinking and Sustainability (3 credits)
MGPO 435 The Origins of Capitalism (3 credits)
MGPO 438 Social Entrepreneurship and Innovation (3 credits)
MGPO 440 Strategies for Sustainability (3 credits)
MGPO 445 Industry Analysis and Competitive Strategy (3 credits)
MGPO 460 Managing Innovation (3 credits)
MGPO 469 Managing Globalization (3 credits)
MGPO 475 Strategies for Developing Countries (3 credits)

*Note that some courses have prerequisites and/or limited seating for Population and Global Health students.
**Students must take both ECON 230D1 and ECON 230D2.
***Students may choose only one of MGCR 352 or MGCR 423 if taking INTG 202.
+INTG 201 and 202 have a maximum of 10 seats for Population and Global Health students.
Courses offered by the Desautels Faculty of Management are capped, and the students from this program will not have priority registration. Thus, students should allow for at least four terms to complete Stream 5: Innovation and Leadership.

10.0 Approvals

Routing Sequence	Name	Signature	Meeting Date
Department	Timothy Evans		August 30, 2021
Curric/Acad Committee	Melissa Vollrath- FCC Chair		18 October, 2021
Faculty 1	Aimee Ryan- FMHS. Assoc. Dean	Digitally signed	Oct. 20, 2021
Faculty 2			
Faculty 3			
CGPS			
SCTP			
APC			
Senate			

Submitted by

Name	
Phone	
Email	
Submission Date	

To be completed by ES:

CIP Code

REMINDERS:
*Box 5.4 – Must be completed; see section 6.5.4 within the New Program Guidelines at: https://www.mcgill.ca/sctp/guidelines.
**All new program proposals must be accompanied by a 2-3 page support document.

10.0 Approvals

Routing Sequence	Name	Signature	Meeting Date
Department	Timothy Evans		October 20, 2021
Curric/Acad Committee	Michael Fronda, Arts		November 8, 2021
Faculty 1	MIchael Fronda		January 25, 2022
Faculty 2			
Faculty 3			
CGPS			
SCTP	Cindy Smith, SCTP Secretary		March 3, 2022
APC		APC	April 14, 2022
Senate			

Submitted by		
Name		To be completed by ES:
Phone		CIP Code
Email		
Submission Date		

REMINDERS:
*Box 5.4 – Must be completed; see section 6.5.4 within the New Program Guidelines at: https://www.mcgill.ca/sctp/guidelines.
**All new program proposals must be accompanied by a 2-3 page support document.

Note: The subject code for the courses within this program is GPHL, an acronym of "Global (G) and Population (P) Health (HL)", with first emphasis given to 'global' given the centrality of a global perspective across the curriculum.

EXECUTIVE SUMMARY

B.A.; Faculty Program in Population and Global Health (54 credits).

Rationale and Vision

The global interdependency that characterizes 21st century health challenges, ranging from pandemics to climate change to mental health, requires new ways of thinking. More than ever, a next generation of leaders is needed who embody diversity, and are wired to listen, collaborate and innovate solutions across disciplines, sectors, and social divides.

McGill's School of Population and Global Health (SPGH) is poised to respond by offering a state-of- the-art undergraduate Bachelor of Arts (B.A.) program that fosters a global state of mind and the skill-sets needed to tackle complex health-related challenges both locally and around the world. The program aims to help students frame the big picture while equipping them to embrace context as the bedrock of grounded learning. Firmly rooted in the values of equity and social justice, the program aspires to create a rich and inclusive learning environment, which embraces diversity.

Designed by leading educators across McGill's various Faculties, Schools and Departments, the program will employ the latest pedagogic methods including blended, problem-focused and hands-on learning.

Key features of the 54-credit Faculty program include:

- Foundation courses which use a competency-based approach and are inclusive of skills in understanding and using data and effective multi-media communication, as well as content on current global health challenges, the social determinants of health, ethics and policy.
- Opportunities for specialization in thematic areas such as Environment & Health, Culture & Society, Systems, Policy & Governance, and Innovation & Leadership, that draw on diverse disciplinary expertise across the university and enable fast-tracking into graduate and professional programs at McGill.
- Required experiential learning that embeds students in community-based, public health and research organizations, to encourage reflexivity and practical and professional skills building.
- The use of blended learning approaches including online modules, and synchronous small group sessions that enable the engagement of students and faculty located in remote settings or globally.
- A mentoring program that supports diversity by matching racialized and other in/visible minority students with faculty within and beyond SPGH who share their experience.

Development and Consultation Processes

Program development was undertaken by a working group comprised of faculty, students and Indigenous and community engagement experts drawn from across the university. Ten full-committee meetings explored program elements and were supplemented by in-depth consultations and specialized working groups focused on community and experiential learning components, and Indigenous health. Technical issues related to program structure, governance and budgets were the subject of consultations with administrative staff involved in the program approval processes at the Faculty and university level, Teaching and Learning Services, the Associate Provost (Teaching and Academic Programs), and the Office of Community Relations.

Program Features

A defining feature of the program is its competency orientation and the manner in which these are iteratively developed. Six competencies emerged from the deliberations of our working group, a review of existing undergraduate global health programs, a rapid survey of the needs of Canadian global health employers and our students, and the pedagogic literature:

1. **Positionality and partnership**: Explain the role of power, privilege and social justice while demonstrating continuous self-awareness when working in teams, different cultures/contexts and/or worldviews
2. **Interdisciplinary problem-solving**: Demonstrate the ability to apply a determinants-of-health, systems-based, reflexive, and ethical approach to interdisciplinary population and global health problem solving and discourse
3. **Origins of systemic inequities**: Describe how historical and politico-economic forces (e.g., colonialism, neoliberalism) have shaped and continue to impact global health policy, research and practice
4. **Research literacy**: Describe quantitative and qualitative research principles and key data analytic techniques used in evidence-based problem solving
5. **Ethical foundations**: Define and apply various ethical frameworks relevant to population and global health in a manner that is culturally sensitive, collaborative and responsive to organizational and community needs
6. **Knowledge mobilization**: Summarize, critically appraise and explain global health ideas to diverse audiences through written, spoken, visual, and other methods

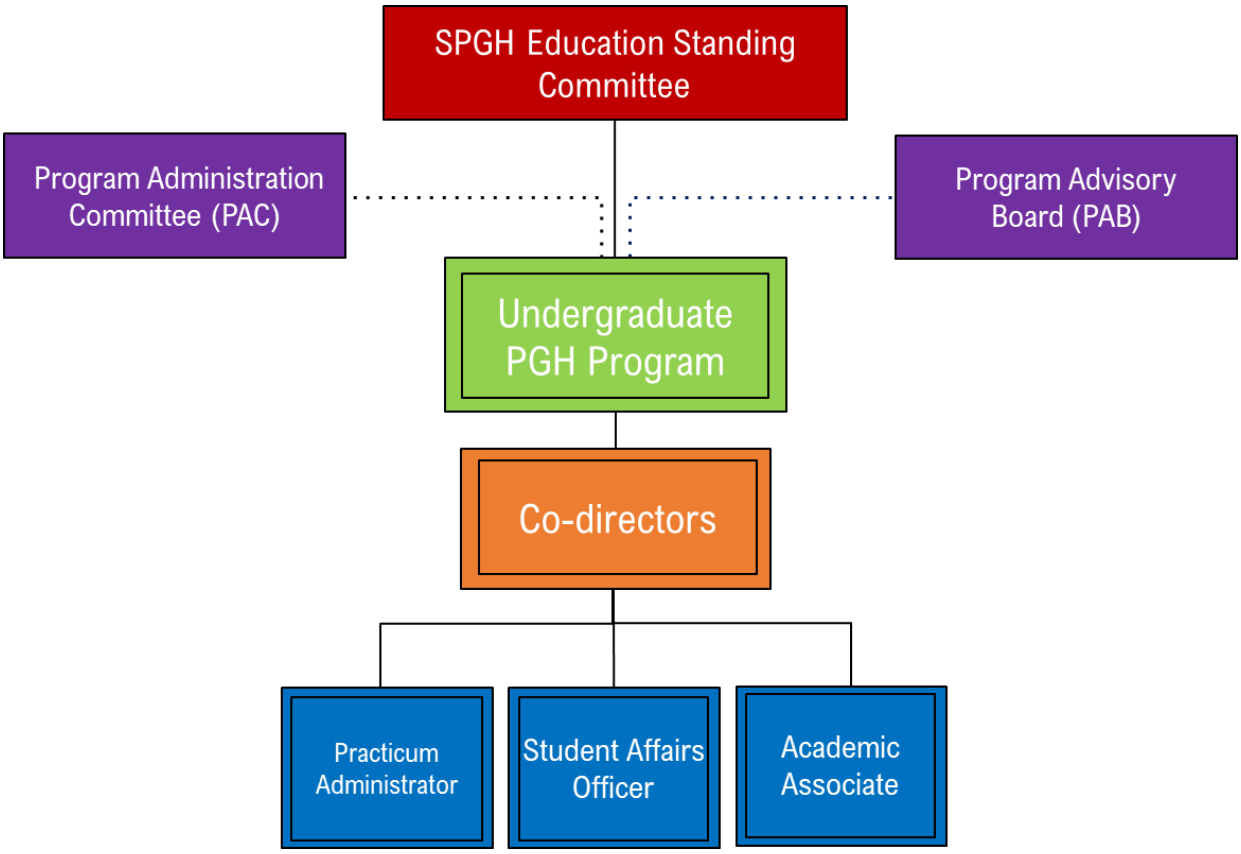
These competencies are reflected in the design and content of this B.A. degree which consists of the following course components: 1) eight required courses (Foundations in Population and Global Health, Ethics and Equity, Community-Engaged Learning, Research Methods, Data Literacy, Knowledge Translation, Critical Issues in Global Health, and a full semester Experiential Learning Project); and 2) twenty-one credits of complementary courses in one of five population health-related areas of specialization/streams (Environment and Health; Diet, Lifestyle and The Life Course; Culture, Society and Health; Systems, Policy and Government, and Innovation and Leadership). Each of these streams will provide an opportunity for students to develop interdisciplinary competencies useful to global and population health problem-solving. Given this emphasis on interdisciplinarity, requirements for a minimum number of upper-level courses, often found in concentrations in the Faculty of Arts, will not apply.

Program Structure

Program Administration: Two co-directors will lead the program: one from the Faculty of Medicine and Health Sciences and the other from the Faculty of Arts. As illustrated in the organigram below, the co-directors will work in close collaboration with the Practicum Coordinator, Program Officer and Academic Associate to administer the program, whose roles are briefly explained below:

- Practicum Coordinator: Responsible for managing all aspects of student placements, relationship building with community and organizational partners.
- Program Officer: Responsible for administrative issues including marketing, recruitment and student inquiries.
- Academic Associate: Responsible for admissions and advising.

Following the lead of the B.A. & Sc. program there will also be a Program Administration Committee (PAC) with membership from both Faculties, responsible for administrative matters including support staff deployment, advising, records maintenance and disciplinary issues. The Program Advisory Board (PAB) will consist of members both within and external to the university such as donors, community members, pedagogical experts and other stakeholders. Its role will be to provide guidance on program objectives, growth, community and organizational relationships, and recommendations on how to manage challenges etc.



Admissions: Admission to the program will be based on explicit criteria that reflect student academic ability, experiential and demographic diversity, and initiative. To create the enriched learning environment that diversity presents, the program will adopt its own admissions pathway in which non-academic factors are considered through the required submission of supplemental admissions materials, including 3 short essay questions. A selection committee co-chaired by the program co-directors will review applications and make decisions regarding admissions. Due to the separate enrollment path, this program does not anticipate competing with the recruitment efforts of other programs at McGill.

The projected student mix is 40% Quebec Students, 40% from the rest of Canada and 20% international. We anticipate that a maximum of 40 students will be admitted each year such that after four years there will be a maximum of 144 students in the program (assuming all of the non-Quebec students will be entering a 4-year program). A cap of 12 students will be allowed for each stream thereby minimizing enrolment pressure on Faculty of Arts courses comprising the five streams.

Advising/mentorship: Each undergraduate student will receive academic advising from assigned faculty members and the program's Academic Associate. This will include guidance on course sequence and course selection taking into account pre-requisites and enrolment limits in certain Faculty of Arts Departments. The Academic Associate will also maintain an up-to-date list of undergraduate Arts and Science courses for each of the streams to assist in course selection. With the approval of the program co-directors, a student will have the option of taking relevant non-listed courses to complete the 21 credits in their selected stream. SPGH courses will be counted as Arts courses in order to keep students compliant with the policy which states that Arts students cannot take more than 30 non-Arts courses.

Student placements: A full-time Practicum Coordinator will work to secure student placements for the required Community Engaged Learning (CEL) course in U2, and the experiential learning semester in U3. Given that placements will occur a minimum of 2 years after program launch, time to establish fully supported community sites is availed. To this end, the Practicum Coordinator will nurture and secure organizational partnerships in collaboration with the Partnership Unit of SPGH, and in coordination with other programs offering similar placements. A pre-existing list of student placements will be maintained and expanded, and regular communications with offering organizations will occur regarding their needs and priorities.

For the required CEL course, local community partners/organizations will receive a team of two to three students to enable progress on the task(s) to which they have been assigned. A local supervisor will manage their workflow, and report to the Practicum Coordinator on a regular basis. For the experiential learning semester, placements will span international organizations, LMIC non-governmental and research organizations, research laboratories, public health and community-based organizations locally, and other approved locations across Canada (i.e., northern Indigenous, other health-related organizations). In the event that a student is unable to complete their CEL or semester placement for medical or other approved reasons, alternative study options will be availed with appropriate performance requirements and supervision e.g., a supervised independent study with a scholarly paper.

Program Demand

Student demand for the proposed Faculty Program is strong. McGill's Global Health Programs has seen an increased demand for its services by both undergraduate and graduate students and across the Faculties of Engineering, Arts, Science, Management, Agricultural and Environmental Sciences, and Medicine and Health Sciences. Currently, at the undergraduate level, the only survey course on global health is PPHS 511 Fundamentals of Global Health, which enrolls approximately 150 senior undergraduate or graduate students per year and is always filled to capacity. A recent survey of students confirmed this unmet need. Over 80% of students indicated that the current offering of undergraduate global health courses was insufficient. When asked about the perceived availability of hands-on learning opportunities, 90% of students conveyed a desire for more opportunities of this nature, and an equal proportion of students indicated their interest in undergraduate program offerings that included internships or experiential learning given their importance to future graduate studies and/or employment in global and population health. Interest in the five program streams was also assessed, all of which were well-received. Focus group discussions with undergraduate students aligned with quantitative findings, indicating support for the major. Students also expressed their desire to study global health with a similarly minded cohort, and to have their global health coursework recognized on their degree.

The proposed program represents the first and only Bachelor of Arts in Population and Global Health in the province of Quebec and promises to fill a widening national gap in undergraduate global health education relative to student demand elsewhere in Canada. Based on an environmental scan of similar undergraduate programs across 13 universities in three provinces (British Columbia, Alberta, and Ontario), of the 19 identified, only seven are explicitly designated as global health undergraduate degrees. The remainder (12/19) are conceptualized as degrees in community health (4/19), community and population health (2/19), public health (3/19), or other (3/19), 11 of which contained some sort of practicum component. Few similar programs embraced the competency-based, interdisciplinary approach that defines the proposed interfaculty B.A degree, and fewer still dedicate a full semester to practical hands-on learning within communities and organizations, both locally and globally.

The **McGill University Senate endorsed the creation of an undergraduate program in 2016**, as part of its approval for the establishment of the SPGH. In the supporting strategy document, the program in Population and Global Health is justified as a means to increase student enrollment, attract new students to McGill and act as a pipeline to Masters and PhD programs such as Public Health, Epidemiology, Sociology, Economics, Geography and Political Science, and professional programs offered by Law, Medicine and Health Sciences, and Dental Medicine and Oral Health Sciences. Beyond the confines of the classroom, the program is expected to fulfill McGill University's mission by encouraging new forms of research, knowledge exchange and partnerships between disciplines and communities in both local and global settings. Aligned with the McGill University Strategic Academic Plan 2017-2022, the program will help to cultivate an open disposition to the world, expand diversity, lead innovation, and foster connections across disciplines and sectors through its innovative, interdisciplinary design and community engagement opportunities.

APPENDIX B

McGill

New Program/Concentration Proposal Form

(2019)

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

Certificate

2.0 Administering Faculty or GPS

School of Continuing Studies (SCS)

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

STEMFndns(Sci,Techno,Eng&Math)

Offering Faculty & Department

SCS/Faculty Partnerships and Summer Studies

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

3.0 Effective Term of Implementation
(Ex. Sept. 2019 or 201909)
Term

202209

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

Cert. in STEM Foundations (Science,Technology,Engineering & Mathematics)

4.0 Rationale and Admission Requirements for New Program/Concentration

Please refer to Annex 1.

5.0 Program Information
Indicate an "x" as appropriate

5.1 **Program Type**

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

5.2 **Category**

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

5.3 **Level**

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

5.4 **Requires Centrally-Funded Resources**

Yes ___ No _X_

6.0 Total Credits or CEUs (if latter, indicate "CEUs" in box)

30

7.0 Consultation with

Related Units	X Yes	No
Financial Consult	Yes	X No

Attach list of consultations.

8.0 Program Description (Maximum 150 words)

The Certificate in STEM Foundations (Science, Technology, Engineering and Mathematics) is a 30-credit undergraduate program that focuses on specific STEM topics (i.e., mathematics, chemistry, biology and physics) at the Grade 12 level.

NOTE: There is no guaranteed admission to a McGill degree program upon completion of the Certificate in STEM Foundations (Science, Technology, Engineering and Mathematics).

9.0 List of proposed new Program/Concentration

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

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

Certificate in STEM Foundations (Science, Technology, Engineering and Mathematics) (30 credits)

Required Courses (24 credits)
CMSC 000 Foundations of Mathematics (3 credits)
CMSC 003 Foundations of Logarithms,Trigonometry & Intro to Calculus (3 credits)
CSCI 010 Foundations in General Biology 1 (3 credits)
CSCI 020 Foundations in General Chemistry 1 (3 credits)
CSCI 021 Foundations in General Chemistry 2 (3 credits)
CSCI 030 Fundamentals of Physics - Mechanics (3 credits)
CSCI 031 Fundamentals of Physics – Waves and Optics (3 credits)
WCOM 150 Critical Analysis and Composition (3 credits)

Complementary Courses (6 credits)
3 credits from the following:
CMSC 004 Foundations:Statistics, Probability&Intro to Linear Algebra (3 credits)*
CSCI 011 Foundations of General Biology 2 (3 credits)**
*For Engineering programs.
**For Health and Science programs.

3 credits from the following [up to 3 credits may be chosen from 100-level courses approved by the program adviser]:
CSCI 022 Fundamentals of Organic Chemistry (3 credits)
WCOM 295 ESL: Academic Skills (3 credits)

Attach extra page(s) as needed

10.0 Approvals

Routing Sequence	Name	Signature	Meeting Date
Department	Dr. Carmen Sicilia, Director of Indigenous Relations Initiative		January 18, 2022
Curric/Acad Committee	Associate Dean Sue Laver, School of Cont. Studies		January 11th, 2022
Faculty 1	Dean Carola Weil, School of Cont. Studies		26 Jan. 2022
Faculty 2			
Faculty 3			
CGPS			
SCTP	Cindy Smith, SCTP Secretary		April 7, 2022
APC		APC	April 14, 2022
Senate			

Submitted by

Name	Effie Dracopoulos
Phone	1201
Email	effie.dracopoulos@mcgill.ca
Submission Date	January 4, 2022

To be completed by ES:

CIP Code

REMINDERS:
*Box 5.4 – Must be completed; see section 6.5.4 within the New Program Guidelines at: https://www.mcgill.ca/sctp/guidelines.
**All new program proposals must be accompanied by a 2-3 page support document.

McGill | School of Continuing Studies

ANNEX 1

Certificate in STEM Foundations (Science, Technology, Engineering and Mathematics)

A Gateway to Freshman/U0 University STEM Programs

Rationale

In discussions with the Faculties of Dental Medicine and Oral Health Sciences, Medicine and Health Sciences, Engineering, and the Ingram School of Nursing, who wish to provide more diverse and increased opportunities for admission to their programs, the School of Continuing Studies has identified a need for a **Certificate in STEM Foundations (Science, Technology, Engineering and Mathematics)** in a variety of STEM-related fields for high-performing but underprepared and/or underrepresented students.

Furthermore, education entities such as Shorelight (USA), Altamont (Dubai), VertoEducation (USA) and TAV College (Montreal) have confirmed the need for such a program within the student populations they serve, that is, a sub-set of students who are not sufficiently prepared, academically speaking, to be admitted into a Health, Science, or Engineering Faculty. This coincides with the need for a gap-filling preparation program for certain underrepresented student populations that are the focus of EDI initiatives, including Indigenous initiatives, at McGill. Such a program could help maximize students' chances of being admitted into a Health, Science, or Engineering Faculty at McGill or elsewhere. In keeping with the Principal's priority to expand diversity (https://www.mcgill.ca/provost/article/mcgill-university-strategic-academic-plan-2017-2022), the guiding principal of inclusivity (https://www.mcgill.ca/medadmissions/about/guiding-principles), and *The Provost's Task Force on Indigenous Studies and Indigenous Education: Final Report*, the program will target not only students from local, underserved communities, but also those who are at a disadvantage because of systemic lack of access.

The School of Continuing Studies (SCS) therefore proposes to create a certificate program that will prepare students for Freshman Year/U0 university studies in a variety of STEM-related subjects.

Target Population

The target student population, while diverse in its composition, is identified as having common gaps in their preparedness for university studies.

The primary target population for the **Certificate in STEM Foundations (Science, Technology, Engineering and Mathematics)** program is students from all backgrounds who lack typical prerequisites for Freshman/U0 year STEM courses, or who wish to enhance their pre-university educational background so as to have more competitive university admission applications. This may include students from underserved and/or underrepresented communities (e.g., Indigenous communities of Canada; ethnic or racialized minorities; new

immigrants; women aspiring to enter STEM professions, etc.), but also a variety of international students coming from different secondary school systems.

The Certificate in STEM Foundations (Science, Technology, Engineering and Mathematics) is set to launch with a first closed cohort of 20-25 Indigenous learners within the Territory of James Bay, specifically the community of Ouje Bougoumou, supported by a three-year grant from the Ministère de l'éducation et de l'enseignement supérieur (MEES).

Admission requirements

a) Students must be at least 17 years of age and in one of the four categories below:

i. High School Diploma OR
ii. Applicants must hold a CEGEP diploma (DCS, DEC or equivalent) from a non-STEM discipline OR
iii. Applicants who do not have the normal academic background for admission but are 21 years of age and older may be admitted as mature students

b) Students must meet SCS's English Language Proficiency Requirement:
https://www.mcgill.ca/continuingstudies/language-policy

Proposed Program

Designed as a gateway to Freshman Year/U0 university programs in North America and elsewhere, the proposed **Certificate in STEM Foundations (Science, Technology, Engineering and Mathematics)** is a 30-credit undergraduate program that focuses on specific STEM topics in Math, Chemistry, Biology, and Physics at the Grade 12 level.

NOTE: There is no guaranteed admission to a McGill degree program upon completion of the Certificate in STEM Foundations (Science, Technology, Engineering and Mathematics).

The proposed program will also provide the target populations with the kind of dedicated support (e.g., tutoring) needed to maximize their academic performance in prerequisite courses that are typically required for admission to undergraduate STEM degree programs.

A special feature of the program will be to provide support to students in the following ways:

1. Students will be assigned a tutor for the duration of the program so that their academic progress in each course is monitored and immediate assistance can be provided if/as needed.
2. Important soft skills, such as note-taking, time-management, exam preparation, and other such skills necessary for academic success, will be developed through participation in extracurricular workshops and activities.

Furthermore, the design of the program lends itself to various delivery modes - on campus at McGill University, off campus (on the premises of a partner institution), or hybrid (partly online, partly in person) depending on demand and/or requests from partner institutions or government bodies. In addition, it may be taken on a part-

time or full-time basis, making it accessible to as many students as possible. Students wishing to take individual courses rather than the complete program will be able to do so as Independent Students.

Program Structure

Certificate in STEM Foundations (Science, Technology, Engineering and Mathematics) (30 credits)
The program is comprised of a total of 30 credits of grade 12-level courses: 8 required courses (24 credits) selected from one of the designated streams in Health/Science or Engineering, and 2 complementary courses (6 credits) selected from the list of complementary courses. Additional complementary courses may be selected in consultation with, and if approved by, the Program Adviser.

Required Courses (24 credits)

CMSC 000 Foundations of Mathematics (3 credits)
CMSC 003 Foundations of Logarithms,Trigonometry and Intro to Calculus (3 credits)
CSCI 010 Foundations in General Biology 1 (3 credits)
CSCI 020 Foundations in General Chemistry 1 (3 credits)
CSCI 021 Foundations in General Chemistry 2 (3 credits)
CSCI 030 Fundamentals of Physics - Mechanics (3 credits)
CSCI 031 Fundamentals of Physics – Waves and Optics (3 credits)
WCOM 150 Critical Analysis and Composition (3 credits)

Complementary Courses (6 credits)
3 credits from the following:
CMSC 004 Foundations:Statistics, Probability&Intro to Linear Algebra (3 credits)*
CSCI 011 Foundations of General Biology 2 (3 credits)**
* For Engineering programs.
**For Health and Science programs.

3 credits from the following [up to 3 credits may be chosen from 100-level courses approved by the program adviser]:
CSCI 022 Fundamentals of Organic Chemistry (3 credits)
WCOM 295 ESL: Academic Skills (3 credits)

The Table below provides a Sample Study Plan - a list of courses to be taken depending on a student's chosen discipline (Health, Science, or Engineering). The grey cells indicate courses for all disciplines. The yellow cells indicate courses for **Health and Science**, while the green cells indicate courses for **Engineering**. The numbers in the last three columns represent the number of credits.

SAMPLE STUDY PLAN

	Type of Course per Stream	Course #	Course Title	Semester 1	Semester 2	Semester 3
1	Required (Health/Science & Engineering)	CSCI 010	Foundations in General Biology 1	3		
2	Complementary (Health/Science)	CSCI 011	Foundations of General Biology 2		3	
3	Required (Health/Science & Engineering)	CSCI 020	Foundations in General Chemistry 1	3		
4	Required (Health/Science & Engineering)	CSCI 021	Foundations in General Chemistry 2		3	
5	Complementary (Health/Science)	CSCI 022	Fundamentals of Organic Chemistry			3
6	Required (Health/Science & Engineering)	CSCI 030	Fundamentals of Physics - Mechanics		3	
7	Required (Health/Science & Engineering)	CSCI 031	Fundamentals of Physics - Waves and Optics			3
8	Required (Health/Science & Engineering)	CMSC 000	Foundations of Mathematics	3		
9	Required (Health/Science & Engineering)	CMSC 003	Foundations of Logarithms, Trigonometry & Intro to Calculus		3	
10	Complementary (Engineering)	CMSC 004	Foundations:Statistics, Probability&Intro to Linear Algebra			3
11	Required (Health/Science & Engineering)	WCOM 150	Critical Analysis and Composition (3 credits)	3		
12	Complementary (Engineering)	WCOM 295 Or another course at the 100 level	ESL: Academic Skills (3 credits) Approved by the Program Adviser (3 credits)		3	

McGill | Faculty of Medicine and Health Sciences

MEMORANDUM

Office of the Vice-Principal, Health Affairs and Dean of Medicine and Health Sciences
3605 de la Montagne, Room 117
Montreal, QC H3G 2M1
Phone: 514-398-3524 Fax: 514-398-4423

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

FROM: David Eidelman
Vice-Principal (Health Affairs)
Dean of Medicine and Health Sciences

DATE: March 22, 2022

SUBJECT: **Request to establish the McGill Institute of Genomic Medicine**

FOR: information discussion decision action

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 Institute of Genomic Medicine in the Faculty of Medicine and Health Sciences.

Background and Rationale/issues to address

As outlined in the attached proposal, The science of genomics has progressed faster than any other field of research in recent decades, propelled by major technological advances. The three billion chemical letters in our DNA blueprint can now be decoded (sequenced) for less than US$1,000 per individual as compared with the US$2.7 billion needed to sequence the first human genome in 2003. Nearly 20 years on, genomics has transformed medicine and biology into big data science that harnesses large-scale research infrastructure and new forms of multidisciplinary collaborations. The results are revolutionizing our understanding of human health, disease and life more broadly; radically changing approaches to medical practice; and shaping widely diverging fields, ranging from engineering to the social sciences.

The vision of The McGill Institute of Genomic Medicine is to harness the University's diverse scientific expertise, research infrastructures and medical resources to achieve rapid advances in large-scale biology and "big data" science through interdisciplinary, convergence research, with the ultimate goals of improving human health and diminishing disease burden across the lifespan.

To achieve this vision, and to consolidate McGill's position as a leader at the interface of genomics and medicine nationally and internationally, we are proposing to create the McGill Institute of Genomic

Medicine (the Institute). This proposal is the fruit of sustained past investments at McGill, strong existing collaborations between McGill investigators and clinicians, and an impressive track record of scientific, medical and funding successes, including recently raising more than $300 million in research support. Creation of the Institute will further the multidisciplinary research culture that has grown at McGill around genomic medicine, promote innovation and position McGill to benefit from new, emerging funding opportunities.

Alignment with mission and strategic priorities

The Institute will build upon McGill's strong position in genomics due to historic investments. By 1995, McGill had already recognized the key role that genomics would have in revolutionizing approaches to medicine in the 21st century. Consequently, the University and its Faculty of Medicine and Heath Sciences (FMHS) prioritized genomics and associated quantitative and computational sciences in their successive Strategic Research Plans. The FMHS commitment to the Institute is reiterated in its 2021 updated Strategic Research Plan, both by identifying Personalized Medicine as a top strategic priority and the creation of the Institute as a critical implementation strategy. The FMHS has sustained efforts over many years in applying genomics to improve diagnosis, intervention and treatments by linking fundamental genomics research to its clinical departments. Priority areas of medical genomics for the FMHS are cancer, infection and inflammation (now including COVID-19), neurological disorders and aging-related chronic diseases. This proposal for the Institute prioritizes disease areas in close alignment with those of the FMHS to ensure maximum coordination and translational impact.

The Institute will position McGill to attract new, increased financial support from national and international funders, philanthropic organizations and industry to contribute to this research, and to the sustainability and expansion of key research infrastructures at the University. The Institute will attract, recruit and retain top talented investigators conducting work at the forefront of medical genomics. It will educate a new generation of global scientific leaders by sponsorship of interdisciplinary training and public engagement of Canadian and international scholars at McGill. It will bring new collaborations with leading scientists and institutions in North America, Europe, United Kingdom, Asia and elsewhere to the University

Consultations

A consultation process has been conducted and letters of support for the Institute obtained from key stakeholders within the Faculty of Medicine and Health Sciences, and from national and international leaders in genomic medicine and related disciplines. Input has been obtained from the McGill Graduate and Postdoctoral Studies and the Equity and Academic Policy offices who have agreed to help implement the educational and equity inclusion and diversity plans. The proposal for the Institute has been presented and approved by the Dean's Operations Committee within the Faculty. Letters of support are attached to the proposal.

Risk factors

We believe there is no risk factors associated to this request. The new Institute's strong cross-institutional and interdisciplinary culture will empower McGill investigators to work together to tackle major challenges that are beyond the reach of individual research laboratories. It will be poised to make breakthrough in our understanding of the molecular basis of diseases, with the expectation that the results will lead to novel therapeutics and new markers for risk stratification and targeted preventive measures and treatment.

Impact of Decision, next steps

The establishment of the McGill Institute of Genomic Medicine in the Faculty of Medicine and Health

Sciences at McGill University will provide a hub of cross institutional and interdisciplinary collaboration. The Institute will also establish industry-sponsored research and training partnerships that will lead to the introduction of new, leading-edge technologies to McGill.

Formal and final approval of this Institute will be announced at the Faculty of Medicine Faculty Council meeting following the Board of Governors approval and communicated via Health-E news (formally med-E news) and other news media within the Faculty of Medicine and Health Sciences.

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

Sincerely,

David Eidelman, MDCM

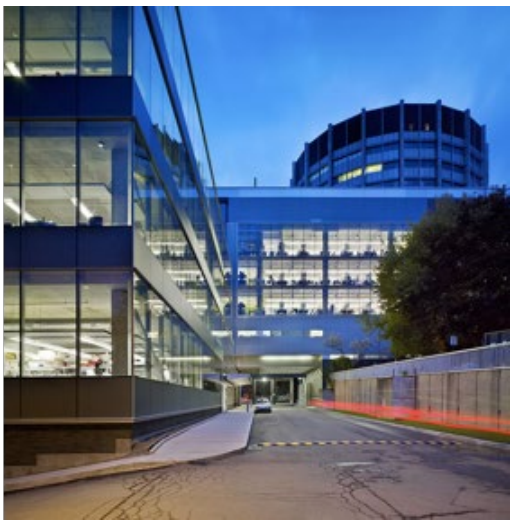
PROPOSAL FOR THE CREATION OF A

MCGILL INSTITUTE OF GENOMIC MEDICINE

PRESENTED TO THE
THE FACULTY OF MEDICINE AND HEALTH SCIENCES

SUBMITTED BY

PROFESSOR MARK LATHROP
DIRECTOR OF THE MCGILL GENOME CENTRE
&
PROFESSOR PHILLIPPE GROS
CO-DIRECTOR OF THE MCGILL RESEARCH CENTRE ON COMPLEX TRAITS



FEBRUARY 14, 2022

Contents

ABBREVIATIONS & LINKS FOR INSTITUTIONS AND PROGRAMS

AMED	Japan Agency for Medical Research and Development
ANR	French Agence Nationale de la Recherche
C3G	Canadian Centre for Computational Genomics
CERC	Canada Excellence Research Chair
CFI	Canada Foundation for Innovation
CGEn	Canadian Genomics Enterprise
CIHR	Canadian Institutes of Health Research
CGP	Centre of Genomics and Policy
CLSA	Canadian Longitudinal Study on Aging
FMHS	McGill Faculty of Medicine and Health Sciences
FRQ	Fonds de recherche du Québec
GA4GH	Global Alliance for Genomics and Health
HCA	Human Cell Atlas initiative
IHEC	International Human Epigenome Consortium
JPND	The EU Joint Programme – Neurodegenerative Disease Research
MGC	McGill Genome Centre
MI4	McGill Interdisciplinary Initiative in Infections and Inflammation
MUHC	McGill University Health Centre
MRCCT	McGill Research Centre on Complex Traits
SD4Health	Secure Data 4 Health

PROPOSAL FOR A MCGILL INSTITUTE OF GENOMIC MEDICINE

1. EXECUTIVE SUMMARY

Our vision is to harness McGill's diverse scientific expertise, research infrastructures and medical resources to achieve rapid advances in large-scale biology and "big data" science through interdisciplinary, convergence research, with the ultimate goals of improving human health and diminishing disease burden across the lifespan. To achieve this vision, and to consolidate McGill's position as a leader at the interface of genomics and medicine nationally and internationally, we are proposing to create the McGill Institute of Genomic Medicine (the Institute). This proposal is the fruit of sustained past investments at McGill, strong existing collaborations between McGill investigators and clinicians, and an impressive track record of scientific, medical and funding successes, including recently raising more than $300 million in research support. Creation of the Institute will further the multidisciplinary research culture that has grown at McGill around genomic medicine, promote innovation and position McGill to benefit from new, emerging funding opportunities.

FOCUSES The Institute will have seven Strategic Aims**:**

1. Enable precision and personalized medicine for chronic and infectious disease;
2. Lead in studies on emerging infections and the microbiome;
3. Obtain novel treatments for major disease;
4. Propel the use of computational medicine tools, and address data goverance;
5. Strengthen McGill's global connections;
6. Educate and train a new generation of scientific talent; and
7. Contribute to policy and inclusive science.

The Institute will have five core divisions - 1. **Large-scale biology**; 2. **Immunology, inflammation and infection**; 3. **Computational systems biology**; 4. **Genomic medicine**; 5. **Society, law, ethics and policy** - that are articulated so as to tackle major challenges of 21st century biomedical research. The Institute will be home to some of the major national research infrastructure, including the Canadian Longitudinal Study on Aging national platforms for Population-scaled Genomics and Metabolomics; the Secure Data for Health Platform; BSL2 and BLS3 facilities; and the Québec COVID-19 Biobank. It will also be a principal node of the Canadian Genomics Enterprise National DNA Analysis Consortium. With a component for large efforts in technology development and integration, the Institute will advance larger thematic initiatives, such as:

- **Canadian National Life Sciences Data Infrastructure**: manage and safeguard data generated by publicly funded research and link it internationally;

- **LIFESPAN: Canadian National Data Platform for Precision Medicine & the Aging Population**: create a comprehensive dataset on the dynamics of biological, environmental and lifestyle factors in individuals as they age;
- **Engineering the microbiome to maintain health and reduce disease burden**: use Institute-wide capacity for microbiome studies;
- **Mobilizing genomics & immunology to fight pandemics:** build upon the Institute's expertise in infectious disease genomics and its successes with COVID-19; and
- **Canada Excellence Research Chair (CERC) in Genomic Medicine: Genes to drug targets for next-generation therapies:** support this CERC, which has already created strong ties between McGill genomics and clinical research.

The Institute will also be a key participant in genome-based research efforts led from elsewhere, such as the Terry Fox Marathon of Hope Initiative in cancer genomics and immunology (~$100 million across Canada) and the McGill Neurogenomics Partnership (~$80 million).

MEMBERSHIP At its inception (planned for first semester 2022), it is anticipated that the Institute will include 29 Core Members who, as permanent senior members, will have their principal academic activity and laboratories within the Institute; more than 325 junior scientists, staff and trainees; and 41 Associate Members. The latter are senior scientists from the Faculty of Medicine and Health Sciences, McGill hospitals and other Faculties, with strong links to the Institute. The Core Membership fuses the expertise and infrastructures in genomics and computation at the McGill Genome Centre, and the platforms, immunology and other biological expertise at the McGill Research Centre on Complex Traits to form a state-of-the-art technology and science platform that will sustain all aspects of genomic medicine at McGill working in close collaboration with Associate Members. The social sciences, along with ethical, policy and legal aspects of genomic medicine, spearheaded by the McGill Centre of Genomics and Policy, will be an integral part of the Institute, providing the expertise to implement a unique full spectrum approach to genomic medicine.

ANTICIPATED IMPACTS The new Institute's strong cross-institutional and interdisciplinary culture will empower McGill investigators to work together to tackle major challenges that are beyond the reach of individual research laboratories. It will be poised to make breakthrough in our understanding of the molecular basis of diseases, with the expectation that the results will lead to novel therapeutics and new markers for risk stratification and targeted preventive measures and treatment. The Institute will position McGill to attract new, increased financial support from national and international funders, philanthropic organizations and industry to contribute to this research, and to the sustainability and expansion of key research infrastructures at the University. The Institute will attract, recruit and retain

top talented investigators conducting work at the forefront of medical genomics. It will educate a new generation of global scientific leaders by sponsorship of interdisciplinary training and public engagement of Canadian and international scholars at McGill. It will bring new collaborations with leading scientists and institutions in North America, Europe, United Kingdom, Asia and elsewhere to the University.

2. PURPOSE OF THIS DOCUMENT

This document summarizes the rationale for establishing a McGill Institute of Genomic Medicine, its Strategic Aims and key anticipated impacts, along with details of its membership, structure, the academic expertise to be encompassed, governance, funding implications, training and outreach. Appendices provide additional supporting information. *(*The names of Institute Members are underlined throughout.)

3. VISION FOR THE MCGILL INSTITUTE OF GENOMIC MEDICINE

The McGill Institute of Genomic Medicine (the Institute) will harness the University's diverse scientific expertise, research infrastructures and medical resources to achieve rapid advances in large-scale biology and "big data" science through interdisciplinary, convergence research, with the ultimate goals of improving human health and diminishing disease burden across the lifespan.

4. THE GENOME REVOLUTION IN MEDICINE

The science of genomics has progressed faster than any other field of research in recent decades, propelled by major technological advances. The three billion chemical letters in our DNA blueprint can now be decoded (sequenced) for less than US$1,000 per individual as compared with the US$2.7 billion needed to sequence the first human genome in 2003. Nearly 20 years on, genomics has transformed medicine and biology into big data science that harnesses large-scale research infrastructure and new forms of multidisciplinary collaborations. The results are revolutionizing our understanding of human health, disease and life more broadly; radically changing approaches to medical practice; and shaping widely diverging fields, ranging from engineering to the social sciences. Genomics has led to new forms of international scientific cooperation designed to deliver "moonshot" style research outcomes. And it has established the open science model in which data are immediately and freely shared to accelerate research advances worldwide.

Genomic medicine is a rapidly developing field in which genomics is applied to understanding how the genome (genetics) directs human development, health and disease and how the environment (everything non-genetic including lifestyle decisions) interacts with it. The ability to decipher genome sequences at low cost is key to understanding these impacts. It opens the possibility to predict, prevent, diagnose, treat and ultimately cure disease. The environmental factors that contribute to health and disease, by modifying the expression of intrinsic genetic risk determinants at the individual or population levels, can be collected through massive information sources residing in biobanks and health records that capture changing medical, psychological, social and lifestyle profiles. This information can be analyzed in conjunction with genome sequences using new mathematical and computational methods designed for interpreting such complex and heterogeneous big data.

In the wake of the success of DNA sequencing, other large-scale approaches have emerged for population-scaled studies that link the genome to biological function. These include technologies to determine the status of the genomic DNA compacted into chromatin (*epigenomics*) and its readiness for expression into RNA (*transcriptomics*) either globally in an organ or a tumour, but also at the single-cell level in different cell populations of the immune system (*single-cell and spatial genomics*). The complete set of protein building blocks and enzymes produced by a cell or organ is identified and studied under different conditions using *proteomics*. Likewise, the activity of all these proteins and enzymes can now be accurately measured by quantifying simultaneously thousands of digestion products and metabolites that can be studied in body fluids such as plasma, urine and others (*metabolomics*). As the genetic information of an individual and its expression into RNA and proteins has been recently shown to be further influenced by small metabolites produced by microbial populations that live on the mucosal surfaces of the body such as the skin, airways and gut, researchers are developing methods to characterize these populations and their systemic metabolic output in the body (*microbiome*).

Recently created techniques for single-cell and spatial genomics now allow us to track and dissect cellular changes and interactions with the environment to understand how disease and other processes affect individual tissues and cells, providing fundamental information on health and disease pathogenesis. New genome editing technologies allow predictable evaluation of the effects of individual base changes to dissect in fine detail how DNA sequence variation contributes to human biology in general, and to disease risk in particular.

The revolutionary successes of genomic medicine are motivating massive new investments in national projects to achieve genome-based breakthroughs in health care, and are spinning off major new initiatives involving large and broad-based international partnerships. The fruits of these activities are

increasingly underpinning national life sciences and medical strategies, as illustrated by the UK Life Sciences Industrial Strategy, the United Kingdom's plans to use genomics for the transformation of the UK healthcare system. In the United States, the National Institutes of Health Strategic vision for Improving Human Health at the Forefront of Genomics is accompanied by new strategic initiatives, such as the Impact of Genomic Variation on Function (IGVF) Consortium launched in 2021 with US$185 million in funding. The overall economic impact of genomic medicine on the U.S. economy is estimated at more than US$265 billion annually, according to the 2021 report, The Economic Impact and Functional Applications of Human Genetics and Genomics. Another feature of the advancement of genomic medicine is the central importance of major international collaborative initiatives such as the Global Alliance for Genomics and Health, International Human Epigenome Consortium, FANTOM (Functional ANnoTation Of the Mammalian genome) and Human Pangenome Reference Consortium.

5. McGILL'S COMMITMENT TO GENOMICS & IMMUNO-GENETICS

The Institute will build upon McGill's strong position in genomics due to historic investments. By 1995, McGill had already recognized the key role that genomics would have in revolutionizing approaches to medicine in the 21st century. Consequently, the University and its Faculty of Medicine and Heath Sciences (FMHS) prioritized genomics and associated quantitative and computational sciences in their successive Strategic Research Plans. They have continued to commit important resources to these areas, fuelling McGill's major international recognition and impact in these fields. The FMHS commitment to the Institute is reiterated in its 2021 updated Strategic Research Plan, both by identifying Personalized Medicine as a top strategic priority and the creation of the Institute as a critical implementation strategy. The FMHS has sustained efforts over many years in applying genomics to improve diagnosis, intervention and treatments by linking fundamental genomics research to its clinical departments. Priority areas of medical genomics for the FMHS are cancer, infection and inflammation (now including COVID-19), neurological disorders and aging-related chronic diseases. This proposal for the Institute prioritizes disease areas in close alignment with those of the FMHS to ensure maximum coordination and translational impact.

McGill's commitment to genomics is reflected in the construction of a building primarily focused on genomics ($22 million; finished in 2003). Housing the McGill Genome Centre (MGC), the building provides 4,562 m^2 (49,110 ft^2) of useable research space situated in the heart of the main campus. Over the last 10 years, the MGC has leveraged federal infrastructure and research funding to develop national platforms for genome sequencing, functional genomics and epigenomics, and computational genomics. In 2015, with collaborators in Vancouver and Toronto, the MGC helped found the Canadian

Genomics Enterprise National DNA Analysis Consortium, which has subsequently attracted more than $170 million of new funding for genomics to partner institutions across Canada. As of 2021, the MGC houses 18 McGill Faculty members and their teams, comprising 221 researchers, trainees and staff. Over the last five years, MGC members have produced more than 700 peer-reviewed publications in many of the world's leading scientific and medical journals.

McGill also demonstrated its commitment to genomic research and large-scale biology in the $100 million construction of a second building complex, the Life Sciences Complex, which includes the Bellini Life Sciences Building and the Cancer Building. Completed in 2007, the Complex houses over 100 scientists and their teams grouped under five interdisciplinary research themes. The McGill Research Centre on Complex Traits, which includes 9 investigators and 39 research professionals and trainees, leads one of these themes for research at the interface of mammalian genetics, functional genomics, immunology and immunogenetics.

A further significative initiative at McGill is the prestigious Canada Excellence Research Chairs program, Genomic Medicine: Genes to drug targets for next-generation therapies, which was awarded $27 million in 2019 to use advances in understanding the genomic basis of disease to develop new therapies in partnership with the pharmaceutical industry. The program federates basic research on the main campus with hospital-based research and clinicians.

In addition to these major campus-based hubs, the FMHS and its associated University-affiliated hospitals house thematic programs of national and international stature in genomic medicine, many with strong links to genomics on the main campus.

6. INTRODUCING THE INSTITUTE

The rapid advances cited above have been propelled by the emergence of a new model of research organization emerging from genomics, based around multidisciplinary and technology-intensive science. To respond to this dynamic, and to consolidate McGill's position as a leader in this area, we are proposing creation of the Institute. This is the fruit of the sustained past investments at McGill outline above, strong existing collaborations between McGill investigators and clinicians, and an impressive track record of scientific, medical and funding successes (Figure 1). Building upon this position, the Institute will provide the foundation for genome-based medical science at McGill over the next decades, positioning us to play a significant part in national and worldwide efforts.

Figure 1: Background information on the proposed Institute and its membership

The statistics refer to Institute Members as listed in the Appendix. Infrastructure support is for 10 through to 2021 years; research funding and cost recovery is for the last 5 years. Research funding includes only the amounts received by the University through fiscal year 2020, i.e. it does do not include the full amount of awards that extend beyond 2021.

The Institute will fuse the expertise and infrastructures in genomics and computation at the McGill Genome Centre (MGC)[1] with the platforms and immunological and other biological expertise at the McGill Research Centre on Complex Traits (MRCCT) [1] to create a state-of-the-art technology and science platform in genomics and immunity (Box 1). The central role of immune analysis is apparent through the increasingly strong evidence that the human immune system not only relates to autoimmune disorders and infectious diseases, but also to a wide variety of many other age-related disorders, making this fusion central to advances in genomic medicine. The social sciences, along with ethical, policy and legal aspects of genomic medicine, as spearheaded by the Centre of Genomics and Policy (CGP)[1], will be an integral part of the Institute, providing the expertise to implement a full spectrum approach to genomic medicine that will address urgent health issues of lifestyle-related diseases and the policy implications of genomics in an increasingly aging society.

The development of a unique cross-institutional and interdisciplinary culture within the Institute will empower McGill investigators to work together to tackle major research challenges that cannot be adequately addressed in individual research laboratories but are amenable to the new collaborative and open science models that have emerged from the ongoing genomics revolution. The Institute will

[1] The MRCCT is formally recognised as a McGill Research Centre by the University. Neither the MGC nor the CGP has this formal status.

Box 1. Examples of currently funded national and regional research infrastructures to be housed at the Institute

- *CGEn National DNA Analysis Consortium* (CFI and Genome Canada, $150M of funding over the last five years, including $28M from CFI in Fall 2020)
- *CIHR Epigenome Mapping & Data Coordination Centres* ($11.4 CIHR funding)
- *C3G National Bioinformatics Network for Computational Genomics* ($8.7 Genome Canada funding)
- *National Platform for Population-scaled Metabolomics* ($4.6M CFI, included in a total $25M CFI award for the Canadian Longitudinal Study on Aging, new in Fall 2020)
- *SD4Health as the National Platform for Health Data Analysis* (CFI $20M, new in Fall 2020)
- *Infection and Inflammation in vivo Core* (Genome Canada $200K)
- *Québec COVID-19 Biobank* (Public Health Canada and Fonds de la recherche en santé du Québec, $10M)
- *Regional BSL2 and BSL3 core facilities for COVID research in cell lines and animals* (CFI $1M)
- Facilities for SARS-CoV-2 Sequencing and Bioinformatics (CFI $1.2M)
- *CoVaRR-Net COVID variants of concern network* (CIHR and the Canadian COVID-19 Immunity Task Force, $14.3M, *new* 2021; $10M renewal for 2022)
- *Canadian VirusSeq Data Portal* (Genome Canada, $400K, *new* 2021)
- *Regulatory/Ethics Workstream of the global GA4GH initiative*

catalyze the creation of new national programs and infrastructures at McGill in emerging domains of biomedicine and health. It will establish a framework to address the important issues of data governance, security and sharing with impacts for health research at McGill, nationally and globally. It will increase attractivity for the recruitment of leading genome scientists from around the world, and it will create new opportunities for interdisciplinary education and training.

7. STRATEGIC AIMS

The Institute's focus on **seven overarching Strategic Aims** will deploy interdisciplinary expertise and provide links with academia and hospitals on the one hand, and with industry for pharmaceutical and technological development on the other.

Aim 1. Enable precision and personalized medicine for chronic and infectious disease. The Institute will play a leading role in the discovery of the pathogenic mechanisms and the role of gene-environment interactions in health and disease. Its research will increase penetration of genomics datasets in diagnosis and therapeutic strategies, and the use of genomics, epigenetics, single-cell genomics and the microbiome to enhance early diagnosis, monitor disease progression and evaluate treatment efficacy. Large datasets from disease genetic association studies transcriptomics and others

will be integrated with medical, psychological, social and lifestyle aspects of the individual to further refine disease categorization and better define gene/environment interactions, including the microbiome, as key determinants of health and disease.

Aim 2. Lead in the development of technologies against emerging infections, and to study the microbiome. There are many microbial infections (bacterial and viral) that are either dormant, near-endemic, endemic with some having pandemic potential either through rapid propagation or emergence of drug resistance or both. The Institute will lead in the application of high-throughput sequencing to identify existing, co-existing and emerging infectious agents in biological specimens from different populations. Institute investigators will collaborate with industry to develop and test vaccine candidates, design and test new therapeutic agents or other impactful interventions, and they will develop ambitious research into the human microbiome in relationship to health and disease. This research will also guide public health policy and decisions.

Aim 3. Obtain novel treatments for major disease. The Institute will combine the power of genomics, epigenetics, and cell-based and animal models with protein biochemistry and medicinal chemistry to identify, validate and prioritize targets for drug discovery; it will then combine this with a structure-based approach for intelligent design of efficacious drugs. The Institute will pursue the use of genetically based clinical trials to develop personalized approaches to medical treatments.

Aim 4. Propel the use of computational medicine tools. The Institute will develop computational tools, algorithms and machine learning processes to support combined analysis of multidimensional, complex datasets. It will contribute to the development of models of data governance and sharing to guide genomic medicine in Canada and internationally.

Aim 5. Strengthen McGill's global connections. The Institute will signal, to the international community, McGill's strengths and commitment to participating in the wave of genomic-based health innovation worldwide. In turn, this will catalyze new partnerships with leading institutions in other countries and attract recruits from Canada and globally. The Institute will further McGill's engagements to improve health for all by nurturing global-minded scientists, identifying synergies across scientific communities to enhance ongoing global health work, and creating new opportunities for impact.

Aim 6. Educate and train a new generation of scientific talent. The Institute will educate and train a new generation of fundamental and clinician scientists with the interdisciplinary skills needed to address the challenges of genomic medicine. The Institute will contribute to McGill's strong education and training programs by creating and supporting multiple new opportunities for trainees to work, study and collaborate with investigators at leading partner institutions in fields central to future biomedical research.

Aim 7. Contribute to policy formulation and inclusive science. The Institute's research will inform policy recommendations from government departments and agencies such as the Public Health Agency of Canada, Health Canada, the Interagency Advisory Panel on Research Ethics, Economic and Social Development Canada, and Veterans Affairs. Members of the Institute will continue their work with international agencies and equity-seeking groups to promote the inclusion of diversity in human genomics into health care. The Institute will be a leader in promoting inclusive science practices for societal and community engagement.

8. SCIENTIFIC ORGANIZATION

The Institute will have five Core Scientific Divisions - **1. LARGE-SCALE BIOLOGY; 2. IMMUNOLOGY, INFLAMMATION AND INFECTION; 3. COMPUTATIONAL SYSTEMS BIOLOGY; 4. GENOMIC MEDICINE; 5. SOCIETY, LAW, ETHICS AND POLICY -** articulated so as to tackle major challenges of 21st century biomedical research. It will implement comprehensive multi-layered analysis of the genome, epigenome, proteins, lipids, cells, organs and individuals (DIVISION OF LARGE-SCALE BIOLOGY); it will apply immunology and related approaches to understanding the biology that these experiments will reveal (DIVISION OF IMMUNOLOGY, INFLAMMATION AND INFECTION); it will provide computational and statistical analysis to interpret the vast amounts of complex ensuing data (DIVISION OF COMPUTATIONAL SYSTEMS BIOLOGY); it will partner with clinical groups to pursue health translations (DIVISION OF GENOMIC MEDICINE); and it will pursue the social policy research and applications that arise (DIVISION OF SOCIETY, LAW, ETHICS AND POLICY).

The Institute will ensure McGill leadership in ongoing developments and applications of innovative methodologies. For example, over the next few years, further rapid advances are expected in genomic technologies, such as the possibility of obtaining a human genome sequence for less than US$100, with increased accuracy and other improvements in single-molecule sequencing and 3D genome analysis. Techniques will be established for methylation/modified base sequencing without the requirements for chemical or enzymatic modifications that can be applied in large-scale epigenomic studies. Work will continue in developing single-cell multi-omic approaches and the integration of single-cell technologies with spatial trancriptomics and proteomics, key technologies for high resolution, integrative analysis of mammalian development and diseases such as cancer. New methodologies and the corresponding research infrastructures will be established within the Institute to implement novel high-throughput immunological assays, base editing for functional genomic studies, and other methods for analysis of genome function. A major strength of the Institute will be its ability to link novel genomic technologies to conduct refined analysis of the human immune system; such analysis is increasingly

recognized as essential to understanding human health and disease. The emergence of these techniques will stimulate the Institute's development and application of powerful new statistical and computational tools suitable for analysis of the resulting complex multi-omics datasets, including methods involving machine learning and AI techniques, research that will be fostered by close connections between molecular and quantitative scientists within the Institute.

The availability of the above methods and research infrastructures will support efforts at McGill to elucidate pathogenic mechanisms across many diseases. Some examples of disease areas and specific projects that will be supported are:

- **Cancer:** The Institute is supporting Rosalind and Morris Goodman Cancer Centre in their programs Grand Challenges in Cancer and the Terry Fox Marathon of Hope initiative by sequencing tumours from thousands of Canadian cancer patients, hundreds of PDX models, performing single-cell and spatial transcriptomics, and undertaking bioinformatics analysis of the datasets. Institute members have key roles in the new patient-centred, genome-based oncology program Oncodrive funded by the MUHC foundation and aiming to sequence the genomes of all cancer patients attending MUHC to support evidence-based genetic research, facilitate the transfer of research findings to clinical settings and access to new clinically approved tests by imbedding genome sequencing in routine patient care.
- **Neuroscience and mental health:** The Neurogenomics Partnership is a new academic/industry initiative led from McGill's Montreal Neurological Institute to tackle Parkinson's disease, ALS, autism/intellectual deficiency and rare neurological disorders. Other work undertaken by Institute members includes multi-omics analyses of small vessel disease and stroke, and single-cell studies of brain tissues. Other areas to be supported at the McGill Douglas Institute are: the use of single-cell genomics and its application to postmortem human brain tissue; the use of brain-derived extra-cellular vesicles coupled with genomics as diagnostic and treatment vehicles for mental illness; the brain-gut axis and behavioral epigenetics.
- **Chronic inflammatory diseases**: The McGill Research Centre for Complex Traits leads worldwide efforts to decipher the complex genetic determinants of IBD, MS and RA in humans, and partners with industry to develop new target-specific inhibitors with improved efficacy in subgroups of patients where such pathways are altered.
- **Infectious disease**: McGill researchers have formed a large network (MI4: McGill Interdisciplinary Initiative in Infections and Inflammation; see below) to implement novel genomic approaches to track and defeat resistance to antibiotics as well as to monitor

emergence of new infections. COVID-19 is at the centre of recent work supported by Institute members.

Further information on activities in these and many other areas can be found in Appendix 1.

One initial and distinguishing focus of the new Institute will be is on infectious and inflammatory diseases. This choice is motivated by the established strength, and excellence in the fields of genomics, infectious diseases, and immunology at McGill. These strengths are captured in part by the current grouping and research programs of the McGill Genome Center (MGC) with those at the McGill Research Center on Complex Traits (MRCCT). The MRCCT brings expertise and scientific programs in areas that include immunogenetics of rare diseases, chronic immune diesease, infectious diesease, microbial evolution, and environmental triggers of disease. Strategically, the integration of expertise with genomics and immunology is critical to understand the biological consequences of genomic variation in the context of both chronic and infectious disease. This choice is also contextual, positioning the institute at a key interface of relevance in the current pandemic, with its critical mass and infrastructure accessing emerging funding programs in a highly competitive fashion.

MGC and MRCCT investigators are also part of the larger multi-center McGill Inter-disciplinary Initiative in Infections and Inflammation (MI4). The new Institute technology platforms in omics research, as well as animal and cell based models of infections and inflammation, are open to all of the MI4 community. In addition, the MGC has pioneered a microbiome research stream and associated platforms (going back to the early 2000s) that supports all aspects of microbiome research at McGill, the MUHC, and for external researchers, playing an important role in the MI4 community (coordinated by K. Dewar). Contributions from the Institute platforms incude microbial genomics, high-throughput DNA sequencing, and bioinformatics analyses, and are being extended to include metabolomics with new CFI funding. These platforms were requisitioned/solicited in the recent months by SARS-Co-V2 sequencing programs, locally (wuth INSPQ) and nationally (CanCoGen; VirusSeq; CoVaRR-Net; SARS-CoV-2 national portal). Similarily, the platforms in genomics, epigenomics, single cell biology, computational biology and others will also contribute to enhance other research programs from McGill researchers interested in any health and disease areas, including gene-environment interactions.

The Institute will provide the framework to address health translations through close partnerships with McGill clinicians in collaborative efforts with immediate and long-term benefits for clinical research and care. First, these partnerships will give access to unique phenotypic data and clinical samples from local patients, especially those who have consented to follow-up visits. Second and importantly, these interactions will have the capacity to move from observations to clinical benefits. This translation and adoption by the medical community of genomic discoveries require demonstration, through proper,

randomized clinical trials, of their added value, above and beyond existing medical care. The Institute's efforts in favour of a coordinated engagement of researchers, clinicians, trialists and patients will be fundamental to success in these endeavours. Through its membership, the Institute will also be linked to McGill's bioengineering and bioprocessing expertise to develop new devices and applications for data acquisition, disease diagnosis and treatment intervention (e.g., biomarker discovery, rapid diagnosis, drug delivery).

In addition to the above, Institute-wide initiatives will be instrumental in sustaining existing research and attracting new resources to the University. Some examples of on-going efforts are:

- **Canadian National Life Sciences Data Infrastructure**: The Institute has the vocation to be the Canadian centre to manage and safeguard data generated by publicly funded research and link it internationally. The new CFI-funded SecureData4Health (SD4Health) platform (led by G. Bourque) will provide the backbone for the Institute's framework to meet the critical security and privacy standards for maintaining and sharing genomic and health data. SD4Health is intended to create, initially in Quebec and Ontario and then across the country, the privacy, software and computational infrastructure needed for the genomic and health data generated within Canadian hospitals and research centres. These resources will be deployed within existing Compute Canada sites, allowing scientists easy access to the technologies needed to reap the full benefits of their data. The project will also facilitate novel information sharing modalities, where the security and privacy of participant data is paramount, and it will enable Canada to play a leading role in the challenging but critically important movement towards international health data sharing.
- **LIFESPAN: Canadian National Data Platform for Precision Medicine & the Aging Population**: The goal is to create a comprehensive dataset on the dynamics of biological, environmental and lifestyle factors in individuals as they age. The program leverages close involvement with the Canadian Longitudinal Study of Aging (CLSA) in order to be a driver of national and international research agendas in genomics and big data in aging research. The LIFESPAN program will accelerate innovation in the science of aging by incorporating large biological datasets that will ultimately track individuals from CLSA over 20 years or more to inform the understanding of aging within the context of other physical and psychosocial systems. This work will draw upon the Institute's research infrastructure and related scientific expertise in genomics, metabolomics, proteomics, immunology, and quantitative methodology/computational methods. One component will be the investigation of constitutive low-grade inflammation (inflammaging) that develops and drives the pathogenesis of many age-

related disorders. Metabolic and functional changes will be studied in the CLSA cohort to elucidate the underlying molecular and cellular processes during inflammaging, focusing on inflammatory mediators, metabolism of dietary constituents and diet-regulated translational or transcriptional networks in various cellular immune system networks. By vastly increasing the scope and depth of biological characterization of the cohort, and by using an open science model for widespread data access following international policies that the Institute members have helped to develop, this project will create one of the world's most important big data infrastructures for the study of aging.

- **Engineering the microbiome to maintain health and reduce disease burden** The personalized, two-way relationships with microbial communities that live in symbiosis with their human host on the skin, gut and other mucosal surfaces have recently come to be recognized as a major determinant of health and disease throughout the life course. Yet, the parameters that determine healthy symbiosis, and the circumstances that cause changes in these interactions (for example, dysbiosis of certain communities) which possibly underlie common chronic diseases, remain unclear. The Institute will deploy it unified efforts to obtain insight into the relation of the microbiome to causes, progression and outcome of common inflammatory and metabolic diseases. In addition, the Institute will promote creation of microbiome-associated datasets to inform the development of novel diagnostic or therapeutic tools of clinical value, and to identify social and behavioral interventions of health benefit.

Mobilizing genomics & immunology to fight pandemics: Prevalent infectious diseases in humans and animals are caused by pathogens that often emerge from other animal hosts. In extreme cases they may cause pandemics such as influenza virus or SARS-CoV-2; in other cases, dead- end infections or smaller epidemics result. Disease emergence reflects dynamic balances and imbalances, within complex globally distributed ecosystems comprising humans, animals, pathogens, and the environment. Understanding these variables is a necessary step in controlling future devastating disease emergences, and one of the challenges that the Institute in collaboration with others at McGill will address. Drawing on a multidisciplinary “OneHealth” conceptual model that considers the health of people, animals, and environments as holistically inter-related, this research will seize new opportunities afforded by emerging approaches in genomics, cellular and molecular immunology, and computational pathogen surveillance, combined with novel biosocial approaches, to dissect the complex interplay of social contexts, genetic and immunological diversity so as to provide effective and rapid response to future infectious disease threats.

- **Canada Excellence Research Chair (CERC) in Genomic Medicine: Genes to drug targets for next-generation therapies:** The CERC (led by V. Mooser) is capitalizing on natural variations of the human genome to support the discovery of novel therapeutics in collaboration with scientific and clinical groups at McGill. The comprehensive strategy exploits the enrichment of rare coding variants in Québec and other populations and the latest developments in genome sequencing, bioinformatics and epidemiology spearheaded by Institute investigators. A major goal is to identify carriers of specific genetic make-up and recruit these individuals into recall-by-genotype studies designed to anticipate the pharmacology of new therapeutics, validate new drug targets and perform proof-of-concept trials for investigational medicines. Plans are underway to recruit large number of patients at McGill-affiliated hospitals and through CARTaGENE, a large Québec database for health studies that is co-led by an Institute investigator (S. Gravel) in collaboration with scientists at other Québec institutions.

9. FRAMEWORK FOR DATA & POLICY

Associated with the above, one of the central objectives of the Institute will be to provide improved data systems and digital tools, including AI, that link from genomics to health data for use in research in multiple settings. The Institute's strategy for data analysis, sharing, privacy and security will support health studies across McGill and have Canadian-wide and international impact. This will build upon the work done over the years with, for example, the Canadian Centre for Computational Genomics (C3G), a Genome Canada funded bioinformatics and data analysis platform embedded in the McGill Genome Centre (MGC); Canadian Distributed Infrastructure for Genomics (M. Brudno, G. Bourque, PIs), funded by the Canada Foundation for Innovation (CFI) and used to manage and share Canadian genomics data; the new CFI-funded SecureData4Health (SD4Health) platform cited above; and McGill participation in the Common Infrastructure for National Cohorts in Europe, Canada and Africa program.

Building on the extensive expertise of the Centre of Genomics and Policy (CPG), the Institute will develop a full framework for health and genomic data governance and sharing, designed to facilitate and promote safe, secure, open data research with continuous and uniform management of data resource for different uses within and outside the Institute. This will serve as a core element of the Canadian National Life Sciences Data Infrastructure, created by the Institute to manage data across Canada; it will be made available for use across McGill. The policies and tools developed as part of the framework will include guidance for managers, researchers, data subjects, ethics committee board members and other stakeholders. The framework will comprise both mandatory core elements and additional optional elements deemed to constitute "best practices" at a given time. It will ensure that this

framework allows, when appropriately consented, a provision for data sharing across provincial nodes and internationally. Security audits (both internal and external) and privacy impact assessments will be performed at regular intervals to ensure that security and privacy standards are enforced. A data privacy/security officer will be appointed within the Institute to address any communication, complaints or issues with the data privacy and security policies.

The Institute's platform will integrate the core requirements of the Quebec Bill 19 on health and social services information and the Tri-Council Policy Statement: Ethical Conduct for Research and meet European General Data Protection Regulation (EU) 2016/679 requirements, while respecting local, provincial and federal laws and regulations in Canada. SD4Health is also designed to meet Global Alliance for Genomics and Health (GA4GH) standards, including the latest GA4GH revised "Framework for Responsible Sharing of Genomic and Health-Related Data" and its "Consent and Privacy and Security Policies", both developed with the help of Institute Core Members. GA4GH is an international non-profit organization that, through its policies and technical standards, enables the responsible sharing of genomic health data within a human rights framework. Institute Members contributing to GA4GH include B. Knoppers, one of it founders, who helped design the human rights framework; Y. Joly, who co-chairs the GA4GH Regulatory and Ethics Working Group; and G. Bourque, who leads a GA4GH Driver Project (real-world genomic data initiatives that guide development efforts and pilot tools). Accordingly, the Institute will be an important contributor to internationally recognized and respected information security standards.

The Institute will lead in research on policy implications associated with advances in genomic medicine and related biology, to address issues such as data access, responses to health emergencies, and the integration of the Institute's results into precision medicine and personalized care. The Institute will build on the robust mechanisms already in place in programs, such as the Canadian Longitudinal Study on Aging, the Institute's COVID-related responses and involvement of Members in forums such as COVID: Vaccine Task Force of Canada (B. Knoppers), to transmit policy conclusions to government decision-making bodies and international organizations.

10. MEMBERSHIP

At its founding, the Institute will include 29 Core Members and 41 Associate Members (see Appendix 3 sections A and B for a list of initial invited McGill members), all engaged in research linked to the Institute's vision of combining large-scale biology with computational and quantitative approaches to big data generation, analysis and interpretation. Fig. 1 shows recent statistics associated with the research

and educational contributions of these Institute members. There will also be 8 members who hold adjunct positions at McGill (Appendix 3 section C).

Permanent Core Members will have their principal academic activity and laboratories within the Institute. In addition to their individual research, they will be charged with developing collaborative research projects, supporting platforms, leading education and training initiatives, participating in community outreach engagement, and supporting administrative activities of the Institute. Founding Core Members will maintain their current departmental affiliations and responsibilities.

Associate Members will be drawn principally from across the Faculty of Medicine and Health Sciences but also from other Faculties, linking the Institute closely to additional research centres and projects on and off campus. Associate Members will be appointed for multi-year renewable terms. A criterion for Associate Membership will be close involvement with research and/or applications in genomic medicine. Associate Members will be invited and expected to be engaged seriously in the scientific life of the Institute by actively participating in scientific planning of programs and projects, and by contributing significantly to other aspects of the Institute's goals. While Associate Members will maintain their primary laboratories within their own departments or research structures, they may have access to Institute space and facilities when needed to support collaborative research.

Certain adjunct McGill faculty holding primary academic positions outside of Canada are also among the initial Associate Members. The international membership contributes to the Institute's goals of expanding the global reach (*rayonement*) of McGill science and creating new opportunities for international research and training collaborations with developed and low- and medium-income countries.

Both Core and Associate Members will have the opportunity to develop and propose collaborative projects that access the Institute's core research infrastructures, and will be eligible for internal funding opportunities. Institute membership will be open to expansion to other McGill Faculties based on their willingness and ability to contribute to the Institute's Strategic Aims. Membership will grow through recruitment of new faculty to relevant departments and Schools.

Membership will be expanded further through new recruitment to meet Institute-defined scientific needs for multidisciplinary, convergence research expertise in all aspects of genomic medicine, in collaboration with departments within the School of Biomedical Sciences. The Institute will use faculty recruitment to respond to the need to develop collaborative and synergetic expertise transcending traditional discipline boundaries. Access to the Institute's infrastructure and the assembled critical mass

of expertise will be used to attract new talent to McGill, with the Institute developing funding strategies (Section 15) to support competitive start-up packages.

11. LOCATION

The Institute will be located physically at two sites on the main McGill campus within the surface area currently occupied by the McGill Genome Centre in the Genome Building and the McGill Research Centre on Complex Traits in the Bellini Building of the Life Sciences Complex (Section 5). In the initial instance, the Institute will rely upon virtual meetings and video conferencing to unite the groups.

As opportunities arise, and by attracting infrastructure funding, the Institute will integrate and expand its facilities in keeping with its Strategic Aims. It will address the ongoing requirements for space and facilities needed to attract and support a critical mass of scientific talent, and to provide the proximity needed to exchange ideas and develop interdisciplinary interactions. For example, support of private donors or foundations could be used as leverage to seek federal and provincial funds from the Canada Foundation for Innovation for additional space, subject to the McGill Master Plan.

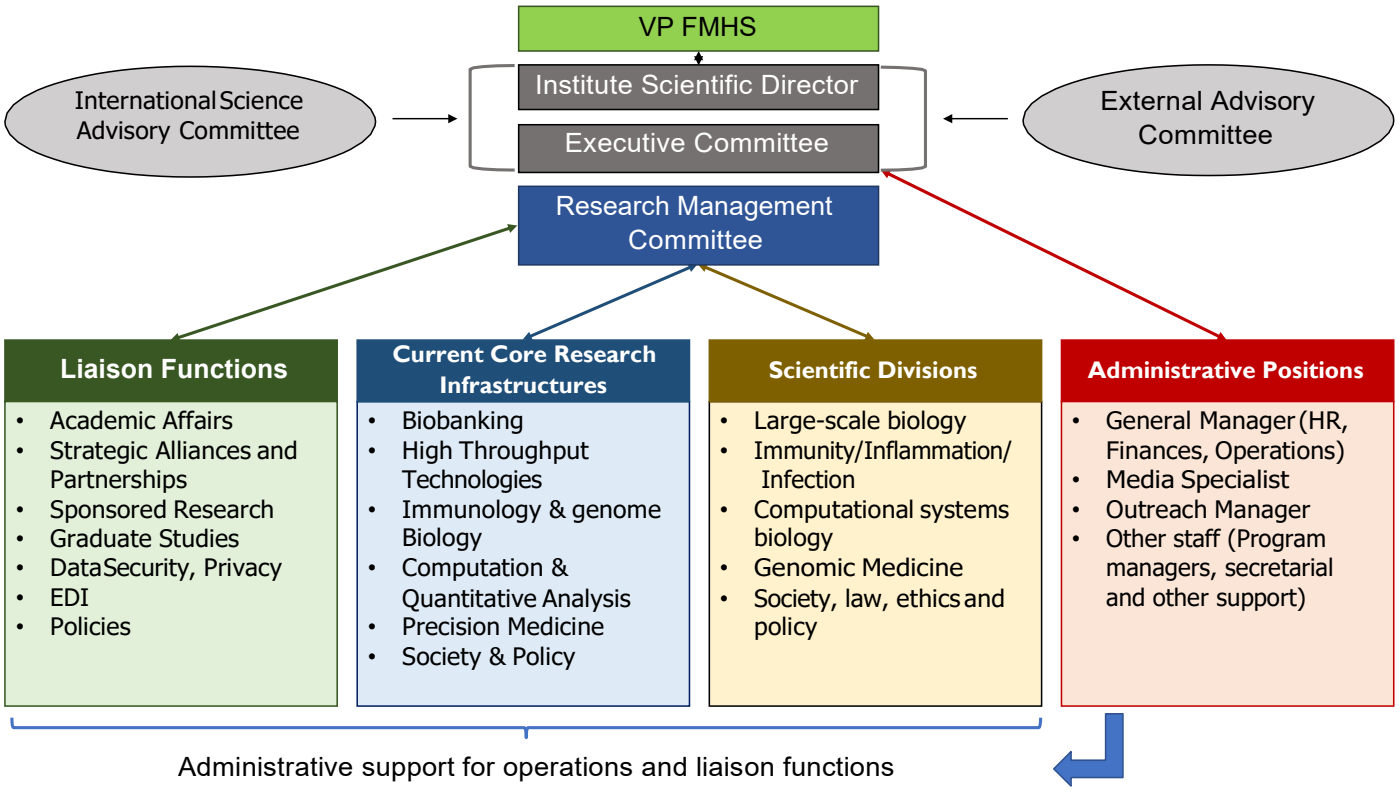
12. GOVERNANCE & MANAGEMENT

The governance and management structures will harness the Institute's interdisciplinary scientific and medical expertise organised in Division to tackle ambitious joint research challenges of national and international scope, while also supporting the goals of individual investigators and research groups. They will also provide an agile interface with the Faculty of Medicine and Health Sciences (FMHS) and McGill administrations (Fig. 2). The management will benefit from, and build upon, the existing scientific, technical and administrative leadership at the McGill Genome Centre, Centre of Genomics and Policy, and McGill Research Centre for Complex Traits, assuring continuity with current mandates and operational objectives. New administrative components and their staffing will be implemented progressively as priorities are evaluated and as funding becomes available.

THE SCIENTIFIC DIRECTOR will be responsible for the development and strategic implementation of the research, including an implementation plan, capacity building, academic priorities and other core activities. The proposed founding director, for an initial three-year term, is Mark Lathrop. A principal responsibility will be to establish the Institute on a road to long-term sustainability. To realize this mandate, he will work closely with an Executive Committee and a Research Management Committee.

THE EXECUTIVE COMMITTEE (EC) will oversee and contribute to the Institute's priorities, large-scale funding, recruitment opportunities and infrastructure optimization. It will help guide strategic planning, develop policies and procedures, contribute to establishing the Institute's scientific programs, approve the budget and validate decisions of the Research Management Committee. Phillipe Gros will chair the

Figure 2: Governance and Management Organization of the Institute



The Institute will profit from, and build upon, the existing scientific, technical and administrative leadership at the MGC and the MRCCT, assuring the Institute's continuity with current mandates and operational objectives.

EC, composed of the Scientific Director, and others from Institute senior scientific and administration leadership.

THE RESEARCH MANAGEMENT COMMITTEE (RMC) will help the Director achieve the Institute's scientific and operational goals; establish milestones; monitor implementation of the budget and progress; oversee platforms and platform access; and promote community outreach, inclusive science and international connections. It will also review compliance with equity, diversity and inclusion (EDI) principles and the Institute's Data Framework. The RMC will meet as often as required to make time-sensitive decisions. Its membership will include the Director, EC Chair and others from Institute

leadership. It will establish sub-committees of its members and others from the Institute as needed for activities such as platform oversight.

THE EXTERNAL ADVISORY COMMITTEE (EAC) will be chaired by the Dean of the Faculty of Medicine or a designated representative. It will provide advice to the Director and EC in implementing the Institute's Vision and Strategic Aims and an independent perspective on the Institute's operations, structure and function. In addition to the Chair, the EAC will include one or two leading academics (external to McGill) with expertise in the Institute's research areas; one to two academics from the McGill community; and one to two prominent members of the Montréal innovation, investment and industrial communities with expertise in commercialization.

THE INTERNATIONAL SCIENTIFIC ADVISORY COMMITTEE (ISAC) will help position Institute activities with respect to international emerging trends, opportunities for partnerships and joint programs, and implementation of joint academic and training programs with international partners. The ISAC will play a dual role in promoting the Institute on the international scene while facilitating collaborative ventures with leading centres of excellence from abroad. The ISAC will be composed of around five members from leading international organizations and one representative from McGill (in addition to the Chair).

ADMINISTRATIVE FUNCTIONS will be held by designated Institute Members (McGill investigators) who will liaise with the FMHS and the University administration as appropriate. These functions will include:

- Academic Affairs to foster the professional development of academic and other professional staff, cultivate ties within and between Institute Members, and guide the implementation of the Institute's Equity, Diversity and Inclusion and SGBA+ plan;
- Strategic Alliances and Partnering to help connect and build partnerships between researchers and teams within and beyond the Institute, including with industry, establish intellectual property policies, pursue international relationships, etc.;
- Sponsored Research to work with researchers on sponsored awards from concept to proposal to award, including award management and compliance;
- Graduate Studies to oversee the Institute's educational and training missions and coordinate with departments;
- Policy Formation; and
- Data Security/Privacy relating to data sharing, privacy and security.

ADMINISTRATIVE SUPPORT will be provided by the Institute's administration, including the specialized and local support needed for management of research infrastructure and other activities that fall outside of the capacity of teams organized through the Faculty or Central administrations. These will include a

General Manager overseeing human resources, finances and infrastructure operations; Program Managers for platforms and large projects; a Media Specialist to develop the Institute's media footprint; an Outreach Manager to connect the Institute with patient groups and other organizations implicated in genomic medicine; and secretarial and other support staff. The Institute is currently supporting some such positions through various grants but will need to secure resources for others.

EQUITY, DIVERSITY & INCLUSION, SGBA+ A senior Institute member will be named as the EDI leader responsible for the implementation of best EDI practices with the aid of the Scientific Director and other members of the Governance committees. The EDI leader will be supported by additional academic and administrative staff in this role. He/she will have the responsibility to make annual reports on EDI to the Executive Committee.

In accordance with the McGill EDI Strategic Plan (2020-25), the Institute will adopt appropriate EDI practices and provide EDI training to Members. The Institute will develop an EDI strategy that includes practices to:

- Recruit staff, students and trainees with diverse experiences, identities and perspectives;
- Ensure that Members understand and respect the rights and duties set by McGill's Policy on Harassment and Discrimination Prohibited by Law and Policy against Sexual Violence;
- Provide equitable access to opportunities for staff, students and trainees related, for example, to mentoring, accessing resources and data, fieldwork, authorship, or conferences and networking;
- Communicate clear and reasonable expectations for staff and students/trainees;
- Identify and implement appropriate metrics to measure success;
- Set commitments also to academic freedom, understanding that EDI and academic freedom sometimes appear to compete or be in tension, but that the Institute commits to both, equally and simultaneously.

13. EDUCATING & TRAINING A NEW GENERATION OF WORLD-LEADING SCIENTISTS

A key mission of the Institute will be training a new generation of researchers and clinicians with the interdisciplinary skills needed to address the challenges of modern biomedical research. The Institute will contribute to McGill's educational mission to be an outstanding environment for trainees and early-stage investigators to develop their careers at the interface between large-scale biology, quantitative methodologies, and medical, social and environmental research. At the core of the Institute's training mission is the concept that scientific research is a global endeavour, and the data acquisition, analysis

and use are delocalized activities whose impact often involves multiple institutions working in collaboration. The Institute will adopt a similar vision for developing a global interdisciplinary training environment for all learners, based on exchanges between established and future leading partner institutions, building upon successful programs and approaches.

Currently, international mobility and hosting of trainees in genomic medicine are promoted through several innovative programs piloted and offered by the McGill Genome Centre. The Institute will further develop and consolidate these approaches. For example:

- The far-reaching collaboration with the University of Kyoto, initiated in 2016 as part of the Japanese government's Top Global University Project, was complemented in 2018 by a joint McGill/Kyoto PhD degree program focused on genomic and computational methods for big data in medicine and biology, principally medical genomics. The highly selective program takes a maximum of two students from each institution annually (14 students enrolled to date). The program is financed by the Japanese Ministry of Education, Culture, Sports, Science and Technology and Fonds de recherche du Québec (FRQ). It involves frequent interactions with both the Centre for Genomic Medicine and Institute for the Advanced Study of Human Biology at Kyoto University, the latter providing opportunities to collaborate in the context of the McGill Regenerative Medicine Network.
- The McGill-RIKEN program, supported by $1.6 million in funding from the FRQ and a RIKEN International Partnership Award, is creating genomic medicine research opportunities for student and postdoctoral exchanges between the Faculty of Medicine and Health Sciences and the RIKEN Centre for Integrated Medical Sciences. To date, 19 exchange visits (of several weeks or months) have been made or are scheduled, with some delayed by COVID-19. Joint workshops are held annually. The most recent (January 2021 by videoconference) attracted 180 participants from McGill and RIKEN. The program has been further strengthened through a Joint Graduate School Initiative that allows RIKEN investigators to have adjunct professorial appointments at McGill and to supervise McGill PhD students at a RIKEN laboratory in Japan. The McGill-RIKEN collaboration was a highlight of the roundtable held to mark the 14th Japan-Canada Joint Committee Meeting on Science and Technology Cooperation in Tokyo in January 2019, and in the similar February 2021 forum (by video conference) organized by the Embassy of Japan in Ottawa.
- The Quantitative Biology and Medical Genetics for the World Queen Elizabeth II Diamond Jubilee Scholarship program was started in 2015 to provide interdisciplinary training, for Canadian and overseas students, at the interface of medical genomics and quantitative biology. The program has supported students from low- and middle-income countries for PhD training at McGill, and it funds

bursaries for Canadian PhD students registered at McGill to undertake part of their research overseas.

- Under the direction of I. Ragoussis and offered through Human Genetics at McGill (but open to students from other universities), the McGill Genome Centre (MGC) has initiated Canada's only hands-on laboratory course in genomics/DNA sequencing. The Canadian Bioinformatics Workshops, housed at the MGC, have a successful track record in delivering effective informatics training to the Canadian research community. Since the course's inception in 1999, more than 2,500 students have been trained in over 100 workshops, including a workshop module dedicated to genomic medicine.

Candidates for interdisciplinary training within the Institute's streams will come from a spectrum of backgrounds and from different academic units—from which they will obtain their degree—including the Departments of Human Genetics, Computer Sciences, Mathematics, Biochemistry, Microbiology and Immunology. The Institute will also coordinate with the MD-PhD and Clinical Investigator Programs of the Faculty of Medicine to integrate and train medical students/residents and other health-care professionals interested in implementing medical genomics approaches to clinical practices in all areas of health and disease. A distinctive feature of the training approach will be the orientation towards student acquisition of a broad skillset of scientific and technical knowledge that integrates large-scale biology and quantitative methodologies with other fields of research. This ensures that students with diverse backgrounds receive training corresponding to current and future needs for success in biomedical research.

The Institute will support the stipend of selected graduate students to perform local and international rotations in different genomics laboratories to acquire knowledge of modern technologies and tools before selecting a research lab for their thesis work; and sponsor trainees for sojourns in labs at leading international institutions that will contribute to their research. It will develop a mentoring program and funding for international exchanges of postdoctoral fellows, aspiring to train the leaders of tomorrow at McGill. Drawing upon an extensive network of interactions and long-term collaborations with scientists from around the world, the Institute will provide opportunities for all learners in the Faculties of Medicine & Health Sciences, Science and Engineering to participate in additional learning and training opportunities in genomic medicine through seminars, webinars, courses, workshops and other scholarly endeavours related to genomic medicine.

14. STAKEHOLDER & COMMUNITY OUTREACH

A consultation process has been conducted and letters of support for the Institute obtained from key stakeholders within the Faculty of Medicine and Health Sciences, and from national and international leaders in genomic medicine and related disciplines. Input has been obtained from the McGill Graduate and Postdoctoral Studies and the Equity and Academic Policy offices who have agreed to help implement the educational and eid plans.

The Institute's community outreach program activities will include actions such as:

- Communicating regularly with a broad range of stakeholders connected to medical genomics, including patients and their families, regulators and industry;
- Engaging with a broad range of countries, including low- and middle-income countries, and international organizations to promote medical genomics to transform health care on an equitable basis;
- Broadcasting webinars "from lab to market" with industrial partner speakers;
- Organizing and providing training workshops for researchers, technical staff, clinicians and educators;
- Engaging with industrial partners who will be invited to participate as speakers in McGill Dobson Entrepreneurship Programs;
- Liaising continually through collaborative exchanges with other groups, units, departments and programs engaged in medical genomics and related research locally, nationally and internationally;
- Providing visiting scholars with opportunities for collaboration and exchange in the Institute's research areas;
- Organizing scientific forums, informal talks and public conferences to raise awareness of issues relating to medical genomics, and information on developments, breakthroughs and potential treatment strategies;
- Creating an interactive website, with an "open" section for the public and a link to a research portal, which provides links to Institute investigators, research opportunities and reports, platform offerings, shared data, training opportunities and outreach events; and
- Working with the McGill Office of Innovation and Partnerships to hold "Discover Days" (online or in-person) to give potential partners, seeking to in-license technologies from our researchers or

execute collaborative efforts, the opportunity to meet with hand-selected groups to ensure meaningful interactions/outcomes.

OUTREACH TO POLICY MAKERS

The Institute's team and collaborators, nationally and internationally, include leading groups researching policy implications associated with advances in genomic medicine. The Institute will have robust mechanisms in place to transmit policy considerations to decision-making bodies with many partnerships including with Public Health Agency of Canada, Health Canada, Economic and Social Development Canada, and Veterans Affairs; international organizations; and equity-seeking groups. This expertise will be applied to tackle major "horizontal" policy issues that governments and others will face in the integration of the program's results into precision medicine and personalized care. The policy objectives, which will be framed broadly, will encompass improving individual and population health, reducing health inequalities, improving the efficiency of health care, and containing prospects for unsustainable growth in health-care costs.

OUTREACH TO PATIENTS, THEIR FAMILIES & THE GENERAL PUBLIC

The Institute will systematically disseminate exciting research results and offer clinical and patient perspectives through public forums. These sessions will be held at various times and using various formats (recorded for later viewing) to allow wide participation of stakeholders. Investigators will present in lay terms experiments and technologies that could lead to medical genomics breakthroughs. An important component will be to encourage patients and their families to have informal interactions with investigators. With support from such individuals along with patient and other organizations, the Institute will develop a citizen engagement plan building upon the CIHR SPOR Patient Engagement Framework. The plan will include components such as:

- Fostering engagement with patient associations (e.g., Arthritis Society, MS Society of Canada, Crohn's and Colitis Society of Canada) to inform and seek advice on the Institute's plans and activities;
- Maintaining and continuously updating a map of dissemination routes to reach citizen/patient communities to keep communications live; and
- Supporting the production and mobilization of citizen-relevant documents and resources within the community, through building relationships with Canadian community and patient organizations and disseminating our resources through their channels.

OUTREACH TO THE BIOTECH SECTOR & INNOVATION STAKEHOLDERS

The Institute will establish industry-sponsored research and training partnerships that will lead to the introduction of new, leading-edge technologies to McGill. Two recent examples of this approach include partnerships with (i) Oxford Nanopore Technology, to establish a new SARS-CoV2 diagnostic-capable platform with potential for public health and clinical applications; and (ii) Olink Proteomics, to implement a certified platform using its second-generation sequence-based technology for highly sensitive, quantitative proteomics assays that detects up to 1,536 proteins in a single multiplex.

Institute Members are engaged in many successful industrial collaborations and contractual studies for discovery, functional analysis and further therapeutic development, demonstrating this search for synergy on both sides. Examples include projects with Merck, Lilly, Novartis, Roche, Astra-Zeneca, GSK, Pfizer, Vertex and Janssen. Many early-stage start-ups have been created at McGill in recent years in areas associated with genomic medicine (Corbin Therapeutics, Pronto Medical Technologies, Sensoreal, Fairhaven Pharmaceuticals/Liminal, Canadienzyme, Vvector, Neurasic, Nplex Biosciences, Iaso Biomed, Traffick Therapeutics, Trepso, Haro Pharmaceuticals, AUM LifeTech, Kanyr Pharma). The Institute will provide a focal point to further such technology transfer.

The Institute will also continue developing relationships with innovation players focused on knowledge translation in medicine, including MEDTEQ (Quebec Consortium for Industrial Research and Medical Technology), which is now part of the federal Strategic Innovation Fund; CQDM; IVADO; Montréal InVivo; Centech; Medtech Canada; TransMedTech Institute; and Axelyx, the new governmental valorization society.

The Institute has also developed links to the global IMAGINE IF! Pre-accelerator (Oxford branch) for early-stage start-ups, and is working towards establishing the first arm in Canada in Montréal. This will represent a major step towards early mentorships, support and funding possibilities for start-ups emerging from McGill and Canada.

The Institute has also developed partnerships with the National Research Council of Canada and has received funding for a collaborative R&D program to develop novel devices and methodologies in genome analysis and pathogen detection.

ACADEMIC NATIONAL & INTERNATIONAL OUTREACH

The Institute will continue to cultivate strong local connections with clinicians, researchers and platforms at the McGill University Health Centre and Jewish General Hospital to facilitate the translation of interdisciplinary and clinical collaborations. Institute Members participate in many national and international research organizations. The Institute will partner with these organizations to hold “global”

information sessions using online media platforms to increase its visibility. For example, a McGill/Royal Society of Canada symposium, ""Lessons from COVID-19" (November 2021), organized by Institute leadership brought together national and international scientific figures in the fight against COVID-19.

The Institute will also expand its ongoing efforts in favour of equity and diversity through research and training collaboration with scientists and health professionals in low- and middle-income countries; pursuit of research programs that examine the impact of ethnic diversity, gender and sex on applicability of the results from genomic medicine (e.g., recent commentary from Institute researchers in Nature); and in scientific seminars, public conferences and other forms of communication that address related questions such as adequate study designs and access to results of genomic medicine (e.g., 2018 McGill-Gairdner International Symposium on Inequalities In Genomics Research (and what to do about them), and further events to be announced in 2022.

The Institute's investigators will ensure that its research programs describe and reflect how SGBA+ factors are integrated into experimental designs, as outlined in the Canadian Institutes of Health Research guidelines. Institute researchers are already exploring important questions related to interactions between biology and sexual/gender diversity in genomic medicine, building upon current work of Institute investigators with protocols designed by the Institute's social scientists to meet ethical requirements and avoid stigmatization.

15. FUNDING STRATEGIES

LARGE-SCALE RESEARCH FUNDING INITIATIVES

The Institute will partnership with the Faculty of Medicine and Health Sciences (FMHS) and University will be used to obtain substantial additional resources for science, infrastructure and recruitment, including donor support. These efforts will target investments in multiple Institute-specific areas and activities that will contribute to the Strategic Aims. University and donor support will also allow seed funding for scientific projects that will be used to obtain preliminary results for grant applications.

PHILANTHROPIC FUNDRAISING

The Institute will work closely with the FMHS, Vice-Principal for Health Affairs and Vice-Principal for University Advancement to plan and mobilize a program to build lasting relationships with the philanthropic donor community. The Institute will designate a director as the point-person champion to work alongside the partners noted above. The Institute will participate actively in developing a Case for Support that will present effective arguments for the following: What will a gift be used for? Why the

Institute? And why now? The Institute will have a ready list of detailed needs for support, including a university chair, training and outreach programs, co-funding with provincial or federal programs, naming opportunities or building expansion. This effort will be coordinated with the affiliated hospital foundations, where appropriate.

CO-FUNDING WITH INDUSTRY

The Institute will facilitate the structuring of new private-public partnerships and attract collaborations and co-funding investments from international pharmaceutical and biotechnology companies. Developing academic/commercial ties is critical because several high-profile provincial and federal programs require research and financial participation with industry. The key to the success of this strategy is to develop long-term relationships within the R&D industry sector. This is a stated mission of the CERC for Genomic Medicine, which is part of the Institute. The Institute will designate one of the directors as the lead, in coordination with the External Advisory Committee (Section 12), to identify and develop these relationships.

16. ANTICIPATED IMPACTS

PURSUING BREAKTHROUGH RESEARCH

With its in-house combination of scientific expertise and advanced research infrastructures, the Institute will be poised to make major discoveries in our understanding of the molecular basis of diseases in ways that are beyond the reach of individual research laboratories, with the expectation that these will lead to novel therapeutics and new markers for risk stratification and targeted preventive measures and treatment. The Institute will enhance McGill's position as the leader of major national projects including the National Data Platform for Precision Medicine and the Aging Population, the Canadian National Life Sciences Data Infrastructure, and other research programs such as cited above.

IMPACTING RESEARCH AT MCGILL

These synergies created by the Institute will extend to the Goodman Cancer Centre, Montreal Neurological Institute, Research Institutes of the Jewish General Hospital, McGill University Health Centre, Douglas Institute and others. The Institute will build upon existing programs of excellence at McGill such as the CERC (Canada Excellence Research Chair) in Genomic Medicine, the Healthy Brains for Healthy Lives CFREF (Canada First Research Excellence Fund) program, the Douglas-Bell Canada Brain Bank, and MI4 to name a few. Investigators from the Faculties of Science (computational genomics), Agricultural and Environmental Sciences (metabolomic data analysis methodologies), and

Engineering (microfluidics) will have ample opportunity to collaborate with the Institute's Members and to access its specialized expertise and equipment. The Institute will provide a forum for scientific exchanges, coordination and planning of new major research infrastructures for biomedicine and the life sciences. The research collaborations dynamized by the creation of the Institute will lead to exciting funding opportunities to attract increased and sustained financial support from national and international funders, philanthropic organizations and industry.

CREATING LEADING-EDGE SCIENCE FACILITIES & NATIONAL PROGRAMS

The Institute will also catalyze new proposals to the Canada Foundation for Innovation (CFI) Innovation Fund, accompanied by requests for operational support from the CFI-Major Science Initiative, and to other funders that similarly support infrastructure. This will contribute significantly to sustaining and expanding McGill's research capabilities. The Institute will be positioned to create strong collaborative ties with other Canadian academic groups, such as already developed within the Canadian Genomics Enterprise and Canadian Longitudinal Study on Aging (see above), which are increasingly essential to attract large national funding for infrastructure. The Institute will provide the critical scientific mass and the experience needed to extend such national collaborations to new fields of biomedicine. Given the rapid evolution of the underlying technologies, the Institute will generate an internal funding pool to respond to emerging needs outside of the schedules of the funding agencies.

INVESTMENT IN TALENT

The Institute will attract, recruit and retain top talented investigators at all career levels who are conducting work in medicine, genomics, immunology and other fields at the forefront of the interface of large-scale biology and quantitative sciences. Internal funding would allow provision of internationally competitive start-up packages, which is essential to attractivity and to assure that recruits can achieve high impact. The Institute could be a vehicle to investigate new approaches to recruitment and retention by encouraging highly recognized scientists to hold dual positions with other leading institutions—a model increasingly used elsewhere to build research and solidify international partnerships. Dual appointments will contribute importantly to training by opening increased possibilities for scientific exchanges of students, postdoctoral fellows and junior faculty.

EDUCATING A NEW GENERATION OF GLOBAL SCIENTIFIC LEADERS

The Institute will have the mission to sponsor interdisciplinary training and public engagement of Canadian and international scholars at McGill. It will create an innovative PhD training scheme that addresses the training needs for students from diverse backgrounds in biology, medicine, quantitative methods and/or social sciences. The Institute's internal funds will support the stipend of a few high-

performing graduate students for local or international rotations in different genomics labs to acquire knowledge of modern technologies and quantitative methodologies. These funds would also support training workshops and international symposia contributing to knowledge diffusion through participation of academia and McGill trainees; the health, pharmaceutical and biotechnology industry sectors; government policy makers; international organizations; and equity-seeking groups.

POSITIONING MCGILL AND CANADA TO LEAD INTERNATIONALLY

The Institute will expand its position as an international infrastructure for large-scale biology and health data by developing strong collaborative linke with leading scientists and institutions in Europe, United Kingdom, Asia and elsewhere in the world. This will open new funding streams as federal priorities turn towards supporting major international initiatives in Canada. Partnerships with leading research and educational institutes in other countries are also a key feature of strategic positioning that will be furthered by the Institute. It will extend successful models that Institute members have already pioneered with Japan (RIKEN, University of Kyoto). UK (Oxford, Imperial College) and France (Bordeaux), to a carefully selected group of other institutions targeted for their ability to contribute to research and training in medical genomics, and to attract international funding support.

APPENDIX 1. FOUNDATIONAL STRENGTHS IN GENOMIC MEDICINE AT MCGILL & RESEARCH HIGHLIGHTS FROM 2019-2021

The Institute's research program will leverage the advanced technologies, scientific expertise and research infrastructures highlighted in this proposal to obtain new breakthroughs in our understanding of disease pathogenesis, with emphasis on the role of gene-environment interactions in human health and disease. The disease areas to be covered include Mendelian disease genetics; immunodeficiencies; infectious, inflammatory and autoimmune diseases; asthma, diabetes and obesity; cancer; and neurological and neurodegenerative diseases including stroke and Alzheimer's disease, as well as in healthy aging. All are existing priorities and areas of strength at McGill that will be boosted by the coordinated efforts afforded by the Institute. The following is a non-exhaustive outline of McGill's positioning in some of these areas.

RESPONSE TO THE COVID-19 PANDEMIC

The Institute's potential for high impact is illustrated by the McGill's coordinated response to the COVID-19 pandemic (see Box 2 for highlights).

The Québec COVID-19 Biobank (BQC19) has been undertaken through a mandate from the Fonds de recherche du Québec (FRQ) and Génome Québec to McGill (V. Mooser, PI), complemented by the Public Health Agency of Canada, to build up a resource of data and samples from COVID-19 infected patients and controls to support COVID-19 research. BQC19 is designed as an observational, multicentre (nine recruitment centres from five Quebec universities), case-control (SARS-CoV-2 PCR positive and negative, resp), longitudinal, extensively phenotyped cohort. Consent allows access to full medical records and sharing data and samples (with appropriate restrictions) with academic and industry researchers. Phenotype includes a detailed standard questionnaire, access to medical records and, for a subset of 2,000 samples, multi-omic analyses including proteomic, metabolomic, transcriptomic and detailed immunology assessment. Genomes of participants are sequenced by the McGill Genome Centre (MGC) within the framework of the federally funded CanCOGen program. So far, close to 4,000 participants have been recruited, totalling 8,000 visits. BQC has contributed to 13 publications to date and data have been released to more than 75 investigators.

Institute investigators have led the rapid response data sequencing efforts for Quebec's public health authorities. They have developed province-wide protocols for virus sequencing and data analysis; undertaken 78% of the sequencing in Quebec, including the rapid response sequencing needed to respond to outbreaks and detect variants of concern; developed the national data portal for virus

sequencing across Canada; and played leadership roles in multi-institutional initiatives, such as HostSeq and CoVaRR-Net, that are structuring the national response to the pandemic.

Box 2. Impacts from efforts in the fight against COVID-19

- The MGC (M. Lathrop, B. Knoppers), with its two Canadian partner Genome Centres in the CGEn consortium, is responsible for $23M C*OVID-19 Host Genome Sequencing Initiative* to sequence the genomes of 10,000 susceptible Canadians.
- The *Québec COVID-19 Biobank* (V. Mooser) is collecting patient samples for sequencing and other integrative 'omic investigations ($10M investment). The MGC provides the technical support for the Biobank, and B. Richards is a lead PI for the clinical and molecular investigations.
- CIHR viral diversity and immune escape variants in vulnerable individuals post-vaccination program (C. Piccirillo, J. Fritz, J. Shapiro, M. Lathrop, G. Bourque, I. Ragoussis et al.)
- In collaboration with the Québec Public Health Authority (Laboratoire de Santé Publique du Québec), I. Ragoussis leads the Provincial sequencing program for SARS-CoV-2 virus, now extended throughout Canada and internationally (EU, Africa, Asia, SouthAmerica).
- In the recently created *CIHR Network for Emerging Variants* (CoVaRR-Net, $24.3M), I. Ragoussis and J. Shapiro lead two principal pillars (*Viral Genomics & Sequencing* and *Computational biology & modelling*), and other Institute members (C. Piccirillo, J. Fritz and S.Vidal) are participants in the immunology and viral components. CIHR has solicited a renewal application to sustain the networ,
- G. Bourque is mandated by the Federal health ministry to implement the national data portal to provide a near real-time snapshot of the COVID-19 pandemic in Canada, including the detection and spread of variants of concern.
- New BSL2 and BSL3 facilities (BCL3 facility led by S. Vidal & D. Malo), are being used to test pharmaceutical and vaccine approaches in rodent models of disease.
- Organisation International COVID-19 Group meeting weekly since April 2020; organisation of the McGill-RSC symposium “Lessons from COVID-19 (Nov 2021)

GENETIC VARIANTS AND DISEASE

Key challenges for genomic medicine are to catalogue genetic variants in the population, determine their contribution to disease at the level of the individual, and study how interaction with environmental and other factors can modulate this genetic information. Despite tremendous progress to date, no single chromosome has yet been finished end to end, and hundreds of gaps persist across the genome. These unresolved regions include segmental duplications, ribosomal rRNA gene arrays and satellite arrays that harbour unexplored variation of unknown consequence. Moreover, this needs to be studied in multiple populations to produce diversified reference genomes. The MGC, which has developed and installed the necessary technology, is conducting a pilot program in whole-genome sequencing of 1,000 newborns that will contribute to these remaining regions and generate the truly complete, high-quality telomere-to-telomere assemblies from diploid human genomes (I. Ragoussis and G. Bourque at McGill with L. Bouchard at Sherbrooke; $1 million in seed funding). The emerging data provide a personal database that will ultimately be applied to all newborns; it will improve quality of life by informing lifestyle decisions and preventing or reducing the burden of disease and its associated impact on an individual level. In collaboration with clinical partners, Institute investigators are applying the battery of high-throughput methodologies to improve diagnosis and treatment of rare diseases with these techniques.

TUMOUR GENOMICS

In oncology, clinicians can use the genome information of a tumour to target a patient's treatment, based on specific tumour enzymes, that are activated or inactivated, for which a specific modulator exists. The approach can also be used as an extremely sensitive diagnostic tool to probe a patient's clinical specimens to assess for residual disease after intervention. McGill has prioritized rare brain tumours in children with world-acclaimed pediatric oncologist N. Jabado leading an effort that has attracted more than $12 million in funding over the last five years. She has identified a molecular pathway altered in these rare tumours and pioneered a new treatment by introducing specific and highly effective inhibitors in patients' tumour cells. I. Watson (Goodman Cancer Research Centre) and M. Park are McGill leads for the new Terry Fox Marathon of Hope Cancer Centre Network across Canada (a $100 million national program with McGill, University of British Columbia and University of Toronto) that aims to advance treatment of cancer using genomic approaches. This is supported by the genomic and bioinformatics platforms at the MGC. M. Park and others from the Goodman Cancer Research Centre, the MGC and elsewhere at McGill are the Canadian contributors to the Cancer Research UK Grand Challenges Program "STORMing Cancer", an international program that uses medical genomic to defeat chronic inflammation as a cause of cancer.

CHRONIC INFLAMMATORY AND IMMUNE-MEDIATED DISEASE GENOMICS

Chronic inflammatory disease such as inflammatory bowel disease (IBD), multiple sclerosis (MS), rheumatoid arthritis (RA) and lupus are surprisingly prevalent in Canada. Although several therapies are available, their efficacy is patient-specific and their long-term use has detrimental side effects. McGill researchers at the MGC and McGill Research Centre on Complex Traits (MRCCT) are leading efforts to decipher the complex genetic component of IBD, MS and RA in humans, identifying genes and pathways involved in pathogenesis, validating the importance of these genes in animal models (M. Lathrop, P. Gros), and partnering with industry to develop new target-specific inhibitors with improved efficacy in subgroups of patients where such pathways are altered. An example is the McGill project on "Interstitial Lung Disease in Systemic Autoimmune Rheumatic Diseases: from Prediction to Cure" (which includes S. Vidal, D. Langlais, A. Nijnik and R. Sladek in its leadership). MRCCT and MGC researchers collaborate with researchers in Japan (RIKEN) through the jointly funded RIKEN-McGill Initiative in Genomics and Immunology, which targets joint training and exchange programs (funded by McGill, FRQ and RIKEN). They will continue to work closely with industry to identify new genetic targets for therapeutic intervention in infections and inflammation, including the discovery and testing of novel drugs using state-of-the-art infrastructure for pre-clinical work. McGill researchers have formed a large network (MI4: the McGill Interdisciplinary Initiative in Infections and Inflammation, led by D. Sheppard;

$20 million investment), which is implementing novel genomic approaches to track and defeat resistance to antibiotics as well as to monitor emergence of new infections.

NEUROGENOMICS

Under the leadership of G. Rouleau, McGill has an outstanding international reputation for contributions to neuroscience and mental health that build significantly on expertise in genomics. McGill's Healthy Brains for Healthy Lives (led by A. Evans), established in 2016 with an $84 million CFREF award, is contributing to expanding genomic activities in these areas of neuroscience and mental health. The Douglas Institute (G. Turecki, Scientific Director) has significant expertise, leadership and unqiue resources in the genomics of behavioral and emotional disorders. Institute investigators' international collaborative programs are funded by multiple sources (EU Joint Programme–Neurodegenerative Disease Research, JPND; French Agence Nationale de la Recherchee, ANR; Japan Agency for Medical Research and Development, AMED) in areas of Alzheimer's disease and other dementias, stroke, small vessel disease and neurological sequelae of COVID-19. The Precision Medicine program, built around the Canadian Longitudinal Study on Aging (CLSA) cohort, will be incorporating 'omics analysis with data on brain MRI for thousands of Canadians taken at multiple timepoints as they age. International support for brain imaging and genomics at the Institute includes the JPND-funded BRIDGET project on neurodegeneration.

NEUROLOGIC DISORDERS AND PAIN GENETICS

McGill hosts another prestigious CERC ($30 million; L. Diatchenko, 2013) in pain genetics that has strong synergies and complementarity with the Institute. The Neurogenomics Partnership is a new multimillion dollar academic/industry endeavour led by McGill's Montreal Neurological Institute under the leadership of E. Fon to engage 'omics datasets to tackle Parkinson's disease, amyotrophic lateral sclerosis, autism/intellectual deficiency and rare neurological disorders.

INTERNATIONAL HUMAN CELL ATLAS

McGill participates in the international Human Cell Atlas project under the leadership of I. Ragoussis, in which single-cell genomic approaches are applied to surgically derived specimens from foetal, pediatric and adult brain to characterize a full developmental trajectory for oligondendrocyte-lineage cells in humans with the aim of building an age-related brain map. Similarly, these techniques are being applied for molecular profiling of senescent human intervertebral disc (IVD) cells to identify molecular therapeutics that clear senescent cells, improve overall IVD health and promote a microenvironment more favourable for tissue regeneration and repair of the degenerate IVD. This work involves multiple

collaborators at the Montreal Neurological Institute, Douglas Research Centre and McGill medical departments.

CERC IN GENOMIC MEDICINE

McGill was awarded the CERC in Genomic Medicine (V. Mooser, formerly at GlaxoSmithKline; $27 million) to bring together basic science researchers, clinical researchers and scientists from industry to develop new and more effective drugs for chronic inflammatory diseases, such as IBD, MS and RA. Researchers are developing and implementing new computational tools to analyze enormous population-based datasets to identify regions of the genome associated with these diseases. The candidate genes are validated in animal models at the MRCCT. These validated targets are being evaluated in partnerships with pharmaceutical companies to develop specific molecules to treat diseases in genetic subgroups of patients. The CERC program is also generating a Mendeliome database for Quebec, aimed at cataloguing all population-specific mutations retained and expanded in the population through ancestral founder effects.

PRECISION MEDICINE

Precision medicine is poised to reduce the burden of disease across the human lifespan and contribute to well-being into older age, a major societal issue in Canada. McGill is a leading partner in CLSA (C. Wolfson, co-lead PI at McGill; M. Lathrop, B. Richards, co-PIs), a strategic initiative for health data acquisition of the Canadian population across the lifespan. The WHO identified CLSA as the largest and best suited to inform the development of the genomic and environmental metrics of healthy aging. The enrichment of CLSA with comprehensive genomic, metabolomics, proteomics and microbiome data at multiple time points as participants age is ongoing at McGill under the direction of M. Lathrop, I. Ragoussis and B. Richards to create a National Data Platform for Precision Medicine and the Aging Population. In 2020 the CLSA was awarded $25 million by the Canada Foundation for Innovation (CFI) including $4.6 million to create the National Platform for Population-scaled Metabolomics. The Institute's immunology expertise is providing mechanistic insights into basic genetic processes of aging, age-related chronic diseases and immunosenescence using CLSA. A common mechanistic denominator of aging and age-related diseases, including obesity, type 2 diabetes mellitus and cardiovascular diseases, is the chronic overactivation of the innate immune system that leads to constitutive low-grade inflammation (called *inflammaging*) that develops and drives the pathogenesis of age-related disorders. A variety of stimuli sustain inflammaging, including pathogens, endogenous cell debris, immune danger signals, chronic nutrient excess and alterations in the gut microbiota. Following this conceptual framework, McGill expertise (J. Fritz) is being applied to characterize the metabolic and functional changes and elucidate the underlying molecular and cellular processes during inflammaging,

focusing on studying inflammatory mediators, metabolism of dietary constituents and diet-regulated translational or transcriptional networks in various cellular immune system networks.

EPIGENETICS MAPPING

Through funding from the Canadian Institutes of Health Research (CIHR) CEEHRC (Epigenetics, Environment and Health) Signature Program, M. Lathrop and G. Bourque with others at the MGC established the McGill Multidimensional Epigenome Mapping and Data Coordinating Centres (EMC) to sustain Canada's participation in the International Human Epigenome Consortium (IHEC). The success of Phase 1 (2012-17) led to the renewal of Phase 2 (2017-22). The EMC contributed 50 publications in epigenome mapping areas, including the landmark release of IHEC papers in *Cell* (2016). Phase 1 has been leveraged to fund 14 grants ($40 million). Over 20 national and international disease mapping projects have been undertaken based on the methods and data produced. An important mandate of Phase 2 is providing support for the Canadian epigenetics community, achieved by the launch (2018) of the CEEHRC Community Access Program. EMC also provides community support through financial and organizational support for the annual Canadian meeting in epigenetics. This work has led to the recent Genome Canada Bioinformatics/Computational Biology funded project, EpiShare, led by G. Bourque and Y. Joly, which was selected in 2019 as a Global Alliance for Genomics and Health (GA4GH) Driver Project.

COMPUTATIONAL MEDICINE

The need to analyze massive ‘omics datasets dominates modern day medical research, from clinical and epidemiological research to molecular biology, giving birth to the field of computational medicine, a prioritized area of research in the Faculty of Medicine. Bioinformatics and computational genomics at the MGC have already received more than $55 million in funding. A new CFI award ($20 million, Fall 2020) was obtained to establish the Secure Data 4 Health (SD4Health) infrastructure as the national hub for health data analysis. In addition to the computational components of SD4Health, the regulatory agenda for this work in a national and international context will be pursued within the Institute. The recent Faculty of Medicine Initiative in Computational Medicine ($1.6 million seed investment) initiated by G. Bourque aims to bring the educational, research and clinical missions of the Faculty into the area of complex computer-based datasets, Specifically, the initiative aims to codify clinical patient-derived datasets, to facilitate their uptake by clinical and basic science researchers (including training), to develop new tools for innovative analyses at the interface of traditional disciplines, and finally to generate novel hypotheses for disease diagnosis and treatment. Pursuit of these efforts in computational medicine will position the Institute as the home of a proposed new Canadian National

Life Sciences Data Infrastructure as well as priming McGill to receive additional funding through the New Digital Research Infrastructure Organization.

BIOLOGICAL AND BIOMEDICAL ENGINEERING

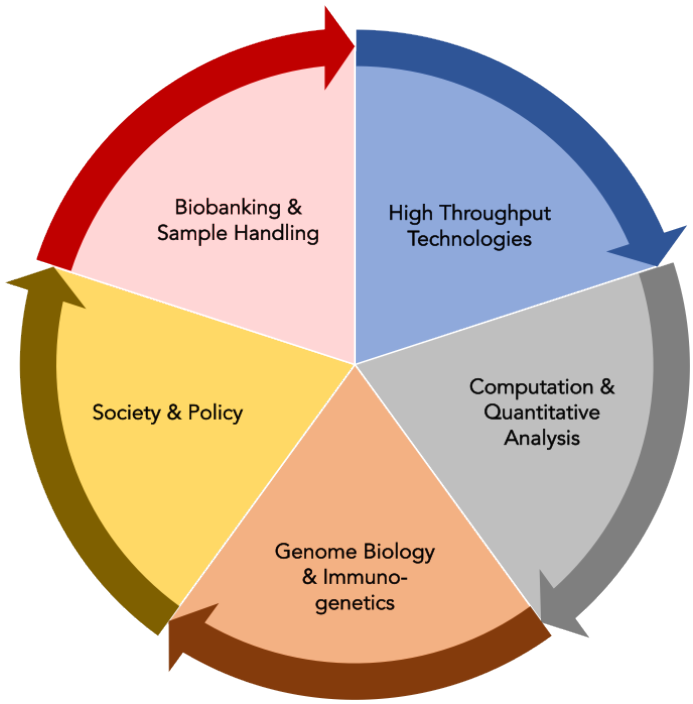
D. Juncker is Department Chair of Biological and Biomedical Engineering, and leads a research group at the MGC. Their research foci contributing to genomic medicine include the development of novel scalable antibody microarrays for protein profiling and their use for biomarker discovery and early diagnosis of disease such as cancer; self-powered lab-on-a-chip 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.

CENTRE OF GENOMICS AND POLICY

Under the leadership of B. Knoppers and Y. Joly, the Centre of Genomics and Policy (CGP) at the MGC is internationally recognized and uniquely positioned at the crossroads of law, medicine and public policy. Applying an interdisciplinary perspective and collaborating with national and international partners, the CGP analyzes the socio-ethical and legal norms influencing the promotion, prevention and protection of human health. Currently, the Centre's research covers six areas of genomics and policy: stem cell research and therapies, pediatrics, privacy, cancer, intellectual property and biobanks (population genetics). The CGP is actively engaged in facilitating the building and supporting of infrastructure resources for several biobanking efforts in Quebec (e.g., CARTaGENE, Québec COVID-19 Biobank). It is also engaged in the Réseau québecois de diagnostic moléculaire to implement new approaches such as registries of metadata to understand genetic determinants of disease resistance and susceptibility. Through its involvement in the national COVID-19 Host Genome Sequencing and SARS-CoV-2 virus sequencing projects, also pursued at McGill, the CGP is building prototype resources to study the current COVID-19 pandemic, with the aim of creating appropriate ethico-legal approaches to the public health aspect of this crisis. The CGP is implementing new data governance models for efficient data sharing in the spirit of open science. (e.g., Opal and the Québec Smartcare Consortium; SecureCloud at Calcul Québec; International Cancer Genome Consortium: Accelerating Research in Genomic Oncology) in collaboration with G. Bourque and others at the MGC. Buttressed by its interpretation of the human right to science, the CGP is central in creating the ethics and regulatory policies and tools for the GA4GH, which is supporting many such collaborations. The CGP leads the Genetic Discrimination Observatory, which aims to provide meaningful protection to vulnerable individuals while engaging the population in debates on the dystopic portrayals of genomics.

APPENDIX 2. THE INSTITUTE'S GENOMIC MEDICINE CORE RESEARCH INFRASTRUCTURES

Figure 3: Coordinated activity of research infrastructures



This section describes existing research infrastructures at the MGC and the MRCCT that will be integral components of the Institute. The research infrastructures act in a coordinated manner (Fig. 3) with projects often drawing upon component activities at different stages of advancement. Some components are mandated by funders to provide scientific support to groups across Canada, which is managed through cost recovery. Current operational support from CFI and other funders is more than $5 million annually, while cost recovery from research grants is around $20 million annually principally accounted for by consumable purchases.

BIOBANKING

The Institute will house specialized infrastructure to manage and prepare samples for large-scale 'omics analyses:

- Over 300,000 samples already assembled from national and international programs (DNA, plasma, serum, microbiome);
- Laboratory Information Management System tracking & robotics for large numbers of samples with protocols for complex preparation (such as very high molecular weight DNA, microbiome, environmental DNA analysis);
- The CLSA DNA bank, Canadian Health Measures Surveys DNA bank, Québec COVID-19 Biobank and links to other McGill hospital biobanks; and
- The new CERC Biobank for Québec disease studies (Québec Mendeliome).

HIGH-THROUGHPUT TECHNOLOGIES

The Institute will exploit recent investments (Box 1) in technology, supported by decreasing costs for computing, DNA sequencing and related 'omics methodologies, and coupled with advances in single-cell analysis and breakthroughs in other areas of biomarker discovery. In addition to its major technology base in genomics, these will encompass other emerging methodologies, such as in proteomics and metabolomics, which, in combination with genomic information, are key to biomarker validation.

- The Institute will house McGill's major CFI-funded genomic infrastructures (multiple genotyping and sequencing platforms, single-cell genomics, digital spatial profiling and others); the principal operational support will come from the CFI-Major Science Initiative (MSI) and Genome Canada. Low costs will be maintained through large volumes and optimized protocols, and robust accounting systems and staff for cost recovery and for financial monitoring and reporting are in place.
- The Institute's research infrastructure will include the new CFI-funded national platform for population-scaled metabolomic profiling, the CIHR-funded McGill Epigenome Mapping Centre, facilities for metagenomic and environmental DNA studies, platforms such as Olink Proteomics for array and sequenced based protein analysis, and other biomarker screening undertaken in conjunction with genomics for multi-omic studies. It will implement new approaches, such as large-scale base editing screens, as platforms that are similarly linked to the Institute's competences.
- The infrastructure activity will be accompanied by significant efforts in development and integration of new technologies and methodologies for high-throughput analysis. These will be supported by Institute Members and through collaborative relationships with academic groups and biotechnology companies.
- Established relationships with other McGill platforms will provide access to additional high-throughput capacity that will be linked to genomics in the Institute's research activities and will contribute to coordination of these activities at the University. Such platforms include the McGill Single Cell and Imaging Mass Cytometry Platform at the Goodman Cancer Centre, the ^{1}H-NMR at the RI-MUHC Drug Discovery Platform, and platforms for isolation and study of extracellular vesicles and particles at the Centre for Applied Nanomedicine.

COMPUTATIONAL AND QUANTITATIVE ANALYSIS

Biomedical research is increasingly a big data science in which computational and quantitative methodologies dominate in a diverse range of problems, from clinical and epidemiological research to

molecular biology. Working at the interface between molecular and data science, the Institute will play a central enabling role in bringing to the fore big data medicine at McGill. Key points include:

- The Institute's informatics infrastructure at the MGC (CFI funding) will support real-time data capture and quality control (QC) for sequencing and other activities. Downstream analysis will also use associated computational resources and storage purchased with the Institute's CFI funding but maintained at the Calcul Québec High Performance Computing facility, with which there are close interactions.
- The Institute platforms will include support for statistical, population and single-cell analyses. These require continual development of new statistical and computational tools that are suitable for analysis and interpretation of biological and clinical datasets that are rapidly increasing in complexity. The Institute will pursue emerging methods for these studies, and will support and aid coordination of these across the University.
- Through the SD4Health platform, the Computational and Quantitative Analysis platform, interacting closely with the Society and Policy platform below, will provide the Institute's framework to meet critical security and privacy standards for maintaining and sharing genomic and health data (Section 9*).*

GENOME BIOLOGY AND IMMUNO-GENETICS

To elucidate disease mechanisms, the MRCCT and other Institute members from the Life Sciences Complex will provide the Institute with the expertise and platforms needed to support a wide array of downstream functional studies in cell-based and whole animal models. This includes research tools in genetics and immunology to tackle the basic mechanisms underlying immune and inflammatory responses, including the cells, molecular pathways and individual genes involved in infectious diseases, inflammatory conditions, and others for further downstream analyses ultimately leading to new molecular disease therapies.

- CFI has supported state-of-the art platforms for immunology and genetic work, including large mouse facilities (20,000 cages), with associated BSL2 core, carcinogenesis suite, transgenic and cryopreservation core, metabolomics core, histology platform, imaging core, immune-phenotyping core, flow cytometry and fluorescence-activated cell-sorting facilities, and the only on-campus BCL3 containment facility for work with SARS-CoV-2 and tuberculosis.
- The Institute will draw upon expertise in advanced gene-editing and related genomic technologies for functional genomics including studies of induced pluripotent stem cells, organoids and animal models.

- With the aid of the chemical and structural biology group at the Life Sciences Complex, NMR and x-ray crystallography will be used to determine the high-resolution structure of valuable protein targets for therapeutic intervention in human diseases of strategic interest to the Institute.
- Molecular modelling techniques and chemoinformatics will be applied to optimize structure activity relationship studies for drug discovery. The Institute will also incorporate an industry partner on-site (Zamboni Chemistry Solutions) for organic synthesis of small molecules, and for medicinal chemistry for discovery of new drugs of potential therapeutic value.

SOCIETY AND POLICY

The CGP brings an interdisciplinary perspective and collaboration with national and international partners for analysis and applications involving the social, ethical and legal norms associated with human health research.

- Platform activities address ethical, legal and policy issues related to the use of samples for genomic studies. This includes the creation of tools for dealing with issues such as the return of incidental findings/variant of unknown significance, frameworks for sample and data sharing, researcher authentication passports, privacy and consent filters, and the development of policies and standards for access to databases and biobanks. A particularly important area of work that has emerged recently is to assure alignment between Canadian privacy regulations and the new EU General Data Protection Regulation requirements to ensure the secure sharing of data.
- The Institute will have an established leadership role in international initiatives such as GA4GH, HCA and IHEC, national programs such as SD4Health, and local programs such as the McGill University Health Centre AI Health Research Launch Committee in advising the policy, ethical and legal issues associated with big data, data sharing and computational analysis in genomics, and in developing the tools to address them.
- The platform will support research and undertake collaborations with others in the social sciences to explore major questions related to biology, genomic medicine and sexual/gender diversity. It will build upon ongoing research (under protocols designed to meet ethical requirements and avoid stigmatization) and address the important issue of the relationship between genetic diversity and equity of access to genomic medicine.

MANAGEMENT OF THE INSTITUTE'S RESEARCH INFRASTRUCTURE

- Existing integrated management and administration systems for research infrastructures have already been developed at the MCG, and these will be applied, and extended as necessary, to

oversee the large-scale research activities and to provide scientific support, often time-critical, to users of the Institute's research infrastructures. The management team will coordinate the associated technology development and its deployment into a high-throughput production environment. These elements are required by CFI-MSI and other federally mandated funders, who provide administrative salaries as part of their funding support.

- The Institute's Administrative Support Group will provide continuity and expansion of the specialized support needed for these research infrastructure management and administrative activities, which fall outside of the capacity of teams organized through the FMHS or McGill Central administrations. Management tasks to be carried over into the Institute include coordination of project workflow activities, entailing statement-of-work management, sample receipt, sequencing (and/or other activity, as needed), data processing and delivery. The project management team is also responsible for compiling estimated timelines, as well as reports on ongoing and forecasted activity. Grant budgets and cost recovery from users are managed according to established and compliant processes. Finance activities include weekly invoicing, monthly consumables inventories and accounting statements, revenue and contingency reports, and quarterly financial statements.
- The existing team at the MGC, which will form the core of the Institute's Administrative Support Group, is already experienced in the financial planning, cost recovery processes, scheduling of activities, and data QC and release processes associated with current operations. These personnel will bring to the Institute the specialized knowledge required to establish research agreements, costing and material transfer agreements; obtain research ethics approval for studies; and negotiate purchases of high-tech equipment, maintenance contracts and consumable pricing in conjunction with McGill purchasing and legal services. Institute program managers will be assigned to specific technical activities with cross training and operate in a common environment of shared processes and support resources, such as shared user interface software, with redundancy, assuring operational continuity to respond to surges in specific demands, such as the need to implement the public health response to the COVID-19 pandemic extremely rapidly, staff absences and staff turnover.

APPENDIX 3. PROPOSED INITIAL MEMBERSHIP OF THE INSTITUTE

A. CORE MEMBERS AND RESEARCH ACTIVITIES

Claude Bhérer, Assistant Professor, Human Genetics
Prof. Bhérer's research interest is to use population and statistical genetics to learn about human biology, evolution and the genetic basis of diseases and traits. Her work focuses on understanding how evolutionary history shapes natural genetic variation in diverse human populations and how to apply this knowledge to support the discovery and development of genetically driven therapeutics.

Guillaume Bourque, Professor, Human Genetics
Prof. Bourque is the Director of Bioinformatics and Computational Genomics at the McGill Genome Centre; he is also responsible for the Program in Computational Medicine in the Faculty of Medicine. The goal of his research is to understand mammalian genomes using comparative genomic and epigenomic analyses. He heads the new $20 million CFI-funded project, SecureData4Health.

Raquel Cuella Martin, Assistant Professor, Human Genetics
Prof. Cuella Martin works in the area of disease functional genomics. She develops new methodologies for genome editing to allow predictable evaluation of the effects of individual base changes to dissect in fine detail how DNA sequence variation contributes to human biology.

Ken Dewar, Professor, Human Genetics
Prof. Dewar is a founder of genome sciences at McGill. His research interests straddle advanced DNA sequencing technologies and bioinformatics. He uses core instrumentation and expertise to advance human and animal medicine, food safety, environmental assessment and biotechnology.

Jörg Fritz, Associate Professor, Microbiology and Immunology
Prof. Fritz's research focuses on understanding how innate host resistance regulates inflammatory and antigen-specific adaptive immune responses. He investigates how innate immune recognition of microbes and of infection-associated physiological changes activate pattern recognition molecules such as Toll-like receptors and Nod-like receptors for the activation of mucosal and systemic immunity against commensal and pathogenic microorganisms.

Simon Gravel, Assistant Professor, Human Genetics
Dr Gravel's research interests are in learning about biology and evolution through creative analysis of high-throughput biological data. He develops mathematical and statistical methods that take advantage of diverse data sources to refine our understanding of fundamental parameters of human history and biology. Recent research has focused on how the history of diverse human populations has affected patterns of genetic diversity and disease.

Philippe Gros, Professor, Department of Biochemistry
Prof. Gros is the founder of the McGill Research Centre on Complex Traits that he now co-leads with another Institute Member, Prof. S. Vidal. His laboratory uses a genetic approach in mouse to discover genes, proteins and pathways that play an important role in complex human diseases. The results are to be translated into clinical applications through the creation of novel diagnostic tools or new small molecules modulators with therapeutic value in the corresponding human disease.

Samantha Gruenheid, Professor, Department of Microbiology and Immunology
Prof. Gruenheid uses genetic approaches to identify the genes and proteins controlling inflammatory response at the intestinal mucosa and susceptibility to lethal infection. As part of this work, she is characterizing the pathogenesis and host response to infection with enterohemorrhagic and enteropathogenic bacteria responsible for acute cases of diarrheal disease with potentially fatal complications.

Yann Joly, Professor, Department of Human Genetics
Prof. Joly is the Research Director of the Centre of Genomics and Policy. His research interests lie at the interface of scientific knowledge, health law (biotechnology and other emerging health technologies) and bioethics. In 2018 he founded the national Genetic Discrimination Observatory, which is now an international organization with experts and collaborators from over 20 countries.

David Juncker, Professor, Biomedical Engineering
Prof. Juncker is the Department Chair of Biomedical Engineering. His research is directed at the development of ground-breaking, transformative micro- and nano-bioengineering technologies for bioanalysis, precision medicine and organs-on-chips.

Bartha Knoppers, Professor, Department of Human Genetics
Prof. Knoppers, Canada Research Chair in Law and Medicine (Tier 1 since 2000), is the founder and Director is the founder and Director of the Centre of Genomics and Policy. World renowned for her work on policy, ethics and legal aspects of genomic and medical and biological data, she leads many international engagements in these areas.

David Langlais, Assistant Professor, Human Genetics/Microbiology & Immunology
Prof. Langlais is investigating the role of transcription factors in normal and pathological inflammatory responses and developing innovative anti-inflammatory treatments using cutting-edge molecular biology and genomics methods.

Mark Lathrop, Professor, Department of Human Genetics
Prof. Lathrop is the Director of the McGill Genome Centre and an international leader in genomics and human genetics. He uses large-scale, multi-centric investigations that combine molecular approaches with statistical genetics to unravel the genetic basis of multifactorial disease. He applies the results to individualize approaches to disease prevention and treatment (precision medicine).

Jacek Majewski, Associate Professor, Human Genetics
Prof. Majewski's research interest in recent years is identifying causative disease mutations and studying their downstream consequences. His identification of disease mutations affecting the epigenome has shifted attention to the study of epigenetic dysregulation in disease and epigenetic mechanisms controlling normal development.

Danielle Malo, Professor, Department of Medicine/Human Genetics
Prof. Malo works on the identification and characterization of genes involved in the host immune response to pathogenic Salmonella using mouse models of the disease and forward functional genetics. Salmonella infections in humans cause diseases (typhoid fever, salmonellosis and invasive non-typhoidal salmonellosis) that are an increasingly important public health issue, both in developed and developing countries.

Judith Mandl, Assistant Professor, Department of Physiology
Prof. Mandl studies the biology of T cells in their crosstalk with cells of the innate immune system at steady-state and during infection. Her recent work has provided important new insights into the role of interactions of T cells with self-peptides presented by Major Histocompatibility Complex molecules to both the selection of an effective T cell repertoire in the thymus and in their trafficking dynamics through peripheral lymphoid
organs.

Vincent Mooser, Professor, Human Genetics
Prof. Mooser, holder of the recently awarded CERC chair in Genomic Medicine at McGill, uses large-scale genomics to contribute to the discovery and development of new therapeutics. Within the CERC program, he is building a hub to support target identification, target validation, optimal indication and proof-of-concept trials for investigational medicines, by capitalizing on natural, rare variations of the genome and the uniqueness of the French-Canadian population.

Robert Nadon, Associate Professor, Human Genetics
Prof. Nadon's research interests include computational and statistical methods in various high-throughput biotechnologies (e.g., gene expression, high-throughput screening, high-content screening, genome-wide translation). He was an early champion of currently broadly accepted formal statistical procedures for gene expression analysis, and developed the first commercially available software package for analysis of microarray data.

Hamed Najafabad, Assistant Professor, Human Genetics
Prof. Najafabad's research combines machine learning and statistical inference with large genomics datasets to characterize the gene regulatory networks that govern cell identity and function, genetic determinants of their activity and their association with human diseases. His work encompasses the study of transcription factors, RNA-binding proteins and non-coding RNAs, with a focus on the role of these factors in development and progression of cancer.

Anastasia Nijnik, Assistant Professor, Department of Physiology
Prof. Nijnik investigates the process of blood and immune cell differentiation from hematopoietic stem cells. She is exploring the molecular mechanisms through which histone-deubiquitinase (H2A-DUB) protein MYSM1 controls bone marrow function and lymphocyte production by regulating gene expression and genetic stability in hematopoietic progenitors. The program is expanding to analyze the functions of other poorly characterized H2A-DUBs, using novel transgenic mouse and stem cell models currently in production.

Ionannis Ragoussis, Professor, Human Genetics
Prof. Ragoussis is the scientific lead of the Genomic Platforms of the McGill Genome Centre and a member of McGill's Integrative and Quantitative Biology Initiative. He has established an Advanced Genomics and Single Cell Genomics Laboratory, which he applies to accelerate research in cancer and other diseases. Among other efforts, Prof. Ragoussis has led the sequencing response to COVID-19 in collaboration with the Laboratoire de Santé Publique du Québec.

Yasser Riaz-Alhosseini, Assistant Professor, Human Genetics
Prof. Riaz-Alhosseini leads many of the cancer genomics research projects at the McGill Genome Centre, including national and international programs in renal and pancreatic cancers. He is developing and applying new technologies for spatial genomic profiling in cancer and other diseases.

Dan Scott-Auld, Academic Associate, Human Genetics
Responsible for overseeing operations for large-scale genomics projects as well as major technology platforms as well as commercialization of genomics discoveries. His research concerns genomics and drug-repositioning, neurodevelopmental and neurodegenerative disease.

Jesse Shapiro, Associate Professor, Microbiology and Immunology
Prof. Shapiro's research uses genomics to understand the ecology and evolution of microbes, ranging from freshwater bacterioplankton to the human gut microbiome. His work has helped elucidate the origins of bacterial species, leading to a more unified species concept across domains of life, and has developed genome-wide association study methods tailored for bacteria.

Robert Sladek, Associate Professor, Human Genetics
Prof. Sladek's research focuses on learning how genetic mutations cause diabetes and other complex diseases. He pioneered the application of genome-wide association methodology to complex disease. His group is now developing new approaches to identify genetic changes across the whole human genome that are associated with type 2 diabetes, and the effects of genetic variation on RNA splicing and gene activation in mouse strains and human populations.

Daniel Taliun, Assistant Professor, Human Genetics
Prof. Taliun's work focuses on the development of computational algorithms and software tools for the analysis of genetic data combined with molecular, behavioural, imaging and environmental data. The scope of his research includes genetic and clinical data integration, web-based interactive visualizations, secure data sharing, and distributed computational algorithms for in-house and cloud computing computational platforms.

Silvia Vidal, Professor, Microbiology & Immunology/Human Genetics
Prof. Vidal is the director of the McGill Research Centre on Complex Traits. She is investigating the molecular interactions between human pathogenic viruses and the host innate response to virus infection using mouse genetic models. Her work addresses the role of activating natural killer cell receptors in both recognition of the infected cell and regulation of natural killer cell activity during cytomegalovirus infection.

Ma'n Zawati, Assistant Professor, Human Genetics
Prof. Zawati's research focuses on the legal, ethical and policy dimensions of health research and clinical care, with a special focus on biobanking, data sharing, professional liability, and the use of novel genomic and informatics technologies in both the clinical and research settings. His work is interdisciplinary, drawing together perspectives from law, ethics, bioinformatics, genomics and policy.

Sirui Zhou, Assistant Professor, Human Genetics
Prof. Zhou's research interest is to identify genetic determinants of diseases and traits via population genetics, genetic epidemiological methods and multi-omics data for the purpose of informing therapeutic development. She focuses on functional biomarkers and polygenic scores from proteomics, metabolomics and genomics data, while leveraging genetic ancestry, for disease outcomes such as the response to the SARS-CoV2 infection and metabolic traits.

B. ASSOCIATE MEMBERS AND RESEARCH ACTIVITIES

Mathieu Blanchette, Associate Professor, School of Computer Sciences
Prof. Blanchette's research is on algorithmic, machine learning and statistical approaches to solve real-world questions from biology. He works in tight collaboration with biologists, biochemists and geneticists to put these tools to use to make biological discoveries. He is particularly interested in two questions: (i) How do genomes evolve and what does that tell us about their functions? (ii) How is gene expression regulated and what role does 3D chromosome organization play?

Bastien Castagner, Associate Professor, Pharmacology & Therapeutics
Prof. Castagner investigates the design of small-molecules and natural product analogues as novel drug candidates. He is especially interested in the chemistry and biology of inositol phosphates and carbohydrates. His group has been involved in novel strategies to inactivate the toxins responsible for the pathogenesis of Clostridioides difficile. He also studies the human gut microbiota and how molecules can impact its composition and metabolism, for the benefit of the host.

Inés Colmegna, Associate Professor, Medicine, Division of Rheumatology
Prof. Colmegna's research focuses on defining basic mechanisms accounting for the disruption of immune tolerance in patients with rheumatoid arthritis (RA). She is specifically interested in understanding the role of adult stem cells in initiating and perpetuating this disease. Ongoing studies aim to characterize the biology of human hematopoietic and mesenchymal stem cells in patients with recent onset and established RA, the cross talk between stem cells and other immune cells, and the impact that interventions targeting stem cells have on the restoration of immune function.

Benoit Cousineau, Associate Professor, Microbiology and Immunology
The main topic of study of our laboratory is on the 'Mechanisms and applications of group II intron mobility; Evolution of mobile group II introns; Lactococcus lactis live vaccines'. Group II introns are ribozymes. They splice autocatalytically from their pre-mRNA transcript by two consecutive transesterification reactions. This process is identical to the splicing of nuclear introns and functions to ligate the flanking exons and release the intron in the form of a lariat. Some group II introns contain open reading frames (ORFs) and are also mobile retroelements. Group II introns are found in bacteria, archaea and bacterial-derived organelles. Very little sequence similarity is observed amongst group II introns; however, their secondary structure is highly conserved. It consists of six domains (DI-DVI) that radiate from a central hub.

Luda Diatchenko, Professor, Faculty of Medicine, Department of Anesthesiology, and Faculty of Dentistry
Prof. Diatchenko holds the CERC in Human Pain Genetics at McGill. She investigates the psychological, molecular, cellular and genetic pathways that mediate both acute and persistent pain states. The primary goal is to identify the critical elements of human genetic variability contributing to pain sensitivity and pathophysiological pain states that will enable individualized treatments and therapies.

Jamie Engert, Associate Professor, Human Genetics
Prof. Engert's research concerns the genetic etiology of a wide variety of cardiovascular diseases. These include myocardial infarction, dilated cardiomyopathy and aortic stenosis. His team currently uses several modern technologies and statistical methods to discover the genes underlying these diseases. It works with data from cardiovascular patients at the McGill University Health Centre as well as large-scale, publicly available data sets. He also studies the genetic epidemiology of the response to various pharmacological therapies for cardiovascular diseases.

Ziv Gan-Or, Assistant Professor, Neurology & Neurosurgery
Dr. Gan-Or and his team is focused on identifying genetic causes and modifiers of neurological disorders, at the population level and at the individual level, towards precision medicine. Using advanced genetic methods such as whole-genome and whole-exome sequencing, targeted next generation sequencing, genome-wide association studies, RNA sequencing and more, he studies the genetic and molecular basis of diseases such as Parkinson's disease, REM sleep behavior disorder, restless legs syndrome, dementia with Lewy-bodies, multiple system atrophy, hereditary spastic paraplegia and others. He uses these genetic results to identify potential drug targets, identify sub-types of diseases and perform genetic stratification for clinical trials.

Audrey Grant, Assistant Professor, Department of Anesthesiology
Prof. Grant's research uses statistical genomics methods, both classical and novel, in the analysis of large, publicly available clinical databases combined with other tissue-specific expression or epigenetics sources applied to the analysis of complex traits. She collaborates with the CERC in

Human Pain Genetics (L. Diatchenko) to investigate chronic pain development, pain sensitivity and conditions featuring pain.

Cecilia Flores, Professor, Psychiatry
Dr. Flores' research program is directed at understanding changes in dopamine neurons and their connections by genetic abnormalities and by exposure to drugs or stressors at different times in life. She studies variations in the netrin-1 guidance cue system at specific developmental stages to determine how they alter the establishment of dopamine circuitry, and is interested in how these developmental events affect dopamine function and behavior in adulthood, and their role mediating resilience to psychopathology in both animal models and in translational human studies. Another goal is to understand how initiation of drug use in adolescence, in comparison to adulthood, increases vulnerability to developing addiction.

Edward Fon, Professor, Department of Neurology and Neurosurgery
Prof. Fon's research focuses on the molecular events leading to the degeneration of dopamine neurons in Parkinson's disease. He is particularly interested in α-Synuclein, parkin and PINK1, all genes known to cause familial forms of the disease. His work developing cellular models of Parkinson's disease using patient-derived induced pluripotent stem cells could provide important clues about the mechanisms of dopamine neuron death and lead to innovative therapeutic strategies for the disease.

William Foulkes, Professor, Oncology/Medicine/Human Genetics
Prof. Foulkes's research focuses on the etiology and clinico-pathological features of hereditary cancers. He is renowned for his work on breast cancer and discovery and characterization of cancer predisposing founder mutations, including a germline pathogenic missense variant in MSH2 in the Ashkenazim and disease-causing variants in PALB2 and RAD51D in French Canadians. Another recent research focus involves genome-wide characterization of patients with multiples primary tumours to identify the genetic predisposing factors at work.

Celia Greenwood, Associate Professor, Epidemiology, Biostatistics & Occupational Health/Human Genetics/Oncology
Prof. Greenwood develops statistical methods for the analysis of high dimensional data, particularly genetic and genomic data. She addresses domains and topics such as methods for analysis of epigenetic data, particularly DNA methylation patterns, linking genetic variation to phenotypes, e.g., how genetic variability is identified through sequencing studies or genotyping plus imputation linked to disease traits and phenotypes; methods for dimension reduction, with applications in many areas including neuroinformatics; and methods for clustering and networks, with applications in cancer genomics and analysis of the microbiome.

Sidong Huang, Associate Professor, Biochemistry
Prof. Huang uses functional genomic tools to study cancer-relevant pathways and guide cancer therapy. He is identifying novel genes and networks that modulate response to cancer drugs and uncovering genetic dependencies of cancer-relevant pathways that can be exploited therapeutically. These studies are intended to develop treatment strategies to overcome drug resistance and uncover vulnerabilities of hard-to-treat cancers that can be exploited therapeutically.

Nada Jabado, Professor, Department of Pediatrics
Prof. Jabado's work is elucidating genetic signatures of pediatric astrocytomas and examining how they compare to adults. She identified a new molecular mechanism, recurrent somatic driver mutations in the tail of histone 3 variants (H3.3 and H3.1), that is involved in the pediatric forms. She is addressing crucial impediments to progress by establishing reliable in vitro and in vivo models for these "oncohistones" and understanding their effects in driving tumours and therapeutic resistance.

Sarah Kimmins, Associate Professor, Department of Animal Science, Faculty of Agricultural and Environmental Sciences
Prof. Kimmin's research focuses on fertility in men and how the father's environment (diet, BMI & toxicants) impacts the sperm, clinical outcomes, development of embryos and offspring health. At the crux of this research is the sperm epigenome, a heritable layer of biochemical information that takes the form of methylation of DNA and the post-translational modification of chromatin associated proteins, the histones. Her research examines how environmental exposures to the father interact with the developing sperm epigenome, and how this molecular information is transmitted to the embryo.

Irah King, Associate Professor, Microbiology and Immunology
Dr. King's research focus is to understand how immune cells communicate with their local environment to promote protective immune responses relevant to human disease. He is particularly interested in immunity at barrier sites such as the gut, skin and lung as these tissues face the complex task of maintaining homeostasis while directly interacting with the outside world. Ongoing studies including the molecular mechanisms of CD4+ T cell differentiation following intestinal helminth infection, innate immune responses that initiate and/or regulate Type 2 immune responses following intestinal helminth and bacterial infection, regulation of skin-resident IL-17-producing T cells in the context of psoriatic-like inflammation, and the influence of the microbiota on protective immunity at barrier sites.

Claudia Kleinman, Assistant Professor, Human Genetics
Prof. Kleinman uses computational analysis of genome-wide data to elucidate mechanisms regulating transcription and RNA processing, their interplay with genetic and epigenetic factors, and how they cause disease. Her work combines genomic technologies with computational approaches to analyze, for example, the dynamics of RNA processing in the developing human brain, or how transcription at the single-cell level can be used to resolve cell-to-cell variation and to identify rare cells driving disease progression and therapeutic resistance in cancer.

Yue Li, Assistant Professor, School of Computer Science
Prof. Li is developing machine learning approaches to decipher, in a human-understandable manner, the etiology of diverse phenotypes including complex human diseases. He seeks to answer some of the key questions in computational biology: what are the genetic predispositions, cell-type specificities, genomic regulatory elements, gene and pathway functions, and their interactions with environments that together give rise to the phenotypic diversity and their interdependency?

Corinne Maurice, Assistant Professor, Microbiology and Immunology
Prof. Maurice's research aims to address two major goals: (ii) identify and characterize the metabolically active microbial members of the gut microbiota, and (ii) determine the role of bacteriophages as regulators of the active gut microbiota. Combining single-cell and metagenomics approaches to the study of the human gut microbiota, her projects aim to explore human health from a microbial standpoint. Ultimately, the goal is to increase understanding of the ecological processes and interactions between the different members of the gut microbiota, focusing on bacteria and phages, so as to modulate them and restore a healthy gut microbiota after clinically relevant perturbations.

Corina Nagy, Assistant Professor, Psychiatry
Corina Nagy, PhD, joined the Douglas Institute and the McGill Group for Suicide Studies in 2020. As an early career investigator, she is looking to push the limits of modern technology and explore the brain at an unprecedented resolution, examining the contribution of each brain cell to the pathological state with a focus on major depression.

Momar Ndao, Associate Professor, Department of Medicine, Division of Experimental Medicine
Prof. Ndao is investigating approaches for (i) diagnosis of parasitic diseases, (ii) the study of host-parasite interactions, (iii) screening drugs to be used as therapies for protozoan parasitic disease, (iv) developing vaccines to prevent parasitic diseases, and (v) applying proteomic technology to discover biomarkers for infectious diseases.

Dao Nguyen, Assistant Professor, Microbiology and Immunology
Dr. Nguyen’s research focuses on Pseudomonas aeruginosa infections and other biofilm infections. Biofilms are multicellular bacterial communities that are exceptionally tolerant to antibiotics, biocides and host defenses. Pseudomonas aeruginosa biofilms cause debilitating and often fatal chronic airway infections in patients with the genetic disease cystic fibrosis. Her work is focused on understanding the molecular mechanisms of antibiotic tolerance and identifying bacterial pathways that contribute to how antibiotics kill bacteria. Her lab also studies how Pseudomonas interacts with the host, and how these relationships shape the inflammatory responses. This is important to the pathogenesis of chronic lung disease in cystic fibrosis patients.

Martin Olivier, Professor, Microbiology and Immunology
Prof. Olivier's research focuses on understanding how pathogens can evade the host immune response by manipulating the biochemical cascades involved in the regulation of phagocyte microbicidal functions. Pathogens of interest are protozoan parasites causing malaria, which causes up to two million deaths annually, and leishmaniasis, which affects more than 250 million people worldwide.

Jerry Pelletier, Professor, Biochemistry
Prof. Pelletier's research combines chemical biology, molecular genetics and genome editing tools to understand how eukaryotic translation initiation regulates and molds the cellular proteome. By integrating his approaches with powerful cancer models, he seeks to understand how translation can be targeted as a vulnerability in cancer progression and drug resistance.

Patricia Pelufo-Silveira, Associate Professor, Psychiatry
Dr Silveira's research focuses on how perinatal and early-childhood environments can shape and modulate both health and disease across the lifespan, into old age. Her aim is to identify genetic/epigenetic markers that interact with environmental adversities in childhood, modifying endophenotypes (impulsivity, sensitivity to reward, food choices) that ultimately affect healthy growth and neurodevelopment, increasing an individual's risk for developing chronic diseases and mental illnesses across their lifespan.

Ciro Piccirillo, Professor, Microbiology and Immunology
Prof. Piccirillo leads the Centre of Excellence in Translational Immunology at the McGill University Health Centre. His research program focuses on the immune regulation of autoimmune and infectious diseases mediated by naturally occurring CD4+ regulatory T cells. The laboratory uses state-of-the-art molecular, proteomic, biochemical, cellular and imaging approaches to characterize the behaviour of nTreg cells in health and disease.

Salman Qureshi, Associate Professor, Division of Experimental Medicine
Prof. Qureshi's research focuses on identifying and characterizing molecules that are essential for protection against progressive respiratory and/or systemic infection (pneumonia and sepsis) using mouse models that accurately represent human disease. His laboratory uses genetic approaches to identify host susceptibility factors and combine these with detailed immunological analysis of the defective genes and their respective pathways. He is also developing protocols to study these molecules in critically ill patients with severe infections.

Janusz Rak, Professor, Department of Pediatrics
Prof. Rak leads the Centre for Applied Nanomedicine, a world-class research project and nanomedicine centre at the forefront of studies aiming to exploit mechanisms of cellular regulation and communication through nanosized extracellular vesicles or particles structures. He has a particular interest in TF, a molecule that can simultaneously cause vascular growth and blood clotting. His team works to develop strategies to treat cancer by blocking the production and activity of TF.

Brent Richards, Professor, Human Genetics, Epidemiology and Biostatistics
Prof. Richards' research interest is identifying the genetic determinants of common endocrine diseases and using this information to improve clinical care. His studies generally involve whole-genome sequencing and/or GWAS for gene identification of tens of thousands of individuals around the world. He is translating the results to patient care through Mendelian randomization (which studies the effect of modifiable exposures on disease), pharmacogenetics and early drug development programs with industry.

Guy Rouleau, Professor, Neurology and Neurosurgery
Dr Rouleau is Director of The Montreal Neurological Institute-Hospital and Chair of the Department of Neurology and Neurosurgery at McGill. He studies genetic diseases and disorders of the brain, and his research focuses on discovering the underlying basis/causes of these diseases to find new treatments.

Pedro Rosa-Neto, Associate Professor, Neurology and Neurosurgery
Pedro Rosa-Neto, MD, PhD, is a clinical neurologist who is interested in the structural changes that occur in the brain as a result of neurodegenerative disease, such as Alzheimer's disease. His studies involve using brain-imaging techniques including positron emission tomography (PET) and magnetic resonance imaging (MRI) to observe and measure these changes.

Erwin Schurr, Professor, Microbiology and Immunology
Prof. Schurr is studying the genetic factors that predispose to tuberculosis and leprosy, two important mycobacterial infections that affect and kill an estimated three million people each year. An important aspect is the identification of host gene variants that determine the protective efficacy of present and newly developed tuberculosis vaccines; the only effective and workable approach to break the transmission cycle of tuberculosis is the availability of a universally efficacious vaccine.

Eric Shoubridge, Professor, Human Genetics
Prof. Shoubrige is Departmental Head of Human Genetics. His research interests lie in the identification and characterization of genetic defects associated with mitochondrial oxidative phosphorylation deficiencies in both adults and children by deciphering the function of nuclear encoded mitochondrial proteins and their role in mitochondrial disease pathology at a molecular level.

George Thanassoulis, Associate Professor, Cardiology
Prof. Thanassoulis' research focuses on cardiovascular prevention with the goal of using genomic and molecular epidemiology to better inform preventive strategies for the general population, as well as identifying personalized preventive strategies to maintain cardiovascular health in genetically predisposed individuals. Most recently, he has co-led an international consortium that completed the first genome-wide association study for aortic valve disease, which identified an unusual form of cholesterol known as lipoprotein(a) as one of the first causal factors for the development of the disease.

Patricia N. Tonin, Associate Professor, Human Genetics
Prof. Tonin research focuses the role of hereditary and somatic genetic factors in high-grade serous ovarian carcinomas. Her studies involve the characterization of genes in the germline of women with the hereditary form of ovarian cancer or in cancer specimens to improve understanding of the biology ovarian cancer as well as provided biomarkers for clinical management.

Gustavo Turecki, Professor, Psychiatry
Prof. Turecki is the Scientific Director of the Douglas Research Centre and heads the McGill Group for Suicide Studies. He conducts studies to better understand the characteristics of individuals who are susceptible to major depression and suicidal behaviours, focusing on early development, personality traits and neurobiological factors, with particular attention to how the environment interacts with the

genome to increase risk. He is involved with investigating the role of epigenetic risk factors, and particularly, how life experience changes gene function and increases risk for suicidal behaviour. Prof. Turecki is the director of the McGill Group for Suicide Studies (MGSS), a center comprising eight independent investigators and carrying out multidisciplinary studies on suicide, including the study of biological, behavioural, clinical and psychosocial risk factors for suicide. The MGSS manages the Quebec Suicide Brain Bank, which provides tissue for post-mortem work on suicide and mental illnesses.

Donald Vinh, Associate Professor, Department of Medicine, Division of Experimental Medicine
Prof. Vihn's research focuses on identifying how genetic defects of immunity predispose patients to infectious diseases. His research program is distinguished by the unique ability to bring patients (and relevant family members) with unusual, severe or recalcitrant infections into the laboratory and meticulously study them, through state-of-the-art genomic and functional immunologic studies and model systems, to delineate fundamental principles of human immunobiology.

Jackie Vogel, Assistant Professor, Biology
Prof. Vogel leads McGill's Integrative and Quantitative Biology Initiative. Her research focuses on the temporal and spatial control of the assembly and function of the cell division machinery. The goal of the research is to measure the physical properties of the mitotic spindle during its assembly and in mitosis, relate these properties to its function in living cells, and discover the molecular origins of chromosome inheritance and loss.

Jérôme Waldsispühl, Associate Professor, Computer Science
Prof. Waldsispühl conducts research in computational molecular biology with a particular interest in RNA structural bioinformatics and cheminformatics. He also develops applications of crowdsourcing and human-computing techniques to bioinformatics, a field of research he helped pioneer with a citizen science video game, Phylo DNA Puzzles, and more recently with the DNA Puzzles project.

Ian Watson, Assistant Professor, Department of Biochemistry
Prof. Watson's research focuses on understanding how mutated genes identified in next-generation sequencing studies promote melanoma disease progression. He is identifying new melanoma genes in patient samples with unknown genetic causes of disease, mutated genes that promote metastatic spread, and molecular features of melanomas that influence response to current treatment modalities. Prof. Watson is a leader of the Terry Fox Marathon of Hope national program in cancer genomics.

Jianguo (Jeff) Xia, Associate Professor, Microbiology and Immunology
Prof. Xia's research focuses on big data analytics (metabolomics, RNAseq, microbiomics, chemoinformatics and biological networks) to understand gene-environment interactions, within the context of diet, microbiome, infectious agents and environmental chemicals. He has three main research areas: (i) new-generation bioinformatics platform development; (ii) transcriptome-metabolome-microbiome data integration; and (iii) systems biology study on host, diet and gut microbiome interactions using a C. elegans model.

C. INTERNATIONAL ASSOCIATE MEMBERS AND THEIR AREAS OF CONTRIBUTED EXPERTISE

Marc Dumas, Chair Systems Medicine, Imperial College London, UK
Metabolomics for systems medicine

Dominique Gauguier, Director of Research, INSERM, Paris, France
Functional genomics of multifactorial diseases

Elin Grundberg, Chair Genomic Research, Children's Mercy Hospital, Kansas City, US
Genetics and epigenetics of obesity and metabolic disorders

Jemma Hopewell, Professor, Nuffield Department of Population Health, University of Oxford, UK
Genetic epidemiology of cardiovascular disease

Atsuko Imai-Okazaki, Division Head, Genomic Medicine Research, National Center for Global Health and Medicine, Tokyo, Japan
Genetics of mitochondrial disease in children

Kimia Kahrizi, Professor, Genetics Research Center, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran
Brain malformation in intellectual disability and micro cephalic patients; medical genetics in isolate populations

Tomi Pastinen, Director, Center for Pediatric Genomic Medicine, Children's Mercy Hospital, Kansas City, US
Functional genomics; genetics and epigenetics of pediatric diseases

Anavaj Skakuntabhai, Head, Functional Genetics of Infectious Diseases, Pasteur Institute, Paris, France
Host/pathogen genomics

APPENDIX 4. LETTERS OF SUPPORT

Alan Bernstein, CIFAR, CA Prof. Bernstein was inaugural President of the Canadian Institutes of Health Research, where he oversaw the transformation of health research in Canada and championed women, early career scientists, and the importance of interdisciplinary team research. In 2012, he became the president and CEO, a Canadian-based global research organization that brings together teams of top researchers from around the world to address important and complex questions.

Rod McInnes, LDI, CA Prof. McInnes is the Iva Chair in Human Genetics, Professor of Human Genetics and Biochemistry, and Senior Investigator at the Lady Davis Institute of the Jewish General Hospital, all of McGill University. Previous he was the Inaugural Scientific Director of the Institute of Genetics of the Canadian Institutes of Health Research (CIHR), acting President of CIHR (2017-18), and Scientific Director of the Lady Davis Institute (2009- 2021).

Mark Caulfield, Barts Life Sciences & St. Mary's University, UK From 2013-2021, Prof. Caulfield served as the founding scientific director of Genomics England, and led the UK 100,000 Genomes sequencing project within the UK National Health Service. In July 2021, he became CEO of Barts Life Sciences and Vice-Principal for Health at St. Mary's University in London, UK.

Michael Boenke, University of Michigan, US Prof. Boenke is Director of the University of Michigan Center for Statistical Genetics and Genome Science Training Program, past Co-director of our University of Michigan Precision Health Initiative, and past external advisor for the Canadian STAGE Training Program in Advanced Genetic Epidemiology. He is statistical geneticist with research focus on the genetics on human health and disease, a member of the National Academy of Medicine, and a Fellow of the American Statistical Association and the American Association for the Advancement of Science.

Monica Justice, SickKids Research Institute, CA Prof. Justice is a world expert in mouse developmental genetics. She is Head of the Genetics & Genome Biology Program at SickKids Hospital in Toronto where she leads a high impact team of scientists that uses genetics and genomics to understand genetic and environmental influences on disease, and translates that knowledge to improve child health through treatment or prevention strategies.

Kathy Siminovitch, University of Toronto, CA Prof. Siminovitch is a geneticist whose had made major research contributions on the molecular mechanisms underpinning development of immunologic disease. She is a Professor of Medicine at the University of Toronto and serves as the Director of the Lunenfeld's Genomic Medicine Program and the Fred A. Litwin Family Centre of Genetic Medicine at Mount Sinai Hospital, and the University Health Network (UHN).

Laurent Abel, INSERM, FR Prof. Abel is one of the world's leading experts in infectious disease genetics. He is Director of Research (DRCE) at the Inserm in France, Head of the Laboratory of Human Genetics of Infectious Diseases at the Imagine - Institute of Genetic Diseases, and holds a prestigous visiting Professorship at The Rockefeller University.

Stephanie Debette, University of Bordeaux, FR Prof. Debette is internationally recognised for her research as a neurologist working on stroke and dementia. She is Vice-President for External Relations, University of Bordeaux & Director of the Bordeaux Population Health research Center, and has been instrumental in establishing bilateral relationships between Bordeaux and McGill such as the dual degree program in Population Health Methods and Data Sciences.

Steve Robbins, LDI Prof. Robbins is a leading cancer researcher and serves as the Scientific Director of the CIHR, Institute of Cancer Research. In 2021, he was appointed as Director of the Lady Davis

Institute of the Jewish General Hospital, and he holds Glaxo Smith Kline Chair in Pharmacology and Professor in the Gerald Bronfman Department of Oncology at McGill University

Rhian Touyz, Director RI-MUHC, CA Prof. Touyz is recognized internationally as an authority in vascular biology and hypertension principal research focus relates to molecular, cellular and vascular mechanisms of hypertension. In March 2021, she was Executive Director and Chief Scientific Officer of the Research Institute of the MgGill University Health Centre.

Guy Rouleau, MNI, CA Prof. Rouleau is a proposed Associate Member of the Institute but writes here in his role as Director of The Neuro (Montreal Neurological Institute-Hospital).

Gustavo Turecki, Douglas Institute & Department of Psychiatry, McGill, CA Prof. Turecki is a proposed Associate Member of the Institute but writes here in his roles as the Scientific Director of the Douglas Institute a major research grouping at McGill, and Professor and Chair, Department of Psychiatry, McGill University.

Eric Shoubridge, Departmental Head of Human Genetics, McGill, CA Prof. Shoubrige is a proposed Associate Member of the Institute but writes here in is his role as the Head of Human Genetics.

Lon Cardon, Jackson Laboratory, US L. Cardon is a leading human statistical geneticist who has led research on translation of genetic research regarding the causes of human diseases into improved medical treatments at leading academic institutions (U. Oxford in the UK; Fred Hutchison Cancer Research Centre in the US), and in the pharmaceutical industry (Senior Vice President at GlaxoSmithKlin; Chief Scientific Officer at BioMarin Pharmaceutical). In October 2021, he was named President and CEO of the Jackson Laboratory, a world-leading non-profit biomedical research institution.

Michel Georges, GIGA, University of Liège, BE M. Georges is internationally acclaimed for research in the field of medical and animal genetics and genomics. He is director of GIGA, the University of Liège's interdisciplinary research institute in the biomedical sciences, housing more than 600 scientists focusing on the development of health solutions for the benefit of the patients.

Mathias Uhlén, Royal Institute of Technology, SE M. Uhlén is a world-renowned for his innovations in proteomics and biotechnology, and he heads the international effort to systematically map the human proteome and transcriptome (the Human Protein Atlas project). Between 2010-2015, he was the founding Director of the Science for Life Laboratory (SciLifeLab) the Swedish national center for molecular bioscience.

Piero Carninci, RIKEN Center for Integrative Medical Sciences, JP P. Carninci is a world-leading innovator in genomics renowned for his contributions to transcriptomics, epigenomics and single-cell biology. He heads RIKEN laboratories for transcriptomic and single-cell technologies, and leads the international FANTOM project, a collaborative endevour that is making major advances in understanding how our genes are transcribed into RNA and what roles those RNAs play in the body.

Drs. Mark Lathrup and Philippe Gros,
McGill University,
Montreal, Quebec
Canada

Dear Mark and Philippe,

Thank you for sharing the proposal to create the McGill Institute for Genomic Medicine (the MIGM). In your letter, you asked me for my frank views on the vision for the Institute, its likelihood for impact on health care, public health and the economy, research and training across the McGill family, opportunities for interdisciplinary research across the biomedical, social, physical and quantitative sciences, building on existing strengths at McGill, Quebec and Canada, and as a tool for international collaborations and recruiting outstanding new faculty.

Attached please find my letter in strong support of your compelling and timely vision for such an institute at McGill. The proposal does not include an estimate or justification for funds that are likely to be required to realize the vision for the Institute. Without these financial details, it was difficult to assess the true scope and ambition for the proposal and I would therefore suggest that perhaps in the next version, such details be included.

Thank you for the opportunity to read your exciting proposal.

Best,
Alan
Alan Bernstein O.C., OOnt., Ph.D, FRSC/MSRC, FCAHS
President & CEO / Présidence et Direction générale
CIFAR

Drs. Mark Lathrup and Philippe Gros,
McGill University,
Montreal, Quebec
Canada

Dear Mark and Philippe,

Thank you for sharing the proposal to create the McGill Institute for Genomic Medicine (the MIGM). In your letter, you asked me for my frank views on the vision for the Institute, likelihood for impact on health care, public health and the economy, research and training across the McGill family, opportunities for interdisciplinary research across the biomedical, social, physical and quantitative sciences, building on existing strengths at McGill, Quebec and Canada, and as a tool for international collaborations and recruiting outstanding new faculty.

I will address the above points below. Let me say at the outset that I found the document to be outstanding and compelling. It articulates a clear and strong vision for genomics and genomic medicine at McGill. It makes an exceptionally strong case that genomics science has now

matured to the point where it has become a, if not the, main driver of fundamental advances in the biomedical sciences, in clinical science and clinical trials, and a major force in the evolution of the biopharmaceutical industry.

Some context first: Biomedical research has gone through at least two revolutions since WWII. The first revolution was the transformation of biological research from a descriptive to a mechanistic science, starting with the discovery of the double helical structure of DNA, the birth of molecular biology and the subsequent elucidation of the molecular basis of heredity and control of gene expression. The second, more recent revolution has been the coupling of high throughput genomics with data science. This current revolution is built on the convergence of powerful advances in high throughout genomic technologies coupled with remarkable advances in our ability to analyze, annotate and make sense of large amounts of data using bioinformatics, AI and increasingly powerful computing technology.

Without doubt, the major challenges and opportunities that lie ahead for biomedicine will come from this new understanding emerging from the convergence of genomic and data science, coupled with other areas of research including imaging technology, drug development, clinical trial design and population-wide studies that build on the natural variation in both genotype and phenotype in the human population. To succeed, an initiative as broad as the proposed MIGM require four overarching conditions:

- a critical mass of research excellence across career stages;
- a culture that encourages collaboration and interdisciplinarity, building on but existing strengths across McGill and its hospital-based research institutes;
- the financial support necessary to transform a bold and aspirational vision into reality;
- enlightened leadership that includes both highly respected senior investigators and highly promising younger investigators.

Scope of the proposed science:

The MIGM proposal envisions 7 areas of focus. They include: the application of precision and personalised medicine to chronic diseases such as aging, cancer, and inflammatory diseases; developing a campus-wide initiative on emerging infectious diseases and within that the role of the microbiome in affecting susceptibility to disease; developing new drugs and other treatments for disease; catalysing the application of AI and computational methodologies to disease diagnosis and treatment; building on this science to recruit new faculty and establish international collaborations and partnerships; developing and modernizing the training of the next generation of scientists and physicians; contributing to policy development and the social and ethical issues coming out of this new science, and serving as a natural home for a good deal of Canada's national genomics research infrastructure.

In each of these areas, the proposal builds on existing scientific strengths at McGill and its affiliated research hospitals and McGill's considerable and internationally recognized strengths in the social sciences and in AI and computer science.

Impact on McGill's scientific performance

Nature and other publications have repeatedly documented that the most impactful science is increasingly carried out by interdisciplinary teams of investigators. The reasons are evident: the major challenges facing science and humanity today are complex and lie at the boundaries between disciplines. Outstanding individual investigators will always be at the very centre of science but their research, increasingly, will and indeed already is performed within large interdisciplinary teams.

What does this mean for universities like McGill? Universities traditionally and historically have a vertical, discipline-based culture which still serves as a strong base for faculty. But forward-looking universities are asking how they can build on these discipline-based departmental structures to develop horizontal structures that are problem- or mission-based and cut across the laboratory, data and social sciences. The MIGH provides an outstanding opportunity for McGill to do just that: build on its existing strengths across not just the Faculty of Medicine but across the university and hospital research institutes to create a new structure whose goal is to combine genomics with clinical medicine, data, and social sciences to catalyze new collaborations and new teams at the leading edge of health research.

Recruiting new scientific talent

In my experience, great scientific talent is attracted to institutions where there is already a critical mass of collegial, collaborative, and outstanding colleagues, ongoing science at the leading edge and addressing the most interesting questions of the day, combined with attractive, competitive start-up packages.

The creation of the MIGH offers an exceptional opportunity to create exactly that sort of draw for new faculty. Coupled with McGill's outstanding reputation as an international university with exceptional undergraduate and graduate students in a highly livable cosmopolitan city, the creation of the MIGH has the potential to create an unbeatable set of conditions for recruiting top scientific talent.

Training and education

Throughout my career, I have interacted with many outstanding young people. They share several things in common: they want to change the world, they are exceptionally smart and fearless, and they have an unerring nose for where future exciting areas of science are and will be. McGill needs to attract and retain these young people and make sure they receive the experience they seek, whether as an undergrad, graduate or medical student or clinical fellow. The first revolution in biomedicine discussed above was notable for the influx of large numbers of young people from the physico-chemical sciences (myself included). The current revolution is being driven by the influx of young people from mathematics, computer sciences and the social sciences. Modernization of how we educate and train young people at all levels in this new environment has become a great opportunity for McGill to lead the way in thinking about this challenge. The launch of the MIGH with a mandate to develop new interdisciplinary courses that embrace this new science provides an exciting opportunity for McGill.

Impact on Clinical Care, Public Health and on Public Policy

Genomic medicine has already begun to revolutionize disease diagnosis and treatment for certain diseases. Cancer treatment has gone from an empirical exercise in which cancer patients are treated with drugs notable for their slightly selective toxicity for cancer cells over normal cells to a highly scientific one in which at least for some cancers, the patient's cancer genome is sequenced, and treatment decisions are made based on the suite of genes that are mutated in that individual's cancer cells.

That sea-change is rapidly accelerating for other diseases. The current pandemic provides a superb example of genomic medicine, when combined with data science, at its most powerful. From mRNA vaccines based on the sequence of SARSCoV-2 to genomic surveillance to detect newly emerging variants and to conduct epidemiology at the molecular level, genomics has revolutionized infectious disease and public health. McGill is playing a leading role in this revolution with the genomic surveillance work that Guillaume Bourque leads for the country and the research that Jesse Shapiro is doing on mathematical modelling of the pandemic. The impact on public policy has been profound and the public hang on every word scientists say during the nightly news, every night for the past 600 days. That unprecedented impact speaks both to the seriousness of the current situation and the fact that scientists have something to say, a direct result of the combined power of genomics and data science and its huge bearing on public health and public policy.

It is no great prediction to say that the impact of genomics and data science on the practice of medicine will profoundly increase in the coming decades. The precise form this journey will take is not clear but what is already clear is that medicine and public health will be revolutionized as a result. The ultimate beneficiaries of this revolution will be the public. It will be those universities, hospitals and countries that lead in this revolution that will also benefit both from the impact of their research on health care and from the economic development that develops out of that science.

Resources required

Your letter requesting my views on the MIGM proposal does not include an estimate of the resources necessary or requested to realize the vision articulated in the proposal. Without these financial details, it was difficult to assess the true scope and ambition for the proposal. I would therefore suggest that, in the next version, such details be included.

Having said that, I note that it would be easy but of questionable value for McGill to launch the MIGM without ensuring that significant new resources are available to realize the vision and achieves the impact and success that I am sure McGill desires if it decides to go ahead. Without details, it is impossible for me to put even an approximate number on either the Chevrolet or BMW versions of such an institute. But the categories of incremental expenses are clear. They include the costs of infrastructure (equipment, new building?), faculty and support personnel, start-up funds, internal grant funds to catalyze interdisciplinary collaboration, external seminar and international meeting funds, training grants, etc.

Summary

The proposal to create a university-wide interdisciplinary program in genomics and data science as applied to medicine is both timely and exciting. The MIGM builds on McGill's prior investments and strengths in genomics and in clinical medicine, the clinical research ongoing at its affiliated hospital-based research institutes, and the unique strengths in AI and data science at McGill. While these strengths are necessary, they are not sufficient. Success depends on a commitment to create a culture of interdisciplinary research in which distinct areas of science converge around significant challenges in biomedicine utilizing the combined power of genomics, data and social sciences. The MIGM holds great promise to accomplish these ambitious goals and I therefore am very enthusiastic about this proposal. It is timely, builds on campus wide strengths at McGill and its affiliated hospital-based research institutes and has the potential to transform the delivery of health care.

Yours sincerely,

Alan

Alan Bernstein O.C., OOnt., Ph.D, FRSC/MSRC, FCAHS
CIFAR
President & CEO / Présidence et Direction générale
E: alan.bernstein@cifar.ca T: 416-971-4255

Hôpital général juif
Jewish General Hospital

McGill

Institut Lady Davis de recherches médicales | Lady Davis Institute for Medical Research

Feb.1, 2022

Dr. Mark Lathrop, Director, McGill Genome Centre
Dr. Philippe Gros, Deputy Vice-Principal (Research and Innovation)
McGill University

The McGill Institute of Genomic Medicine

Dear Mark and Philippe,

It gives me great pleasure to strongly support the Faculty of Medicine's initiative to establish a McGill Institute of Genomic Medicine (MIGM).

In my present role as the Alva Chair in Human Genetics at McGill, and in former roles as President of the American Society of Human Genetics (2010), inaugural Scientific Director of the CIHR Institute of Genetics (2000-2010), and Acting President of the Canadian Institutes of Health Research (CIHR) (2017-2018), I have become very familiar with the Canadian and international genetics/genomics research communities and the central role of genomics in modern biomedical research and health care.

I will comment on four issues related to the MIGM proposal:

1) Genomics research is now at the very forefront of both biomedical research and healthcare.

2) McGill has all the components in place to create an internationally prominent genomics institute.

3) All leading academic institutions around the world have invested huge resources and effort in genomic research and genomic medicine.

4) The McGill Institute of Genomic Medicine would allow McGill to remain at the forefront of this rapidly evolving area.

1) Genomics research is now at the very forefront of both biomedical research and healthcare.

Genomics has become a dominant science in driving innovation in health research and patient care, and a major recipient of massive government and private sector funding in the US, UK, Europe, Japan and China. Genomic medicine is now prominent in almost every issue of the leading journals in biomedical science and health care: the *New England Journal of Medicine, The Lancet, Science, Nature and Cell*; virtually every issue is replete with transformative genomics discoveries.

2) McGill has all the components in place to create an internationally prominent genomics institute.

The worldwide development of medical genomics was possible only through essential contributions from other fields of science. Each of these other fields has strength at McGill, including

i) Large scale DNA sequencing technologies, developed by the private sector. The most up-to-date sequencing machines are in use at the *McGill Genome Centre* (led by Mark Lathrop). It is one of three national high-throughput sequencing centres funded by the *Canadian Foundation for Innovation* (CFI);

ii) Computational biology *and* the qualitative life sciences, for which the *McGill Genome Centre* is also the major location on the campus, but other departments and the hospital institutes also have talent in these fields. These two fields of research are essential to interpreting the unprecedented and massive amount of data generated from the DNA sequencing.

iii) The immediate recognition by healthcare providers of the impact of genomics on medical diagnosis and treatment, leading to an increasing number of physicians and genetic counsellors who can interpret and apply genomic knowledge in the clinic. The McGill hospitals all have strong teams who employ genomic knowledge on a daily basis to provide personalized health care.

The major clinical beneficiary of genomics over the past two decades has been cancer, where genomics now routinely defines the diagnosis and guides treatment, including the specific subtype of cancer the patient has and the particular combination of drugs that will be most effective. This example is a powerful illustration of personalized medicine at work, medicine tailored to the individual. McGill has world leaders in the clinical applications of genomic medicine, the outstanding example again being in cancer. For example, McGill is home to three internationally recognized leaders in breast cancer diagnosis and treatment: Will Foulkes (*JGH and MUHC*) who has advanced knowledge of inherited forms of breast and ovarian cancer, and Mark Basik (*Segal Cancer Centre*) and Morag Park (*Goodman Cancer Institute*) who studies the cellular basis of cancer metastasis and response to treatment.

iv) Outstanding internationally recognized faculty. Human genetics and genomics at McGill have always been held in the highest regard internationally, exemplified historically by past leaders such as Clarke Fraser, Charles Scriver (both past-Presidents of the American Society of Human Genetics) and Tom Hudson, and by current faculty including Mark Lathrop and Philippe Gros (the authors of the MIGM proposal), Bartha Knoppers, Guy Rouleau, Will Foulkes, Eric Shoubridge (the Chair of the Dept. of Human Genetics), and many others. Moreover, McGill has great strength in mouse genetics, a major complement to human genetics that facilitates experimental analysis of human genetic discoveries. For example, the *McGill Research Centre on Complex Traits* is a leading centre that explores mechanisms of human immunological and infectious diseases using murine models. In addition, Vincent Mooser, the *Canada Excellence Research Chair*, has recruited an impressive team of

researchers to identify novel potential drug targets using genomic analyses of the Quebec population.

3) The leading research institutions around the world have invested huge resources and effort in genomic research and genomic medicine.

In contrast to the leading medical schools around the world, no Canadian university has a genomics institute or anything analogous to it. The exemplars are the Broad Institute of MIT-Harvard and the five Harvard teaching hospitals, and the McKusick-Nathans Institute of Genomic Medicine at Johns Hopkins. In these and other institutions the genomic institutes facilitate regular interactions between basic laboratory researchers and clinicians that can impact healthcare with an immediacy that was previously unimaginable – think Covid and the development of vaccines to control the current pandemic.

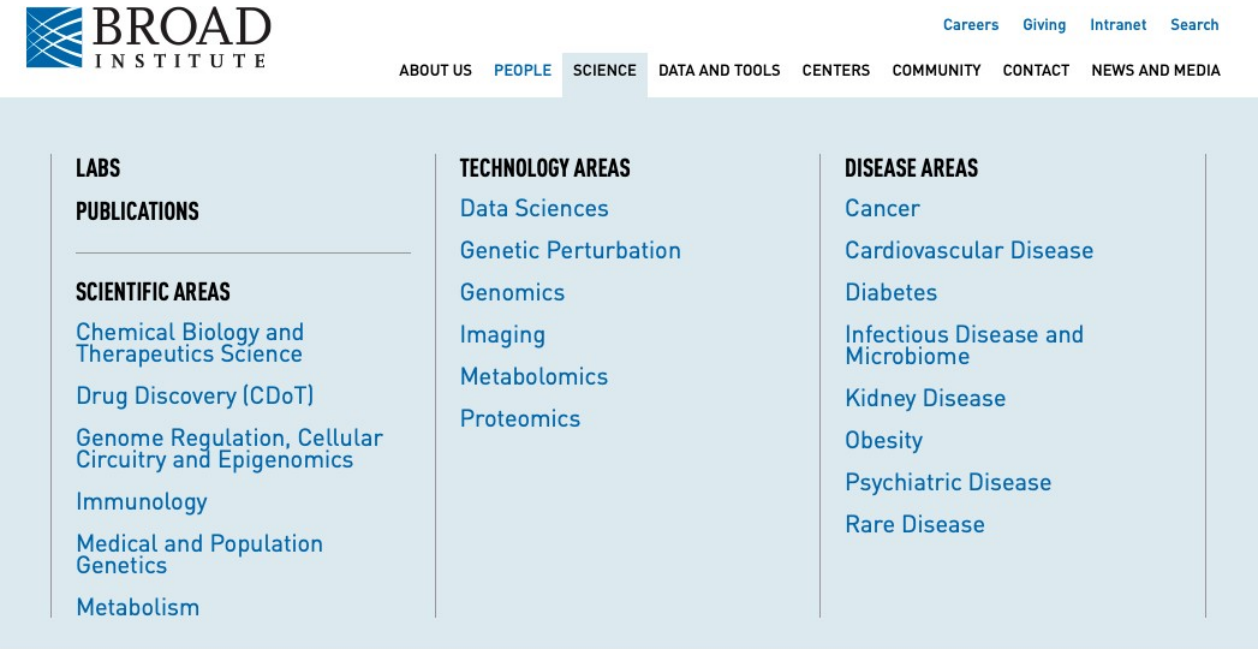
4) A McGill Institute of Genomic Medicine would allow McGill to remain at the forefront of this rapidly evolving area, building on McGill's excellence in genetics, genomics and in clinical medicine.

I am firmly convinced that McGill must now build on its remarkable legacy in genetics/genomics to remain internationally competitive in this preeminent area of medical research and healthcare. The advantages of creating a cohesive critical mass of interacting genomics researchers of all types are numerous. *First*, it would facilitate the organization of regular scheduled interactions and meetings between basic researchers, clinical researchers, clinical geneticists and others. Such face-to-face interactions are central to the on-going education of researchers in fast-moving areas of science. Clinically oriented investigators will learn what is happening in genomics at McGill and around the world, and basic scientists will better appreciate the challenges that arise in the clinic, challenges that would benefit from a genomic approach.

Second, with the impressive reputation of its McGill faculty and resources, the MIGM would act as a powerful magnet to attract new graduate students and postdoctoral fellows. The MIGM website would also be a major recruiting tool for new faculty, since websites are now the first place potential candidates and trainees examine when searching for positions. An MIGM website would bring together many current McGill websites under one roof that would encompass faculties, departments and institutions, enhancing their individual visibility by being part of an impressive whole. Furthermore, by organizing and holding international symposia and training programs in genomics, the MIGM would become a major ambassador for McGill's strength in genomics in medicine, increasing the international profile of the genomic research in all the participating McGill institutions.

Third, the MIGM would be a unifying force on the campus, bringing together faculty in any discipline with an interest in genomics. The resources and expertise required to undertake genomic research would be available to any interested individual or department. The

interdisciplinarity required to undertake basic genomic research and apply genomics to medicine is almost unprecedented in medical research. The diversity of research programs at the remarkable MIT-Harvard Broad Institute is a model of the possibilities. The Figure below from the Broad website captures a snapshot of its activities.



It is likely that the MIGM will be of great benefit not only to the Faculty of Medicine but to other faculties as well, involving for example the following types of researchers:

· Biologists with expertise in genomics and related large-scale multiomic technologies to generate genome data, along with knowledge of genetics, RNA science, immunology, inflammation, microbiology, etc. needed to link these data genome function.

· Clinicians who can identify the patients and clinical parameters to study, and who can translate the results into medical applications.

· Epidemiologists experienced with handling and interpreting environmental and health data, and for combining this with genomics to understand gene/environment interaction.

· Social scientists to evaluate these social-environmental factors in the context of genomics, to explore the effects of targeted life-style and other interventions, and to provide the legal/ethical framework.

· Bioengineers and chemists to expand the technology base and to help with pharmaceutical development.

· Data scientists with the knowledge to develop and apply quantitative and computational methods for "big data" analysis, and provide the linkages between data sources from genomics to health.

In closing I should add that the MIGM initiative is being led by two of McGill's leading researchers, both of whom have deep knowledge of the science involved and impressive leadership experience.

Yours sincerely,

Roderick R. McInnes, CM, OOnt, MD, PhD, FRSC, FCAHS
Alva Chair in Human Genetics
Director Emeritus
Lady Davis Institute
Jewish General Hospital
Professor of Genetics and of Biochemistry
McGill University

Professor Sir Mark Caulfield
MD FRCP FAHA FBHS HonFPharmacol FMedSci
Vice Principal for Health
Queen Mary University of London
Charterhouse Square
London EC1M 6BQ
m.j.caulfield@qmul.ac.uk

Executive Assistants: Clare Birch
Tel: 020 7882 3402
clare.birch@qmul.ac.uk

Profs Mark Lathrop and Philippe Gros,
Director of the McGill Genome Centre & Philippe Gros, Co-Director of the McGill Research Centre on Complex Traits
740 Dr Penfield Ave,
Montreal, Quebec,
H3A 0G1
Canada

7th January 2021

Dear Mark and Philippe

Re: The proposed McGill Institute of Genomic Medicine.

I write in the strongest possible support of the proposal by Professors Lathrop and Gros to establish the McGill Institute of Genomic Medicine. During my leadership of the 100,000 Genomes Project I visited McGill and was hugely impressed by the potential to link across your faculty with forefront leadership of world-class genomics, biology, clinical research, computational, quantitative sciences and social and ethical policy setting. This is a crucial time in genomics where the value will only be fully realised if we integrate genomics and multiomics with key multi-disciplinary focused teams that provide the missing functional characterisation including human and model organisms that convert a genetic variant into biology and a clinical diagnosis. McGill is extremely well-placed to do this through this new institute and if you then add the opportunity from uniting this research endeavour with your linked hospitals in Quebec you have the ideal ecosystem to mobilise your research findings and march these into direct precision healthcare of patients across Canada.

In my experience of visiting multiple centres worldwide McGill is extremely well placed to drive research into implementation across Quebec and has the vital international links to ensure success. Through your leading role as one of the CGEN sequencing centres in Canada you have the technological infrastructure and the vital human capacity to be in global vanguard of precision healthcare. In my view the moment is now for a centre in Canada to combine it's talent base and take a leading role for the nation in driving genomics into healthcare and such an initiative could compete with the best in the world.

The McGill team have already recognised the huge value of integrating big data and multi-omics (combining genomics, epigenetics, transcriptomics, proteomics and metabolomics) to leverage biological insights that a single approach may not achieve. If I may humbly suggest Canada needs a Genomics centre with real critical mass, concentrated in a single multidisciplinary institute, and if McGill do not seize this opportunity then it is likely that Toronto or Vancouver will occupy this space and that would be a missed opportunity to create synergy at your university and for Canada.

Yours sincerely,

THE UNIVERSITY OF MICHIGAN
SCHOOL OF PUBLIC HEALTH
DEPARTMENT OF BIOSTATISTICS

1420 WASHINGTON HEIGHTS, SPH II
ANN ARBOR, MICHIGAN 48109-2029

December 22, 2021

Mark Lathrop, Director of the McGill Genome Centre
Philippe Gros, Co-Director of the McGill Research Centre on Complex Traits
740 Doctor Penfield Avenue
Montreal, Quebec H3A 0G1 Canada

Dear Mark and Philippe:

I am writing to express my strong support and enthusiasm for your proposed Institute focused on research and training in genomic medicine at McGill. I am happy to do so. As Director of our University of Michigan Center for Statistical Genetics and Genome Science Training Program, past Co-director of our University of Michigan Precision Health Initiative, and past external advisor for the Canadian STAGE Training Program in Advanced Genetic Epidemiology, I think I bring a useful perspective to the importance of what you propose. McGill provides an outstanding location for this effort. Just as important, the two of you, with your combined expertise in human and mouse genetics and genomics, and strong scientific leadership experience and skills, will provide superb leadership for this effort. To introduce myself to your colleagues at McGill who might be reviewing this letter, I am a statistical geneticist with research focus on the genetics on human health and disease, a member of the National Academy of Medicine, and a Fellow of the American Statistical Association and the American Association for the Advancement of Science.

Genetics/genomics is without questions one of the most exciting area in biomedicine. This excitement is driven by impressive advances in technology, the sequencing of the human genome, the remarkable successes of genome-wide association studies (GWAS), and the development and application of a wide range of other omics tools. To take advantage of the opportunities presented by these advances, there is a clear need for institutes with a critical mass of investigators and trainees with a broad multi-disciplinary range of knowledge and interests. Central to these efforts is expertise in quantitative methods including statistics and computer science with the ability to develop tools and strategies to manage and interpret large complex datasets. Expertise in the social sciences also is required, to address ethical, legal, and social issues of data sharing, the role of life-style factors in human health and disease, and the policy implications that arise as we seek to take advantage of new knowledge. Bringing together investigators with this range of strengths has the potential for huge impact on both basic science and translation to medicine and public health.

McGill already has impressive strengths in these areas. Building this Institute will take advantage of these existing strengths and positively impact research performance by empowering McGill investigators to work together to tackle major challenges that are beyond the reach of individual research laboratories. At Michigan, forming our Center for Statistical Genetics had exactly this effect, bringing together relevant faculty, trainees, and staff, encouraging collaboration, and resulting in a

substantial increase in external (mostly US National Institutes of Health) research support that continues today >20 years after the Center's founding. Your new Institute would provide a superb critical mass of investigators to apply for funding under initiatives like the Canada First Research Excellence Fund (CFREF), allowing internal university resources to serve as a force multiplier.

McGill is already well known as an outstanding research and teaching institution in general and in genetics/genomics in particular. I was delighted when one of my own recent trainees, Daniel Taliun, joined your faculty as an assistant professor. Creation of this Institute will strengthen your reputation in the field and draw attention from the very best scientists at all career stages. Competitive start-up packages will further enhance your reputation and the ability to hire more outstanding faculty.

Creation of the Institute also has the potential to strengthen interdisciplinary education and training at the interface of biology, medicine, and the quantitative sciences. The Institute would encourage students from the life sciences or medicine by giving them multidisciplinary training that encompasses quantitative methods that are essential for career development. It would also expand training for those with quantitative backgrounds by providing an increased focus on the interface between large-scale biology and quantitative methods, and a corresponding environment to pursue research based around the latest technologies and corresponding data. I was particularly excited to learn of your plan to support highly promising students and post-doctoral trainees to undertake their research in an international context through formalized exchanges with Institutions in other countries.

In summary, I am highly enthusiastic about your proposed Institute, and look forward to seeing where this initiative leads. I wish you all the best with this important effort. Please do let me know if there is anything more I might do to be helpful.

Sincerely,

Michael Boehnke, Ph.D.
Richard G. Cornell Distinguished University Professor of Biostatistics
Director, University of Michigan Center for Statistical Genetics
Director, University of Michigan Genome Science Training Program

SickKids RESEARCH INSTITUTE

Monica Justice, PhD
Program Head and Senior Scientist
Genetics & Genome Biology Program
Professor of Molecular Genetics, University of Toronto
The Hospital for Sick Children, PGCRL
686 Bay Street RM 14.9716
Toronto, Ontario M5G 0A4 Canada

Phone: 416-813-7654 ext309199
Fax: 416-813-4931
Email: monica.justice@sickkids.ca

UNIVERSITY OF TORONTO

8 January 2021

Mark Lathrop, Director of the McGill Genome Centre
Philippe Gros, Co-Director of the McGill Research Centre on Complex Traits
740 Dr Penfield Ave,
Montreal, Quebec
H3A 0G1 Canada

Dear Mark and Philippe,

I am writing in strong support for the creation of the McGill Institute of Genomic Medicine (the Institute) that will be focused on research and training in genomics for medicine at McGill. McGill University has a long standing reputation in immunology and genomics, which will enhance a natural growth into this institute.

The scope of the scientific vision for the Institute is timely. Recent events on the world scene, such as the pandemic, have demonstrated the need for large scale genomic and multi-omic approaches to tackle immunology, infectious disease and inflammation biology. A genomic medicine institute that focuses on the genetics of immunology and infection will be poised to rapidly identify risk factors for susceptibility to infection and development of pathologies, providing urgent aid to the world population. Such an Institute can provide scientific critical mass, with broad multidisciplinary expertise in genomics and infectious disease, which will be uniquely powerful in the post-GWAS era of genetics.

The generation of huge amounts of data in nearly every field of biology and medicine require that computational methods play a greater role in defining interrelationships as they enable exploration and analysis of complex high-dimensional data. Thus, quantitative methodologies and strategies to manage and interpret large complex datasets will be an essential component of the Institute. The outcome will have an immediate impact on health care. Importantly, the proposal contains a social science component to address the role of life style factors, as well as issues of data sharing, legal and ethics questions, linking all of these to governmental policy. Importantly, many of Canada's leaders in ethical, legal and social issues will be members of the Institute.

The formation of the Institute will positively impact research performance of current faculty and trainees. As evidenced by the establishment of research nodes at other institutions, including The Broad Institute at MIT, providing critical mass for leading problems will empower McGill investigators

to work together to tackle major challenges that are beyond the reach of individual research laboratories. Increasingly, the complexity of data sets and scientific endeavours require that they must be tackled by a team of experts with differing expertise. Collaborations and funding opportunities are a natural outcome of providing research infrastructure and critical expertise. McGill's current investment in genomics enterprises has led to the successful funding of the collaborative CGEn National DNA Analysis Consortium and CIHR Epigenome Coordination Centres. Partnerships with the private sector are also a natural outcome of the recognition earned through expanding genomics programs that will have predictive value for pharmaceutical companies.

The Institute will increase the likelihood of recruiting top notch scientific talent. In my experience as a leader, critical mass is essential to future recruitment. Scientists with complementary or unique expertise from all career stages will be attracted to the accomplishments of existing investigators, opportunities for collaborative research, and competitive start-up packages created by the Institute. Tools and analytic methods provided by the Institute and its investigators will provide resources for productivity. The rich health care environment in Montreal will also ensure that impactful therapeutic discoveries will be made.

The Institute will strengthen interdisciplinary education and training at the interface of biology, medicine and the quantitative sciences. The Institute will allow McGill University to build on a strong PhD program in Quantitative Life Sciences, providing alternate career pathways for life science and medical students, which will allow them to gain essential multidisciplinary training that encompasses quantitative methodologies. Conversely, the presence of the Institute will link large-scale biology and medicine with quantitative methodologies, providing expanded biological training for those with quantitative backgrounds. Such training would be valuable in many contexts, as our own Hospital seeks those that can access and analyze large health datasets through the latest technologies. An important component of training is that the Institute will support research for highly promising students and postdoctoral trainees in an international context through formalised exchanges with Institutions in other countries, bringing multidisciplinary timely expertise back to Canada.

In summary, the establishment of the McGill Institute of Genomic Medicine will expand on strengths and infrastructure already present in Montreal, establish a unique focus in infection and inflammation in genomics, while ensuring that McGill continues to lead in the emerging field of the data sciences. I highly support this initiative, which will impact research throughout Quebec and Canada, as it will also increase international scientific recognition for Canada. I wish you all the best in your efforts to establish the Institute and look forward to working with you in the future.

Sincerely,

Monica J Justice, PhD
Program Head and Senior Scientist, Research Institute, SickKids
Professor, Department of Molecular Genetics, University of Toronto
Fellow, American Association for the Advancement of Science

Sinai Health | Lunenfeld-Tanenbaum Research Institute

600 University Avenue, Room 11D-400
Toronto, Ontario M5G 1X5
Dr. Katherine Siminovitch
Tel: 416-586-8723
Fax: 416-586-8731
Email: ksimin@mshri.on.ca

January 6, 2022

Mark Lathrop, Director of the McGill Genome Centre &
Philippe Gros, Co-Director of the McGill Research Centre on Complex Traits
740 Dr Penfield Ave,
Montreal, Quebec H3A 0G1
Canada

Re: Proposal to create McGill Institute of Genomic Medicine

Dear Drs. Gros and Lathrop,

It is my pleasure to write this letter indicating my strongest support for the creation of the McGill Institute of Genomic Medicine (the Institute). As you may know, I am a physician-scientist whose responsibilities include directing the University Health Network/Sinai Health System Clinical Genetics Service (the primary provider of clinical genetics care for adults in Ontario), the Clinical Genomics Centre (a provider of high throughput genotyping/sequencing services to academic members working in Ontario as well as other centres across Canada and the USA), and directing my own discovery research program in basic and translational immunogenomics. I am also a founder of Inagene, an Ontario-based pharmacogenetics service provider and am working closely with Regeneron Pharmaceuticals in their research aimed at leveraging genomic technologies for discovery of new drug targets. I am therefore very familiar with the national and international landscape in biomedical research and genomic medicine.

I begin my commentary by pointing out that despite the many world-class scientists working in this country, compared to other developed nations, Canada falls woefully short in relation to connecting its biomedical research excellence to medical and for that matter economic benefit. There are many reasons for this long-standing problem, but it is a problem that requires urgent resolution if Canadians are to reap the healthcare and socioeconomic benefits arising from the rapidly-evolving "omics" technologies. I believe the Institute that Drs. Gros and Lathrop propose to develop within the McGill academic milieu, represents an enormous opportunity to reposition this country's biomedical research enterprise so as to translate one of this country's greatest "natural" resources – its pool of first-rate biomedical scientists – into the discoveries that transform healthcare outcomes.

More specific rationale for creating this Institute at the current time are as follows:

1. The need for critical mass: In contrast to the science of yesteryear, omics technologies are optimally leveraged by tight integration of researchers with highly diverse areas of expertise.

Sinai Health | Lunenfeld-Tanenbaum Research Institute

600 University Avenue, Room 11D-400
Toronto, Ontario M5G 1X5
Dr. Katherine Siminovitch
Tel: 416-586-8723
Fax: 416-586-8731
Email: ksimin@mshri.on.ca

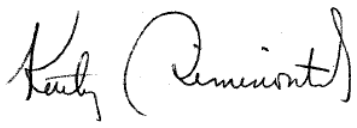
Improving the understanding and, by extension, treatment of debilitating complex diseases such as autoimmune, neoplastic and neurodegenerative diseases, requires the collective and integrally connected efforts of clinicians, immunologists, computational scientists, biomedical engineers and many, many others. The proposed Institute will provide a powerful and urgently-needed framework for consolidating this pool of diverse expertise so as to promote the level and depth of synergistic activity required for meaningful impact on the outcomes of chronic complex disease.

2. The potential for impact: The opportunity for science to reshape healthcare and health outcomes has never been greater than at the current time. Concepts such as personalized medicine, CRISPR-mediated disease treatment etc have been discussed intensely over this past decade, but the opportunity to move from the conceptual to reality has only just begun This situation largely relates to technology and computational advances which have made it possible to study complex human disease directly in humans in ways that were previously impossible – i.e. to move away from mouse modeling and to deeply interrogate the biology of disease in humans. We are witnessing a true paradigm-shift in biomedical research and it is only those institutions with the collective human "infrastructure" who will translate this potential into novel therapies that can more effectively treat, cure or even prevent the common diseases that continue to impose profound medical and socioeconomic burden across the population. The creation of this new Institute at McGill is, in my opinion, a prerequisite if McGill is to leverage its existing expertise so as to capitalize on this unprecedented opportunity to radically improve global human health

3. Impact on talent acquisition: To attract and retain the very brightest, an academic institution has to be among the very best. The Institute envisioned in this proposal, consolidating the world-class expertise and excellence that exists across McGill, will serve as a magnet for attracting and training the outstanding trainees who can drive the next-generation research needed to position Canada as a world leader in discovery and translational biomedical research.

In summary, I wish to convey my unequivocal support and enthusiasm for your compelling vision of a Genomic Medicine Institute at McGill – an enterprise that has enormous potential to reposition Canada at the global forefront of personalized, genomic medicine.

Yours sincerely,



Katherine Siminovitch, MD, FRCPC, FACP, FRSC
Director, Genomic Medicine Division & Clinical Genomics Centre
Director, Fred Litwin & Family Genetic Medicine Program
University Health Network/Mount Sinai Hospital
Professor, Departments of Medicine, Immunology, Medical Sciences
University of Toronto

Laboratory of Human Genetics of Infectious Diseases

McGill University Senate and Board of Governors

Paris, January 4, 2022

Dear Members,

I am delighted to write this letter of support for the creation of a McGill Institute of Genomic Medicine.

The creation of this Institute will be especially timely by integrating in a synergic manner the multidisciplinary research culture existing at McGill around genomic medicine. By developing large-scale biology and big data science, the Institute will seek to fundamentally accelerate translational research toward clinical application as well as dissemination of knowledge by teaching and education following seven strategic aims :

1. Enable precision and personalized medicine for chronic and infectious disease;
2. Lead in studies on emerging infections and the microbiome;
3. Obtain novel treatments for major disease;
4. Propel the use of computational medicine tools;
5. Strengthen McGill's global connections;
6. Educate and train a new generation of scientific talent;
7. Contribute to policy formulation and inclusive science.

It is obvious that the scientific research conducted in the Institute will very significantly accelerate the acquisition of knowledge on many diseases. It will take advantage of the broad multidisciplinary expertise of the research groups participating to the Institute. In particular, the Institute will fuse the expertise and infrastructures in genomics and computation at the McGill Genome Centre with the immunological and other biological expertise at the McGill Research Centre on Complex Traits to create a state-of-the-art technology and science platform in genomics and immunity. This will be a critical advance as there is increasing evidence that the human immune system 1) not only relates to infectious and auto-immune disorders but also to a wide variety of human diseases, in particular age-related, and 2) could be investigated at best by genomic approaches. Related to this point, the research program of the Institute includes a highly relevant project on infectious diseases, my main domain of expertise, with specific efforts to fight pandemics as COVID-19 which is of course timely and based on very strong expertise of several groups.

The Institute will capitalize on a critical mass of scientific and clinical talents who are internationally recognized, with strong networks and partnerships across public and private institutions. The integration of these groups into the Institute will allow them to tackle major challenges that are beyond the reach of individual research laboratories. It will also help them to benefit from large granting opportunities in Canada and elsewhere. This will result in the development of new biological concepts, diagnostic tools, and innovative therapeutics leading to personalized medicine and improved quality of care for patients. Importantly, the social sciences, along with ethical, policy and legal aspects of genomic medicine will be an integral part of the Institute. This will provide the expertise to implement an integrated approach to genomic medicine that will address urgent health issues of lifestyle-related diseases and the policy implications of genomics in an increasingly aging society.

Laurent Abel, MD, PhD
Director of Research (DRCE Inserm)
Head, Laboratory of Human Genetics of Infectious Diseases
Visiting Professor, The Rockefeller University
Laboratory of Human Genetics of Infectious Diseases

Imagine - Institute of Genetic Diseases
Paris University - INSERM UMR 1163
24, boulevard du Montparnasse, 75015 Paris France
Tel: +33 1 4275 4317; Fax: + 33 1 4275 4224
laurent.abel@inserm.fr; http://www.hgid.org

The Institute has also a very strong training and education project. It will extend existing PhD programs in quantitative life sciences to students coming from more medical background to give them multidisciplinary training essential for their carrer development. Likewise, it will expand training for those with quantitative backgrounds by providing an increased focus on the interface between large-scale biology and quantitative methodology, and a more medical environment. The Institute will support highly promising students and post-doctoral trainees to undertake their research in an international context through formalised and innovative programs with Institutions in other countries following the succesfull existing example with the University of Kyoto. It will also support training workshops and international symposia strongly contributing to knowledge diffusion through participation of McGill trainees. I am convinced that the innovative courses and the improvement of the education structures proposed by the Institute, will train a novel generation of researchers, ready to implement and increase efforts towards the understanding and treatment of genetic disorders.

Thanks to all these assets, the Institute will be also very attractive to recruit new scientific international talents at the forefront of medical genomics. In particular it will encourage highly recognized scientists to hold dual positions with other leading institutions, an approach which is excellent to strengthen international partnerships, and to increase the exchanges of younger scientists. Importantly, the Institute will also facilitate the development of private-public partnerships and co-funding investments from pharmaceutical and biotechnoloy companies. It is clear that the Institute will provide an ideal environment to attract high level scientists with complementary expertise from all career stages.

Overall, the Institue project is designed to be a unique place dedicated to genomic medicine integrating experimental and translational research, innovative care, education and valorization. This new avenue of personalized genomic medicine will tremendously impact research on diseases and consequently a huge number of health outcomes, with quite significant economic consequences.

I therefore wholeheartedly and unreservedly support the creation of a McGill Institute of Genomic Medicine.

Laurent Abel, MD, PhD

Laurent Abel, MD, PhD
Director of Research (DRCE Inserm)
Head, Laboratory of Human Genetics of Infectious Diseases
Visiting Professor, The Rockefeller University
Laboratory of Human Genetics of Infectious Diseases

Imagine - Institute of Genetic Diseases
Paris University - INSERM UMR 1163
24, boulevard du Montparnasse, 75015 Paris France
Tel: +33 1 4275 4317; Fax: + 33 1 4275 4224
laurent.abel@inserm.fr; http://www.hgid.org

Prof. Stéphanie Debette
E-mail: stephanie.debette@u-bordeaux.fr
Phone +33 (0) 6 20 89 62 24

Prof. Mark Lathrop, director of the McGill Genome Center &
Prof. Philippe Gros, co-director of the McGill Research Center on Complex Traits

Bordeaux, 6 janvier 2022

Dear Dr. Lathrop, dear Dr. Gros,

It's an honor and pleasure to write this letter of support for the creation of the McGill Institute of Genomic Medicine. I have been very impressed by the ambition and innovation of your proposal.

In quality of incoming Director of the Bordeaux Population Health research center (BPH, co-hosted by University of Bordeaux and Inserm), I would like to stress how much we appreciate and value our close collaboration with the McGill Genome center, which has been incredibly fruitful over the past years, through collaboration on multiple grants (EU-JPND, ERC, Leducq transatlantic network of excellence, RHU from the French national initiative of excellence, Healthy Brain Healthy Life International partnerships etc.) and high profile joint publications, including several recent manuscripts currently in the review process in NPG journals.

We would be extremely eager to pursue and scale up this partnership through the creation of the McGill Institute of Genomic Medicine. The BPH is one of the largest centers in France dedicated to research in epidemiology and public health with about 500 staff members (>120 permanent researchers) and ~3000 publications over the past 5 years, with a particular focus on brain health across the lifespan, infectious diseases, data science encompassing large-scale "omics" studies, and more recently social and environmental determinants of health. Our center also leads large-scale interdisciplinary research projects (from clinical trials to policy-oriented research) in collaboration with middle and low income countries, especially in Africa. BPH researchers have created and followed up several large population- and clinic-based cohort studies, of which many of the biobanks have been processed at McGill Genome center (3C, i-Share, MEMENTO, CADISP…).

Your strategic aims and areas of investigations show important synergies with our centers' objectives and key research domains. Based on this and our track record of collaboration we would be very interested to explore the possibility of a strategic institutional partnership between the McGill Institute of Genomic Medicine and the BPH. This could be embedded within the long-standing strategic partnership between our host institutions, McGill University and the University of Bordeaux.

Adresse postale
Université de Bordeaux
351 cours de la Libération
33405 Talence cedex
www.u-bordeaux.fr

We would also be very interested to reinforce opportunities for joint training and exchanges of students and early career investigators between our institutions, expanding on the already very successful joint master degree between the Digital Public Health graduate school at the University of Bordeaux and McGill University, as well as various jointly organized symposia and summer schools such as Neurepiomics. It could be interesting to link this to the European research-based training programs that we are establishing within the ENLIGHT European university alliance (combining 9 leading European universities, co-coordinated by University of Bordeaux and Ghent University) by applying for joint doctoral and postdoctoral training in the framework of Horizon Europe MSCA programs and beyond.

I wish you all the deserved success with this very exciting and transformative initiative and look forward to opportunities for collaboration with the McGill Institute of Genomic Medicine.

Professor Stéphanie DEBETTE, MD PhD

Vice-President for External Relations, University of Bordeaux
Director of the Bordeaux Population Health research Center, INSERM-University of Bordeaux
Chair of Directors, ENLIGHT European University Alliance

Adresse postale
Université de Bordeaux
351 cours de la Libération
33405 Talence cedex
www.u-bordeaux.fr

Hôpital général juif
Jewish General Hospital

McGill

Institut Lady Davis de recherches médicales | Lady Davis Institute for Medical Research

February 10, 2022

Dr. Mark Lathrop
Director, McGill Genome Centre
740 Doctor Penfield Avenue
Montreal, Quebec H3A 0G1 Canada

Dr. Philippe Gros
Co-Director of the McGill Research Centre on Complex Traits
740 Doctor Penfield Avenue
Montreal, Quebec H3A 0G1 Canada

RE: Letter of support for the creation of the McGill Institute of Genomic Medicine.

Dear Mark and Philippe,

As the new Director of the Lady Davis Institute for Medical Research (LDI) at the Jewish General Hospital I am very pleased to write this letter of support to accompany your proposal for the creation of a McGill Institute for Genomic Medicine (the Institute). I believe that this proposal is very timely and will leverage McGill's diverse scientific expertise, extensive research infrastructure and clinical affiliations to improve the health of Canadians and beyond. Based on my over 8-year experience as a Scientific Director at CIHR it has become evident that moving personalized medicine to the clinic requires a vision and structure like you propose, one that advances and implements 'big data' through an interdisciplinary approach. I envision the LDI research and clinical community being an integral part of the Institute and will hopefully help realize your vision. I will highlight a few areas of synergy with respect to the strategic aims of the Institute you have proposed.

Enable precision and personalized medicine for chronic diseases. At the LDI there has been a strong translational focus with respect to the implementation of personalized medicine in the area of oncology including establishing a very productive Clinical Research Unit (CRU) that has reported close to 350 registered clinical trials. Our CRU is part of provincial (Q-CROC) and Pan-Canadian (Exactis Innovation) Networks that coordinate the recruitment of clinical studies bring together public and private partners focusing on precision oncology research.

Lead in studies against emerging infections and the microbiome. Building from strong foundational research in the area of HIV our Infectious Disease division within the Jewish General Hospital remains one of the busiest units in Quebec and remains a focal point for future academic growth. Our recent contributions to help establish the Quebec COVID-19 Biobank (BQC19) with the McGill Genome Centre has been very successful and represents a great example of genomic medicine in practice and within the community.

Obtain novel treatments. The LDI has a history of fostering and promoting innovations in drug discovery, from the pioneering work on the antiviral capabilities of lamivudine (3TC) by Wainberg and colleagues to more recent clinical advancements including my own personal experience with a peptide that has advanced to a Phase 3 study in hospitalized COVID patients. The LDI will continue to foster and provide infrastructure for pre-clinical advancement and target validation to ensure a pipeline to the clinic.

Propel the use of computational medicine tools. We certainly recognize the importance of integrating diverse datasets into a format that can be interrogated for clinical application. The recent experience with the BQC19 would suggest we are well positioned to continue to expand our clinical impact in this regard. It is important to note that in the BQC19 there is diverse representation of different ethnic populations more reflective of the population that we serve, a very important aspect of harnessing the full potential of genomic medicine.

Educate and train a new generation of scientific talent. With well over 200 trainees at the LDI we hope to be able to contribute to your vision of training the next generation of researcher with a focus on applied personalized medicine.

Collectively these strengths within the LDI research environment will be “added value” to the creation of the Institute and we look forward to collaborating and partnering. I think it is also worth noting the unintended consequences of the pandemic on the health of Canadians. With forgone care including in cancer prevention, delayed cancer diagnosis and other impacts on chronic disease detection your proposal is well positioned to tackle and address the complexities of the health concerns of tomorrow.

Looking forward to embedding the LDI research community within the initiative.

Sincerely,

Stephen M. Robbins, Ph.D
Director, Lady Davis Institute for Medical Research at the Jewish General Hospital
Glaxo Smith Kline Chair in Pharmacology
Professor, Gerald Bronfman Department of Oncology
McGill University
3755 Chemin de la Côte-Sainte-Catherine
Montreal, Quebec H3T 1E2

Centre universitaire de santé McGill
Institut de recherche

McGill University Health Centre
Research Institute

Rhian Touyz
MBBCh MSc(Med) PhD FRCP FRSE FMedSci FCAHS

Directrice exécutive et scientifique en chef
Institut de recherche du Centre universitaire de santé McGill
Chaire Dr Phil Gold en médecine
Université McGill

Executive Director and Chief Scientific Officer
Research Institute of the McGill University Health Centre
Dr. Phil Gold Chair in Medicine
McGill University

E S1.5066.6 - 1001 boul. Décarie
Montréal QC H4A 3J1
CANADA
Tél 514 934-1934, 71608
rhian.touyz@mcgill.ca
ircusm.ca rimuhc.ca

January 5, 2022

Via email: mark.lathrop3@gmail.com
philippe.gros@mcgill.ca

RE: Letter of support – Creation of a McGill University Institute of Genomic Medicine

Dear Dr. Lathrop and Dr. Gros,

I read with great interest your proposal to establish the McGill Institute of Genomic Medicine (the Institute). Building on McGill's international reputation of scientific and academic excellence in the fields of genomics, immunology and computation and by fusing expertise between the McGill Genome Centre and the Research Centre on Complex Traits, places the Institute in a powerful position to be a world leader at the interface of genomics and medicine.

In today's world of COVID, it has become more apparent than ever that multidisciplinary team science that crosses boundaries between traditional and non-traditional biomedical disciplines is not only important, but essential if we truly want to tackle chronic diseases and infections in a timely and impactful manner. In this context, the Institute is ideally suited to address this as it brings together critical intellectual mass encompassing broad multidisciplinary expertise in genomics/multiomics, immunology/inflammation biology, and clinical medicine, together with quantitative methodologies, social sciences, biomedical ethics and law.

It is especially noteworthy that the Institute will embody precision/personalized medicine as a strategic priority. The evolving and future landscape of clinical medicine is personalized/precision medicine and precision health, where unique patient-specific disease risks and treatments, together with precise disease prediction, prevention and health promotion strategies will ensure improved patient management and healthy populations. This demands bringing together unique biology together with life and environmental circumstances for each person and requires expertise ranging from genomics/multiomics to high fidelity patient profiling to public health. Academic environments that truly encompass such broad-ranging expertise and infrastructure in a comprehensive manner are few. However, through the Institute, McGill has a real opportunity to have major impact in this arena.

Creation of the Institute will not only provide a 'hot bed' of intellectual capacity to brainstorm around strategies to improve human health and diminish disease burden across the lifespan, but it has the potential to positively impact research performance. In particular, it will promote research at the interface between clinical medicine and basic

science and will enrich clinically impactful translational research. For this to be successful and feasible, engagement with clinical researchers at the Research Institute of the McGill University Health Centre (RI-MUHC) is essential, and as Director and SO of the RI-MUHC, I commit my strongest support. The Institute will also create an environment that will foster collaborative research to tackle 'big questions' by McGill investigators that would be beyond the reach of individual research laboratories.

The ambitious objectives, cross-cutting science and reputation of research excellence makes the Institute very attractive to recruit the best minds nationally and internationally. Recruits will not only enrich existing domains but they will bring new skills, techniques, expertise and approaches in large-scale biology, bioinformatics and data precision medicine, thereby ensuring that McGill remains at the forefront in biomedical and health sciences.

Fundamental to new academic initiatives is education and training. Based on the vision and mission of the Institute it is perfectly positioned to advance, and develop new, interdisciplinary and multidisciplinary learning and teaching possibilities at the interface of biology, medicine, quantitative science and public health. It is especially encouraging that this training would be complementary to non-traditional biological sciences such as mathematics, physics and engineering. The fact that the Institute will provide funding opportunities for highly deserving students and post-doctoral fellows to have 'international experience' will not only enrich the student experience but will help establish and solidify potential collaborative projects internationally.

Taken together, it is evident that the Institute has enormous potential to be amongst the beacons of excellence at McGill.

I wish you every success with the proposal and truly hope that the McGill Institute of Genomic Medicine becomes a reality.

Yours Sincerely,

Rhian M Touyz MBBCh, PhD, FRCP, FRSE, FMedSci
Directrice exécutive et scientifique en chef
Executive Director and Chief Scientific Officer
Institut de recherche du Centre universitaire de santé McGill (IR-CUSM)
Research Institute of the McGill University Health Centre (RI-MUHC)
Chaire Dr Phil Gold de médecine, Université McGill
Dr. Phil Gold Chair in Medicine, McGill University

Institut-Hôpital neurologique de Montréal
Montreal Neurological Institute-Hospital

Guy Rouleau
OC, OQ, MD, PhD, FRCPC, FRSC

Directeur, Le Neuro
Directeur, Dép. de neurologie et neurochirurgie, Université McGill
Directeur, Dép. de neuroscience, CUSM

Director, The Neuro
Chair, Dept. of Neurology and Neurosurgery, McGill University
Director, Dept. of Neuroscience, MUHC

McGill
Centre universitaire de santé McGill
McGill University Health Centre

January 24, 2022

Mark Lathrop, Director of the McGill Genome Centre
Philippe Gros, Co-Director of the McGill Research Centre on Complex Traits
740 Dr. Penfield Ave.
Montreal, Quebec H3A 0G1

Re: Letter of support – Creation of the McGill Institute of Genomic Medicine

Dear Mark and Philippe,

You have my full support in the project of creation of the McGill Institute of Genomic Medicine, that will be focused on research and training in genomics.

Genomics is key to medicine and the scientific scope described in your proposal, along with the potential to positively impact research performance will be of great benefit to McGill University. The Institute will further empower McGill investigators to work together to tackle major challenges that are beyond the reach of individual research laboratories; will strengthen the attractivity for recruiting scientific talent from around the world; and will have a major impact on education and training. The Neuro and the Department of Neurology and Neurosurgery are eager partners to this initiative.

All the components are brought together to constitute the specific mission of an Institute which McGill University will be extremely beneficiary.

Kind regards,

Dr. Guy Rouleau

Gustavo Turecki MD PhD FRSC
Professor and Chair,
Department of Psychiatry
McGill University

Douglas Mental Health Institute
6875 LaSalle blvd
Montreal, QC H4H 1R3
Phone: (514) 761-6131

Mark Lathrop, Director of the McGill Genome Centre &
Philippe Gros, Co-Director of the McGill Research Centre on Complex Traits
740 Dr Penfield Ave,
Montreal, Quebec H3A 0G1
Canada

December 29, 2021

Dear Mark and Philippe,

It gives me great pleasure to write this letter to express my strong enthusiasm for the creation of the McGill Institute of Genomic Medicine. The last thirty years have seen tremendous advance in our understanding of the genome, starting initially by the decoding of its sequence, and subsequently, by major advances in our understanding of its regulation. A number of McGill scientists have made important contributions to this effort, either helping advance basic concepts of genome sequence and function or using genomic tools to understand illnesses, including genetic variants or genomic changes associated with risk or as consequence of disease.

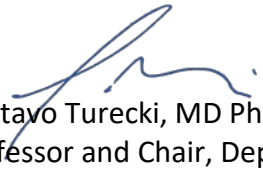
Genomic research is highly technical, expensive and constantly evolving. It generates a tremendous amount of data and requires highly qualified personnel to produce it. The analysis and interpretation of the data also require unique expertise and significant computational resources, and research outcomes generate important societal questions that are not trivial and that have been among the most important ethical debates of the last decades. Thus, it is clear that genomic medicine is not a field of work that one can efficiently do in individual labs and/or in isolation. As such, your proposal to bring together significant McGill genomic efforts under a common Institute is important and timely. It will be support individual research efforts, advance genomic science, and equally important, consolidate McGill's efforts and help our Institution better position itself as an important national and international player in Genomic Medicine and better help us compete for financial and human resources.

The Institute you are proposing is likely to have a direct impact on McGill's research performance and catalyze change. More specifically, by bringing capacity under a common umbrella, McGill will foster increased collaboration, increased power to tackle major challenges in genomic medicine, increased ability and access to shared resources, and importantly, the potential to positively impact research performance. Accordingly, the Institute will further empower McGill investigators to both produce major research breakthroughs and obtain significant funding, either through dedicated national funding agencies, such as Genome Canada or through strategic funding competitions both in Canada and internationally.

Investigators working in genome research need access to state-of-the-art facilities and constantly changing equipment to remain competitive. When recruiting new talent, McGill competes with other national and international universities to attract the best candidates, and in my experience,

access to the appropriate facilities, technical resources and support from more senior colleagues are important factors considered by young researchers when deciding on offers. The creation of the McGill Institute of Genomic Medicine will increase McGill's capacity to attract the best talent to our university.

A final point I would like to make is that, in addition to the benefits discussed above, your proposed Institute will also have an impact on training high-qualified personnel. From undergraduates to postgraduates, including technical personnel, the Institute will provide a unique environment that will be intellectually and scientifically stimulating to students. More importantly, it will promote interdisciplinary education and facilitate the training of students in areas that intersect between fields, such as between quantitative/computational sciences and genomics or social sciences and genomics to name a few. Such an environment will be quite attractive to high caliber international students and will contribute to McGill's international reputation.



Gustavo Turecki, MD PhD FRSC
Professor and Chair, Department of Psychiatry, McGill University
Scientific Director, Douglas Institute
Psychiatrist-in-Chief, CIUSSS ODIM

Department of Human Genetics
McGill University / Faculty of Medicine
3640 University Street
Strathcona Anatomy Building
Rooms W315C, W315D, W315E
Montreal, Quebec, H3A 0C7
Tel.: 514-398-3600 / Fax: 514-398-2430

February 16, 2022

Dear Mark,

I read with great interest your proposal to establish an Institute of Genomic Medicine at McGill. It impressively builds on the foundations that have been established in the Genome Centre, and indeed throughout the McGill system. It is comprehensive, visionary, and inclusive. I would be pleased to be an Associate member of the Institute and as Chair of the Department of Human Genetics I offer my full and unequivocal support for the project.

Please let me know how the Department can help in bringing the proposal to fruition.

Yours truly,

Eric Shoubridge, PhD FRSC
Professor and Chair, Department of Human Genetics
Izaac Walton Killam Chair in Neurology and Neurosurgery
McGill University

McGill | Goodman Cancer Research Centre | Centre de recherche sur le cancer Goodman

Morag Park, PhD, FRSC, FCAHS,
Director
Rosalind and Morris Goodman Cancer Centre
Cancer Pavilion
McGill University
1160 des Pins West, Room 601
Montreal, Québec
Canada H3A 1A3

Centre de recherche sur le cancer Rosalind et Morris Goodman
Pavillon du Cancer
Université McGill
1160 des Pins Ouest, bureau 601
Montréal, Québec H3A 1A3 Canada

February 17th, 2022

Re: Proposal for the Creation of the McGill Institute of Genomic Medicine

Dear Dr. Lathrop and Dr. Gros,

I am writing to express my strongest support for the establishment of an Institute of Genomic Medicine at McGill.

The rapid growth of the field of genomics has been transformative for research into many aspects of human health, including cancer research. McGill has established itself at the forefront of genomic medicine through the recruitment of world leaders in the field, including the CERC in Genomic Medicine, and through investments in state-of-the-art infrastructure. This has included the establishment of major centres for research on genomic medicine such as the McGill Genome Centre, the McGill Centre for Research on Complex Traits, and many outstanding in-house programs at various units of the Faculty of Medicine and Health Sciences. The proposed Institute presents a vital opportunity to consolidate and build upon McGill's strengths in research, technology development, education and training across the spectrum of genomic medicine, from sequencing and "omics" technology and computational medicine to social sciences, ethics and policy. Given the continued developments in genomics and its expanding reach throughout many domains of biomedical research and into healthcare, the timing for this initiative is ideal and will allow McGill to maintain its position of strength and develop further global leadership.

At the Goodman Cancer Research Centre (GCRC), we have collaborated closely with McGill's genomic medicine research community for many years to develop multi-omic analysis of cancer as well as matched patient derived cancer models and patient samples and new computational analysis methods for cancer genome data. This large research resource linked with clinical data and patient outcomes provides unprecedented opportunities to intersect with the proposed Institute of Genomic Medicine and International partners within the McGill ecosystem. Several members and associate members of the GCRC are prominent members of McGill's genomics community and will also be members or associate members of the McGill Institute of Genomic Medicine. We see the development and application of genomic medicine technologies and analysis methods as essential to the understanding of cancer development and progression, drug responses and resistance and the development of new therapeutic strategies. These approaches are critical and will lead to better outcomes for patients.

The development of the McGill Institute of Genomic Medicine will also bring tremendous benefits for provincial, national and international research efforts and consortia aimed at understanding the genomic basis of human disease and developing new treatments. This includes cancer, where the national Marathon of Hope Cancer Centres Network (MOHCCN), an initiative of $150M funded by the Federal Government and the Terry Fox Research Institute (TFRI) where I co-lead the Quebec node, is poised to develop unprecedented Canada-wide cancer "omics" datasets, with McGill Institute of Genomic Medicine researchers playing a leading role. This will empower previously untenable studies of cancer genomics and lead directly to new clinical trials and opportunities to improve clinical outcomes.

In summary, I am delighted to offer this letter of support for your proposal, and I look forward to continuing our work together.

Yours sincerely,

Morag Park, C.Q., FRSC, FCAHS, Ph.D.
Director, Rosalind and Morris Goodman Cancer Research Centre
Diane and Sal Guerrera Chair in Cancer Genetics
Distinguished James McGill Professor,
Depts. of Oncology, Biochemistry and Medicine,
McGill University

The Jackson Laboratory
LCCl ding *th e* srn rc/l
Jiir tomorroll·: *cure.,*

Lon R. Cardon, Ph.D., FMedSci
President & Chier Executive Orricer
(207) 288-6041 t l (628) 214-8942 m
lon.cardon@jaxorg

January 18, 2022

Mark Lathrop, Ph.D.
Director of the McGill Genome Centre & Philippe Gros
Co-Director of the McGill Research Ce ntre on Comp le x Traits
McGill Un iversity
740 Dr Penfield Ave, Room 6105
Mon treal, Quebec, Canada, H3A 0G1

Dear Mark,

I am writin g in st rong support of your proposal to create the McGill In st it ute of Geno mic Medicine. As you know well, I have lo ng been and remain a strong supporter of the in ternat io na lly recognized genet ics/geno mics research conducted at McGill. For this proposal, I particularly exc ited to see the strategic ins ig ht of yourself and Professor Gros in recogniz ing that by drawing together the many strengths of McGill genom ics research, you can create a transformational entity at exactly the time when the geno mics sub-disciplines have finally matured to a point where this co hesive ness is fe asible, and powerful.

The genetics / ge nomics field has broadened dramatically from sing le -ge ne diso rders to comple x disorde rs, to appreciation of the underpinnin g of immuno lo gy/inflammation and to a deep appreciation of sophisticatio n of quantitative analytic al methodologie s underl ying all resea rch, propelled by the self-reinforcing advancement of technolog ie s in -om ics. Iso late d research in eac h disc iplin e is not sufficient to unleash the broader potential for improving hum an health. The need to work together has never been greater and you have captured just that need in the present proposal.

Ove r the past 15 years, research in genet ics has demonstrated the power of data sharing. Although the field of Genetics cann ot cla im be the first to show this power of sharing so clea rly, it is difficult to argue against the fact that the et hical, legal, financial , political/policy and practical question s in the current era are very much 21$^{s t}$ce ntury issues. It is impo1tant to see that you have fully integrated these to pics in your proposal. Unfortunately, in many internat iona l resea rch proposals, the se topic s are often recog nize d, yet take an ectopic , seco nda ry, position relative to the research paradigms. I am particu la rly pleased to see that this is not the case with this McGill proposa l. These are primary iss ues. Their full integration is essentia l.

While my own primary intere st relates to max imizing the human health impact of genetics and genom ics , it is also important to recognize so me of the immed iate, practical benefits of a program such as this, including fund ing and tale nt rec ruitment and retentio n. Early in my career I had the oppo rtunity to work on a number of early genetics consortia, inc luding the HapMap Consortium, the SNP Consortium and the Wellcome Trust Case Control Consortium whic h I co- founded. Later I hel ped develop the Accelerated Med ic in es Partnership and the Target Validat io n Center, later renamed " Open Target s." I can attest directly to the le verage enable d in resea rch funding and the simple ab ilit y to tackle la rger problems afforded by an In st it ute relative to individual investiga tor s. Many of the Genomic s prog rams toda y are no w in the realm of co lla borative "big science." The McG ill Inst itute for Genomic Medicine seems poised to unlea s h the deep and long proven genom ic s e xpertise in the university and across Canada overall. It sho uld maximize the potential to compete favorably in lar ge funding opportunities.

As mentioned earlier, genetics and genomics research at McGill University has long been internationally recognized. As such, it would seem obvious that McGill can attract some of the best talent globally, and I believe that is correct now. However, as we have learned in all disciplines via the globalization ofresearch and the pandemic of the past 2 years, recruitment and retention has become an acute challenge. A world leading institute such as that proposed would serve to magnify the strengths of the individual laboratories, bringing the next generation of bright researchers and novel ideas to the unique environment of Montreal and the region. Critical mass is key and it already exists within McGill in individual groups. An Institute could create a broader magnet that would amplify the attraction for Quebec, for those either coming from within the province or moving from afar.

Closely coupled to the recruitment and retention advantage is the critical long-term issue of sustainability of science excellence in Canada, namely via education and training. Again, McGill has an impressive and recognized track record in PhD training in Quantitative Life Sciences already. What is attractive in this proposal is the broadening of the scope to bring together life sciences with traditional quantitative disciplines. This is clearly where the research is leading us toward in genomics, but from a broader perspective it offers even more by equipping the next generation with a breadth of skills that affords them the flexibility to adapt to an exciting yet unpredictable future of scientific direction.

In summary, I support this application without reservation. Professors Lathrop and Gros have unquestionable track records in science and leadership, and the broader McGill research expertise is recognized globally. This is the right time and mechanism to leverage the expertise, infrastructure and potential of the excellence in Montreal to contribute to transformational impacts in human health and scientific sustainability.

Yours sincerely,

Lon R. Cardon, Ph.D., FMedSci

LIÈGE université
GIGA institute

Liège, 9 January 2022

To whom it may concern:

It is my very pleasure to be able to hereby lend my fullest support to the initiative to create an Institute in Genomic Medicine at McGill University.

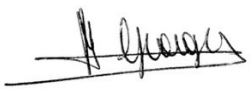
Genomic Medicine has been portrayed as an imminent transition for some time now (f.i. Green ED *et al.* Charting a course of genomic medicine from base pairs to bedside. Nature 470: 2034-213, 2011). Although, and as typical in cycles of technological innovations, it has taken a bit more time than hoped for by some to witness a major impact of genomics in clinical practice, many signs indicate that we are truly at the verge of seeing omic-type data incorporated as an essential source of information in routine clinical decision making. This is due to a large extend to the dramatic reduction in the cost of whole genome sequencing that has become as cheap or cheaper than many other tests that are being used routinely in the clinic: our children will all have their genome(s) sequenced multiple times during their lifetime. In addition, while there remains a lot to be learned, our understanding of the genetic architecture of medically important phenotypes (including the risk to develop disease), our improving capacity to predict the consequences of individual germline and somatic variants, and our increasing ability to follow-up genomic exploration with targeted clinical actions for the benefit of the patients, now makes the near-systematic collection of genomic information increasingly justified and cost-effective including from an health care systems point of view.

Examples of “real world” applications of medical genomics that are increasingly being deployed around the world include precision oncology (one or more driver mutations identified in >90% of sequenced tumors, mutations predictive of drug response in > 30% of sequenced tumors), polygenic risk scores for common complex diseases (in clinical tests in several countries), non-invasive prenatal diagnosis (applied on hundreds of thousands of pregnant women, reimbursed in many countries, will provides access to maternal and fetal whole genome sequence in the near future), pediatric genomics and preconceptual genetic screening (evaluated in several countries).

Taking full advantage of the potentials offered by medical genomics, whether from the patients/health care system perspective or from the research and development’s perspective, requires that countries (i) organize the collection and regulate the use of the life-history and medical data at population level that are required for the effective implementation of genomic medicine (which is “big data” and “AI” dependent), (ii) engage forcefully in research and development in genomic medicine, and (iii) educate and train a new generation of medical professionals that have acquired the new set of skills needed to deploy genomic medicine.

Setting up a new Institute in Genomic Medicine at McGill University would be a major step towards achieving each one of these goals. Such institute would build on the already world-renowned expertise of McGill University in human genetics/genomics while providing McGill’s medical and research community with a renewed focus and ambition. It would enhance the attractiveness of McGill for international talent. It would lay solid foundations to maintain Canada at the forefront of what is bound to be one of the major economic sectors of our future societies.

Yours sincerely,



Michel Georges

GIGA institute
Bâtiment B34 (CHU) – Quartier Hôpital
Avenue de l’Hôpital 11, 4000 Liège, Belgique
www.giga.uliege.be

Stockholm 2022-02-02

Letter of recommendation

I'm writing to express my strongest support for proposal for the creation of a McGill Institute of Genome Medicine. I believe the funding of this proposal would be beneficial for Canadian life science in general and for genome medicine-based research in particular. I am deeply impressed by the breath and quality of genome related research at McGill since more than a decade, with many flagship publications and excellent science.

I strongly support the vision to harness McGill's diverse scientific expertise, research infrastructures and medical resources to achieve rapid advances in large-scale biology and "big data" science through interdisciplinary research, with the ultimate goals of studying human health and disease. I believe funding would allow further development of the multidisciplinary research culture that has grown at McGill around genomic medicine. I believe that funding of the institute would allow further empowerment of McGill's knowledgebase to tackle major scientific challenges that are beyond the reach of individual researcher groups.

Regarding the scientific scope, I would like to high-light the critical mass of the McGill set-up, including multidisciplinary expertise and the inclusion of multi-omics experience by the applicants. The importance of managing and interpreting large complex datasets will be important for future medical developments, including the field of precision medicine and the institute would be important for further strengthen this area at McGill.

McGill is already an attractive hub for life science research, but funding of an institute would strengthen the possibility to attract the most talented researchers both nationally and internationally. The intent to attract scientists with complimentary expertise for different career stages and complement such recruitment with the existing critical mass and knowledgebase will be important for the success of the institute.

The institute would also be important to strengthen interdisciplinary education and training at the interface of biology, medicine and quantitative sciences. I strongly support the intent to provide additional pathways for students in field of multidisciplinary training and quantitative methodologies.

In summary, I support for proposal for the creation of a McGill Institute of Genome Medicine. If you have questions of comments regarding this letter of support, please do not hesitate to contact me.

Yours sincerely,

Mathias Uhlen, Director of the Human Protein Atlas program

Mathias Uhlen, PhD., Professor
Science for Life Laboratory
Karolinska Institute! and Royal Institute of Technology (KTH)
SE-106 91 Stockholm, Sweden
Phone: +46 8 790 99 87 (seer)
e-mail: mathias.uhlen@scilifelab.se
Homepages www.proteinatlas.org

RIKEN Center for Integrative Medical Sciences

1-7-22 Suehiro-cho, Tsurumi-ku, Yokohama City, Kanagawa, 230-0045, Japan
Tel: +81-45-503-9222, Fax: +81-45-503-9216
http://www.ims.riken.jp/

To: The McGill University Senate and Board of Governors

Yokohama, March 15, 2022

I'm writing to provide my strongest recommendation in support to the creation of the McGill Institute of Genomic Medicine.
The Institute will leverage current excellences in several aspect of genomics, genetics, immunology and other branches of science already available at McGill. Importantly, the outstanding leaders of the new Institute, Mark Lathrop and Philippe Gros, fully understand and values the importance of scaling up science in large, interactive, interdisciplinary projects, where discoveries and applications will originate at the interface between established fields. While traditional fields of genetics, immunology, infection and medicine have achieved excellent results, it is now essential to bring together ideas and expertise because most transformative discoveries happen when different expertise meet to work together.

I was truly impressed by the vision, summarized in a series of strategic aims, which will have a profound impact to the health and well-being of Canadian citizens, with also global repercussions for the lessons that will be learned from the science that will be produced in the Institute. The McGill Institute of Genomic Medicine will deliver in several key areas, including precision and personalized medicine, infection diseases and microbiome, treatment for major diseases and, computational medicine; further, it will lead the field by addressing data governance, making McGill as a global science hub, educate and train the next generation of scientist and contribute to policies for inclusiveness.

I also applaud at the strategy to establish five core divisions, in particular by putting together science approached broadly with large-scale biology, genomic medicine and computational systems biology, together with the focus on immunology, inflammation and infection. Together, these will address a broad range of diseases, meeting the needs of the society. It is also important, as planned, to take into deep consideration legal and ethical implications as well as policies, which are essential for personalized medicine and for broad discussion needed before new types of medical treatments will be made available. Altogether, this will result in large strategic initiatives, including a National Life Science Data Infrastructure, a Canadian National Data Platform for Precision Medicine and Aging Population, Engineering the microbiome for health and reduction of disease burden, enhancement of genomics and immunology to address pandemics, and excellence in genome medicine, to design drugs based on genes and genetics.

RIKEN Center for Integrative Medical Sciences

1-7-22 Suehiro-cho, Tsurumi-ku, Yokohama City, Kanagawa, 230-0045, Japan
Tel: +81-45-503-9222, Fax: +81-45-503-9216
http://www.ims.riken.jp/

Remarkably, the Institute originates from research that is already excellent and internationally widely recognized. McGill investigators and clinicians have an outstanding track record of achievements and funds that they raise for research support. Among these, the Terry Fox Marathon of Hope Initiative, in cancer genomics and immunology (raised 100 million) in Canada and the McGill Neurogenomics Partnership (raised 80 million), with very solid track records of existing initiatives. The new Institute as planned has a definitely increased potential for funding for nationally scaled programs and research infrastructures, and for international collaboration. The lineup of core members and junior scientist is impressive and does not only guarantee the success of the new Institute but will also further increase the attractivity of the Institute for recruiting top talents from around the world. Ultimately, this proposal is about creating a center of excellence, which will have enormous impact and importance for educating/training scientists at the interface of the disciplines represented in the Institute, with a permanent legacy for the science at McGill and in Canada.

I am convinced that the new Institute is fantastically designed to bring together talented scientists in an interdisciplinary research environment, which will result in the creation of interdisciplinary programs addressing major health challenges in an aging society and will become the place where major breakthroughs in medicine happen.
In conclusion, I am providing my strongest recommendation to the plan for the creation of the McGill institute of Genomic Medicine.

Sincerely Yours,

Piero Carninci

Leader of the Laboratory for Transcriptome Technology
RIKEN Center for Integrative Medical Sciences
1-7-22 Suehiro-cho, Tsurumi-ku, Yokohama, Kanagawa 230-0045 Japan
Phone (office): 81 (0)45 503 9222, Phone (desk): 81 (0)45 503 9331
E-mail: carninci@riken.jp

Head of the Genomics Research Center,
Human Technopole,
Via Rita Levi Montalcini 1, Milan, Italy
E-mail: piero.carninci@fht.org

APPENDIX D

DESAUTELS Faculty of Management
Faculté de gestion

M E M O R A N D U M

Yolande E. Chan PhD
Dean and James McGill Professor
Doyenne et Professeure James McGill
1001 Sherbrooke Street West
Montreal, QC, H3A 1G5, Canada
Tel.: 514-398-4001
Fax: 514-398-5116
yolande.chan@mcgill.ca

TO: Professor Christopher Manfredi, Provost and Vice-Principal Academic, Chair of APC

CC: Ms. Julie Degans, Academic Program Officer

FROM: Professor Yolande E. Chan, Dean, Desautels Faculty of Management

SUBJECT: To approve the creation of the Centre for Business Ethics to be called the Laidley Centre for business Ethics/ Centre Laidley pour l'éthique des affaires

DATE: April 5, 2022

With this memo, I am requesting the approval of the Academic Program Committee (APC) of the creation of the Laidley Centre for Business Ethics.

This request is pursuant to the approval of the creation of the Centre for Business Ethics at the Faculty Council of the Desautels Faculty of Management on March 18, 2022. An extract of the minutes of the Faculty Council meeting is attached.

Also attached is a description of Centre and its preliminary strategic plan for consideration by APC members.

Thank you for your assistance.

Dean Yolande E Chan Date: April 4, 2022

The Laidley Centre for Business Ethics/ Centre Laidley pour l'éthique des affaires

Table of Contents

1. *Executive Summary*

The Laidley Centre for Business Ethics (Centre), anchored at the Desautels Faculty of Management (Desautels), is to be McGill University's central hub for the support of teaching, academic research, and community engagement for ethical behaviour in business. The Centre will foster multi-disciplinary research in areas such as business, law, public policy, economics, engineering, religion and psychology. Collaborations will focus on ethics, and include a sub-focus on equity, diversity and inclusion (EDI) in business. The Centre's multi-disciplinary approach will extend to course and program development for undergraduate and graduate students and to its offering of activities for professionals and other learners.

2. *Introduction: About the Centre*

The Centre will take an interdisciplinary approach in seeking to improve ethical decision-making in current and future leaders through a wide range of activities:

- Develop academic programming and activities that prepare current students to advance ethics in the workplace;
- Support students from the Desautels Faculty of Management and from other faculties in their research collaborations with a wide network of educational and business institutions;
- Promote excellence in research in the support a multi-disciplinary approach to business ethics research;
- Undertake outreach with the wider community, to encourage discussion and share business ethics best practices realized through programming, including public symposia, guest lectures, and social media outreach.

The creation and mission of this Centre is in line with the University's strategic academic plan (www.mcgill.ca/provost/article/mcgill-university-strategic-academic-plan-2017-2022) and its EDI strategic plan (www.mcgill.ca/equity/files/equity/edi_annual_report_-_final.pdf).

The Centre will enact the five key objectives of the University's strategic plan, namely to be open to the world, expand diversity, lead innovation, connect across disciplines and sectors, and connect with our communities. The implementation of these key University objectives will be evident in the Centre's strategic plan and resulting achievements.

University level and Faculty level EDI initiatives and goals will be fully integrated into the development of the Centre. Desautels' EDI Strategic Plan and Commitments (www.mcgill.ca/desautels/about/equity-diversity-and-inclusion/edi-strategic-plan-2022) include educating leaders, future leaders and learners of all levels in the embodiment of EDI knowledge, awareness and practice. The three key objectives of EDI at the Faculty are to strengthen EDI culture and infuse EDI values through all aspects of the Faculty; to build and maintain structures and processes that reflect and support EDI values; and to create knowledge and provide thought leadership on EDI. The Centre will integrate these principles and goals into its own strategic plan and activities.

The Director of the Centre will liaise with the Faculty's Director, Equity, Diversity and Inclusion (EDI) on a regular basis. The two Directors, however, will also carry out independent projects and have independent mandates. Initiatives co-led by the two Directors will be included in the strategic plan for the Centre and in the strategic plan developed by the Director, EDI.

3. Governance

The Director of the Centre, under the oversight of the Dean of Desautels Faculty of Management, will carry out activities to advance the mission of the Centre. The Director will have administrative support. Please see Appendix B for a view of the organizational chart.

A committee chaired by the Dean of the Desautels Faculty of Management, and which includes the Vice-Deans (Desautels), Associate Deans (Desautels), the Directors of the Laidley Centre for Business Ethics and of EDI (Desautels), as well as administrators supporting Desautels' Ethics and EDI goals, will be composed to establish and review plans and priorities for each academic cycle. The committee will also liaise with the Faculty's Academic Director (Research), Academic Director (Faculty), and the Master's and BCom Program Offices, as required. The Committee will invite representation from two Deans of other Faculties and seek input from all Deans from time to time.

The Centre also will be guided, in part, by recommendations made by members of the Desautels International Advisory and Advancement Board (DIAAB). The DIAAB is comprised of successful industry leaders from around the globe who provide regular support and recommendations to the Faculty. DIAAB members facilitate the link between the Faculty and leading companies and executives who bring their industry expertise into the Desautels classrooms, hire students and provide sponsorship.

4. Funding

The initial funding for the Centre has been generously gifted by Mr. David Laidley (BCom 1967).

Mr. Laidley's $5-million gift will endow the Centre, with an initial $500,000 allotted to hire its first few staff members and launch the Centre.

Mr. Laidley is Chairman Emeritus of Deloitte LLP, having retired from Deloitte in 2007 after a distinguished 40-year career with the firm. While serving as Chairman of Deloitte LLP from 2000 to 2006, he was a member of the Global Board of Deloitte Touche Tohmatsu, a member of the Governance Committee and Chairman of the Audit and Finance Committee. In 2001, Mr. Laidley was elected a fellow of the Québec Order of Chartered Professional Accountants.

Funding is being sought by University Advancement to establish a Chair in Ethical Leadership. In addition, there will be Centre-led submissions of research proposals to the tri-agencies and other traditional funding sources. The Centre will establish new government and corporate funding sources for the promotion of research, thought leadership, pedagogy, practice and other goals.

5. *Naming*

The name of the Centre was approved at the Executive Committee of the Board of Governors meeting of March 24, 2022 as the Laidley Centre for Business Ethics/ Centre Laidley pour l'éthique des affaires.

6. A. Operationalization: Key Priorities and Timeline

Key Priority	**Timeline**
Onboarding of the Academic Director.	Accomplished
Onboarding of the Associate Director.	Spring 2022
Constituting the Strategic Committee with multi-Faculty representation.	Summer 2022
Formalizing an approval of the strategic direction plan.	Fall 2022
Exploration of course and program development for undergraduate and graduate levels.	Fall 2022
Establishment of Fellows who are senior industry experts consulting on Laidley Business Ethics Centre activities and areas of focus.	Fall 2022
Development of case competitions that will leverage Desautels expertise, focusing on past and present real-world business ethics cases.	Fall 2022

Establishment of public lecture series and mini-ethics course series. A preliminary plan for the Mini-Ethics series may include the following participation: - Business and Law - Ethics in AI - Ethics in Religion - Ethics in Psychology - Sustainability - EDI in Business - Public Policy/Economics	Fall 2022 soft launch activity
Exploration of course development for delivery through the Desautels Executive institute (McGill Executive Institute | Desautels Faculty of Management - McGill University).	Fall 2022

6. B. Operationalization: Staffing

Academic appointments will not be made directly to the Centre.

Professor Elena Obukhova (Assistant Professor, Strategy & Organization, Desautels Faculty of Management) has been appointed as the first Director of the Centre.

Professor Obukhova is an economic sociologist with interests in labour markets, social networks, and identity. Her work uses a variety of methods, including survey research, interviews, simulations, experiments, and big data. Her research has been featured in Huffington Post, Academy of Management Insights, The Conversation, and on CNPolitics.org.

Professor Obukhova is a recipient of several Insight Development grants from the Canadian Social Sciences and Humanities Research Council, the Fulbright-Hays Fellowship from the U.S. Department of Education, and two Fellowships from the Social Science Research Council. She currently serves on editorial boards of Organization Science and Management and Organization Review.

For more information on Professor Obukhova*, click on Elena Obukhova | Desautels Faculty of Management - McGill University.* Professor Obukhova's CV has been included as Appendix C.

Staff support for the Centre is currently being sought. The interview process for an Associate Director (MPEX 3) is underway. The job posting for the position has been included as Appendix D. The incumbent is expected to be hired during spring 2022.

6. C. Operationalization: Space and Resources

Office space will be established for the Centre within the physical space allocation made by the University to the Desautels Faculty of Management.

7. List of Appendices

a. Appendix A – Extract of Faculty Council Meeting Minutes, March 18, 2022
b. Appendix B – Extract from Organizational Chart
c. Appendix C – Professor Elena Obukhova's CV, Director of Laidley Centre for Business Ethics
d. Appendix D – Job Posting for Associate Director, Laidley Centre for Business Ethics
e. Appendix E - Brochure Developed by Desautels University Advancement

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Faculty Council Meeting Minutes

Friday, March 18, 2022
2:00-4:00 PM, Zoom

Moderator: John-Paul Ferguson

Chair: Chan, Yolande E. (Dean)

Faculty members:

Abrams, Amanda
An, Kwangjun
Andrei, Daniel
Animesh, Animesh
Aronovich, Aviva
Ashraf, Ahmed
Bassellier, Genevieve
Beaudin, Marie-Jose
Beaumont, Paul
Betermier, Sebastien
Campofredano, Giulia
Carrieri, Francesca
Chan, Yolande
Cohen, Lisa
Cote, Matthew
Dakhlallah, Diana
David, Robert
Demetry, Daphne
Ding, Daniel
Dore, Bruce
Obukhova, Elena
Elie-St-Germain, Delphine
Errunza, Vihang
Etemad, Hamid
Ferguson, John-Paul
Galperin, Roman
Gomez, Alfonso
Gopalakrishnan, Sanjith
Guadagno, Angela
Han, DaHee
Han, Kunsoo
Haruvy, Ernan
Hewlin, Patricia
Holmgren, Lindsay
Hossain, Shoeb
Joshi, Preetika
Kim, Anna
Korey, Leigh
Lamothe, Marie-Josee
Lee, Dongyoung
Lee, Ryan
Levy, Philippe
Ma, Guang
Ma, Yu
Madan, Sujata
Mahabadi, Sara
Mantere, Saku
Masi, Anthony
Melville, Donald
Miao, Sentao
Moore, Karl
Mukherjee, Ashesh
Nason, Robert
Oh, Peter
Pinsonneault, Alain
Qi, Wei
Rivera, Thomas
Roussellet, Guillaume
Rubineau, Brian
Sarigolu, Emine
Scott, Julia
Tahrizadeh, Seyed
Sidthidet, Taweewan
So, Hyunji
Sonberg, Melissa
Tan, Hongping
Tanguay, Sol
Tinn, Katrin
Vaast, Emmanuelle
Weitzner, Gregory
Wenzel, Brian
Westgate, Chantal
Wheatley, Amanda
Yoo, Changseung
Zavosh, Ghahhar
Zhang, Jingjing

Library: Wheatley, Amanda

Student Representatives: Élie-St-Germain, Delphine (MUS VP Academic); Mahabadi, Sara (DDSS President)

Administrative Staff: Beaudin, Marie-Jose; Ceolin, Gina; Forsythe, Michelle; Houlahan, Greg; Inamahoro, Darlene; McAdam, Rita; Borenstein, Bonnie

11. Creation of the Centre for Business Ethics to be named the Laidly Centre for Business Ethics / Centre Laidley pour l'éthique des affaires **(Dean Yolande Chan)**

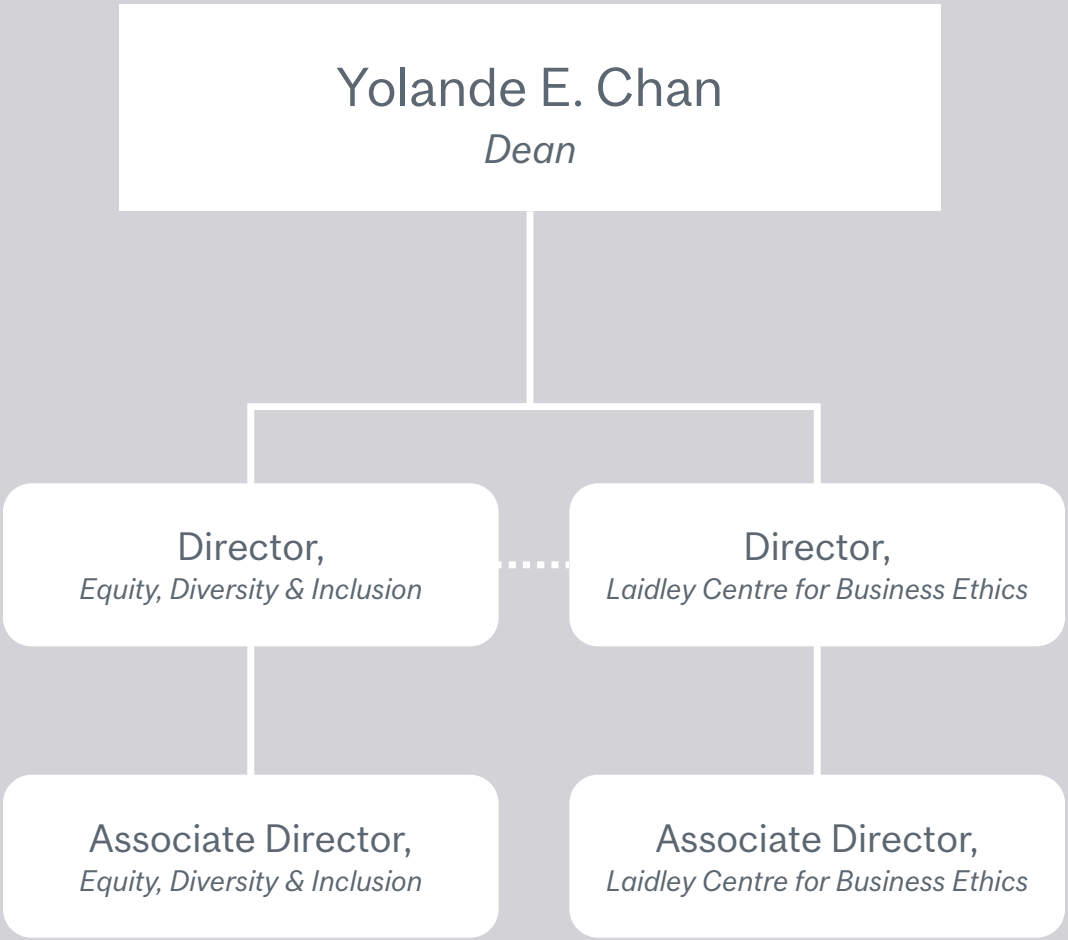
Dean Chan began by thanking Mr. Greg Houlahan and the Desautels Advancement team for their excellent work on facilitating the creation of the Centre which is to be called the Laidley Centre for Business Ethics once the name has been approved by the Board of Governors. Concurrently, the Faculty is seeking approval of the Centre through the University academic governance bodies. For the latter to be achieved, the Dean explained that the Faculty must approve the creation of the Centre though Faculty Council before asking for approval from the Academic Program Committee (APC). Approval will thereafter be sought from Senate and the Board of Governors.

The Dean moved that the Centre be approved by the Desautels Faculty Council.

Motioned: Yolande Chan Seconded: Saku Mantere

Motion passed: Yes

Appendix B: Extract from Organization Chart



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McGill Desautels Faculty of Management
Organizational Chart

Elena Obukhova

Desautels Faculty of Management
McGill University
elena.obukhova@mcgill.ca

Employment

2013- Assistant Professor, Strategy and Organization
Desautels Faculty of Management, McGill University
Parental leave, 2019-2020
2007-13 Assistant Professor, Global Economics and Management
Sloan School of Management, MIT

Education

2007 Ph.D., Sociology, University of Chicago
1997 M.S., Mathematical Methods in the Social Sciences, Northwestern University
1994 B.A., Anthropology, University of Florida

Research interests

Organizational theory; economic sociology; social networks and careers; optimal distinctiveness; comparative and international; China

Journal articles (*co-author is a student at the beginning of the project)

2020 Obukhova, E. and A. M. Kleinbaum. Scouting for Good Jobs: Gender and Networking in Job Search. *Academy of Management Discoveries*.
- Honorable mention award, Gender and Diversity Division, Administrative Sciences Association of Canada.
- Media coverage: *Huffington Post*.

2020 Obukhova, E. and B. Rubineau. Market transition and network-based job matching in China: The referrer perspective. *Industrial Labor Relations Review*.

2017 Obukhova, E. and L. Zhang*. Social Capital and Job Search in Urban China: The Strength-of-Strong-Ties Hypothesis Revisited. *Chinese Sociological Review* 49(4): 340-361.
- Finalist for Best Overall Paper Award of the Careers Division, Academy of Management
- An abridged version published in the Academy of Management 2015 *Best Paper Proceedings*

2016 Zhang*, J., E. Zuckerman and E. Obukhova. A Lack of Security or of Cultural Capital? Acculturative Conservatism in the Naming Choices of Early 20th-Century U.S. Jews. *Social Forces* 94(4): 1509-1538.

2014 Obukhova, E., E. Zuckerman and J. Zhang*. When Politics Froze Fashion: The Effect of the Cultural Revolution on Naming in Beijing. *American Journal of Sociology* 120(2): 555-583.

- Honorable mention for Clifford Geertz Prize for Best Article, Culture Section, American Sociological Association
- Media coverage: CNPolitics.org.

2013 Obukhova, E. and G. Lan*. Do Job-Seekers Benefit from Contacts? A Direct Test with Contemporaneous Searches. *Management Science* 59(10): 2204-2216.

2012 Obukhova, E. Motivation vs. Relevance: Using Strong Ties to Find a Job in China. *Social Science Research* 41(3): 470-480.

Working papers

Zhang, LT, H-J Cho, and E. Obukhova. Awards as Shields: The Effect of Managerial Award-Winning on Strategic Change. Revise and Resubmit. *Organization Science*.

Obukhova, E. and F. Tian. Referrals in China and the US. In preparation for submission.

Book reviews

2019 Social Mobility and the Legal Profession: The Case of Professional Associations and Access to the English Bar, by Elaine Freer, . New York: Routledge, 2018. Reviewed for *Contemporary Sociology*, 48(6): 660-661.

2011 Culture and Economics: On Values, Economics and International Business, by Eelke De Jong. Routledge, 2009. Reviewed for *Administrative Science Quarterly*, 56(2): 310-311.

2006 The Making of the State Enterprise System in Modern China: The Dynamics of Institutional Change, by Morris L. Bian. Harvard University Press, 2005. Reviewed for *American Journal of Sociology*, 112 (2): 629–631.

2004 Red Capitalists in China: The Party, Private Entrepreneurs, and Prospects for Political Change, by Bruce J. Dickson. Cambridge University Press, 2003. Reviewed for *Economic Development and Cultural Change*, 52 (4): 901-903.

Other publications

2005 Obukhova, E. Redefining State Embeddedness for the Global Economy: The Rise of China's Silicon Valley. *Proceedings of 2005 Chinese Economists Society International Conference on Sustainable Economic Growth in China*. Volume I-B, p. 3-8.

2002 Obukhova, E. and J. Guyer. Transcending the Formal/Informal Distinction: Commercial Relations in Africa and Russia in the Post-1989 World. In *Theory in Economic Anthropology*, J. Ensminger, ed. Alta Mira Press: Walnut Creek, CA.

2002 Obukhova, E. Living and Trusting in the Economy of Debt: The Distribution of Newspapers and Magazines in Ibadan. In *Money Struggles and City Life: Devaluation In Ibadan and Other Urban Centers in Southern Nigeria, 1986-96*, J. Guyer, L. Denzer, and A. Agbaje, eds. Heinemann: Portsmouth, NH.

Seminars and conference presentations (last 5 years)

2020-2021
People and Organizations Conference, Wharton School, Philadelphia (expected)

2019-2020
Academy of Management Conference, Boston

2018-2019
Academy of Management Conference, Montreal
Organizational Behavior Seminar, GSB, Stanford (invited seminar)
Management Department, Santa Clara University (invited seminar)
Administrative Science Association of Canada Meeting, Toronto
Economic Sociology Conference, Georgetown and UMaryland, Washington, DC

2017-2018
MIT-Harvard Economic Sociology Seminar, MIT (invited seminar)
East Asian Studies Workshop, University of Chicago (invited seminar)
Center for Applied Social and Economic Research, HKUST (invited seminar)
Sociology Department, Hong Kong Baptist University (invited seminar)
Stanford Graduate School of Business Hiring and Organizations Conference
Economic Sociology Conference, Kellogg, Northwestern University
American Sociological Association Meeting, Montreal
International Sunbelt Social Networks Conference, Beijing, China

2016-2017
Academy of Management Annual Meeting, Anaheim
American Sociological Association Meeting, Seattle
Organizational Theory Junior Conference, Rotman, University of Toronto
Strategic Management Society Annual Meeting, Denver
People and Organizations Conference, Wharton School, Philadelphia

Honors

2017 Li Ka Shing Faculty Exchange Award, Desautels Faculty of Management, McGill University
2008 Fred Kayne (1960) Career Development Professor of Entrepreneurship, MIT Sloan School of Management
2005 Park Lectureship, Sociology Department, University of Chicago

Research fellowships and grants

2020 Research Grant, Center for Strategy Studies in Organizations, McGill University
2018 Insight Development Grant, Social Sciences and Humanities Research Council
2018 MITACs Globalinks Fellowship for undergraduate research project (w/ Orla Magill)
2018 Research Grant, Center for Strategy Studies in Organizations, McGill University
2016 Research Grant, Center for Strategy Studies in Organizations, McGill University
2016 Social Sciences and Humanities Insight Development Grants (co-PI, Yuanyuan Wu (PI))
2015 Social Sciences and Humanities Development Grant, McGill University
2012 Research Support, Junior Faculty Fund, MIT Sloan
2010 Research Support, Edward B. Roberts Entrepreneurship Center Fund, MIT Sloan
2006 Markovitz Dissertation Writing Fellowship, University of Chicago
2003 Fulbright-Hays Doctoral Dissertation Abroad Fellowship, US Department of Education
2003 Corporation as a Social Institution Program Dissertation Fellowship, Social Science Research Council
2000 Century Fellowship, Social Sciences Division, University of Chicago
1998 Pre-dissertation Fellowship, Social Science Research Council
1998 Blakemore Foundation Fellowship for Study of East Asian Languages

Teaching experience

McGill Desautels Faculty of Management:
International Business (BCom core)
Managing Globalization (BCom elective)
Managing Globalization (MBA elective)

MIT Sloan School of Management:
Global Strategy and Organization (MBA elective)
Global Markets, National Politics and the Competitive Advantage (MBA elective)
Diaspora Networks for Managers and Entrepreneurs Workshop (MBA)
Organizational Processes Team Project Advisor (MBA core)
Institutions, Society and International Business (PhD)

University of Chicago, Sociology Department:
Technology and Society (BA)

Teaching innovations coverage:

The McGill Reporter
McGill Teaching and Learning Services Blog

Mentoring and advising

Doctoral Dissertation Committee Member:

Sumeet Duggal (Organizational Behavior, McGill University)
Yongwan Lee (Strategy & Organization, McGill University)
Steven Zhixiang Liang (Management, Concordia University)
Letian Zhang (Sociology, Harvard University, completed 2018)
Rima Bhattacharyay (Strategy & Organization, McGill University, completed 2017)
Timea Pal (Political Science, MIT, completed 2012)

Master's Thesis Supervisor:

George Lan (MIT Sloan)
Shannon Murphy (MIT Sloan)

Academic service - University

McGill Desautels Faculty of Management:

Member, Research Council, 2014-2020
Member, Center for Strategy Studies in Organizations, 2019-2020
Co-organizer (with Brian Rubineau) Montreal Social Networks Working Group, 2015-2017
Member, Center for Strategy Studies in Orgs, Dissertation Grant Committee, 2014-2016
Member, MBA program committee, 2013-2014

MIT Sloan School of Management:

Member, Economic Sociology PhD Admissions, 2007-2010
Reviewer, MIT International Science & Technology Initiatives Global Fund, 2009
Co-organizer, MIT-Harvard Economic Sociology Seminar, 2008-2009
Co-organizer, Sloan Behavior and Policy Sciences Junior Faculty Conference, 2008

Academic service - Profession

Council member, Economic Sociology Section, American Sociological Association, 2018-2021

- Fund-raised 2K for section reception
- Served on program committee, organized and chaired session

Co-organizer and program chair, Fellow Travelers on Different Roads: The Intersections of Economic Sociology and Organizations, Occupations, and Work Mini-Conference, Montreal, 2017.

- Fund-raised 5+K for the conference

Service at professional journals

Editorial Board Member

- Organization Science (2020-present
- Management and Organization Review (2020-preset)
- American Journal of Sociology (2017-2019)

Ad hoc reviewing: *American Journal of Sociology, American Sociological Review, Administrative Science Quarterly, Organization Science, Management Science, Social Forces, Marketing Science, Strategic Management Journal, Social Networks, Social Science Research, Management and Organization Review, Small Business Economics Journal, Strategic Organization, California Management Review, Industry & Innovation, Work and Occupations, European Sociological Review, British Journal of Industrial Relations, Journal of International Sociology, Sociological Forum, Socio-Economic Review, Poetics*

Conference activities

Virtual Café organizer, "Soc PhDs Navigating B-School Market", Academy of Management, 2020.

Sessions organizer and chair, Economic Sociology Section, American Sociological Association, 2020.

Symposium co-organizer (with Minjae Kim), "Scandals as Strategic Opportunities," Academy of Management, 2019.

PDW co-organizers (with Kwnagjun An), "Genesis and Dynamics of Brokerage Positions," Academy of Management, 2018.

Symposium co-organizer (with Yonghoon Lee), "Grappling with Agency: Tie Creation, Mobilization and Renewal," Academy of Management, 2016.

Symposium co-organizer (with Adina Sterling), "From Whence They Came: How the Origins of Networks Constrain Their Effects," Academy of Management, 2013.

Invited session organizer, "Transnational Processes," American Sociological Association, 2013.

Other reviewing activities

Paper reviewer, Academy of Management Conference (OMT), 2009-

Reviewer, INFORMS / OS dissertation competition, Academy of Management, 2008-

Proposal reviewer, Social Sciences and Humanities Research Council, Canada, 2013-

Paper reviewer, Strategic Management Society, 2017

Reviewer, International Assessment Exercise, School of Higher Economics, Russia, 2012

Recent non-academic publications

2020 (with Daphne Demetry) "Startup founders help each other weather the COVID-19 crisis. *The Conversation*. https://theconversation.com/startup-founders-help-each-other-weather-the-covid-19-crisis-141920

Language proficiency

- Russian – native speaker
- English – fluent
- Chinese – professional fluency (HSK level 8)
- French – low intermediary

View Job Posting Details

Associate Director

Job Description

Please refer to the How to Apply for a Job (for Internal Candidates) job aid for instructions on how to apply.

The Laidley Centre for Business Ethics has been established through a generous donation from one of the members of the Desautels International Advisory Board, David Laidley, Bcom '67. While this new Centre will be anchored at Desautels, it will be the University's central home for examining ethics in business in an interdisciplinary and integrated manner, involving researchers from other areas such as law, public policy, economics, engineering, religion and psychology, in its activities. A focus will be on the importance of equity, diversity and inclusion (EDI) in business. The Centre's goal will be to support academic research, teaching and community engagement in a way that responds to the continuous need for solutions to issues surrounding unethical behaviour, unethical decision-making, ethical failures and equity within organizations. The Centre will take an action-oriented approach to improving ethical decision-making for current and future Canadian and international business leaders in the following ways: promoting excellence in research; educating current students to develop future-ready, ethical business leader; and undertaking outreach with community and business partners.

Position Summary:

Working closely with the Dean and/or Academic Director, the Associate Director leads the strategic planning and efficient administration of the Centre. They are responsible for establishing and monitoring the priority agenda for the Centre with input from the Dean and/or Academic Director. They advise on the scoping and implementation of program and partnership activities while also being the administrative lead on strategic Centre initiatives.

The Associate Director provides operational oversight of the Centre, including financial management, HR responsibilities including staff recruitment and supervision, and management of unit-based governing bodies and committees. The Associate Director plays a central role in the development of unit and project-based metrics and reporting. They establish and implement unit standards, practices and systems, and they are called upon to interpret and apply University regulations, policies and guidelines. As a member of the administrative leadership team at Desautels, they provide authoritative advisory services, support and participate in senior-level decision making at the Faculty-level in coherence with the values and culture of McGill University. They act as a liaison between the Centre and other units within Desautels and McGill, including the Office of the Dean of Management, program and service offices, as well as between the Centre and external organizations.

Primary Responsibilities:

- Provide high-level support and senior professional expertise to the Dean and/or Academic Director with respect to matters related to the Centre's projects and overall strategy, governance, human resources, finances, reporting, performance monitoring and analysis.
- Continuously analyze staffing, financing, operations, policies, systems and procedures to ensure efficient and effective departmental performance.
- Co-design strategic plans and project plans for the Centre, while leading own initiatives.
- Evaluate and determine internal priorities and annual objectives for the team and other key partners.
- Coordinate and set the agenda for team meetings, maintain a global overview of Centre files, schedule and plan all projects and programming with the aim of removing barriers and

keeping them on track.

- Supervise administrative staff, when they are hired, and manage human resources in close collaboration with the Desautels HR team, including onboarding and training, task scoping and project monitoring, personnel and performance evaluation, maintaining a pulse on the team morale and ensuring a positive work environment for the team.
- Establish the Centre's budget and spending priorities with the Dean and/or the Academic Director, providing oversight of all aspects of the Centre's finances including: operating and project-based budgets and implementation of the approved budget; managing expenditures, ensuring funding for staffing of ongoing activities and *ad hoc* projects; monitoring budgetary progress throughout the academic year; and ensuring compliance with the University's budget policies and financial procedures.
- Review new contractual obligations, including with external consultants and service providers, and monitor and maintain agreements.
- Oversee the organization of committee and working group meetings or Centre-related content for entities organized by other units, and ensure timely and excellent follow-ups that move agendas forward. Examples of key university-based stakeholders, committees and working groups include the Office of the Dean of Management, the Desautels Faculty Advisory Board, the Centre's Advisory Board, and other key donor-based groups.
- Cultivate and maintain strategic partnerships with external stakeholders and represent the Centre and/or Desautels at internal and external meetings.
- Triage and respond to external requests for Centre participation/support in a variety of academic initiatives both within the Faculty and externally.
- Collaborate with Faculty-based communications and McGill University Advancement teams to produce marketing and communications materials for the Centre. Contribute, when requested, to producing Centre-related material for Faculty marketing and fundraising efforts as well as annual reporting and *ad hoc* internal and/or external requests for information.

Other Qualifying Skills and/or Abilities

- MBA or graduate degree in a related social sciences or humanities.
- A minimum of 5 years of experience in a similar managerial role with operational responsibilities ideally at a Canadian university or institution of higher education; in particular, with previous experience directing other centres or institutes.
- Possess a strong knowledge of the academic setting in the areas of research, teaching and community engagement relative to behavioral and decision-making issues in business ethics and equity, diversity and inclusion.
- Strong preference for candidates with direct experience at McGill and/or Desautels, who are familiar with the organizational culture and business systems (ex. Workday, Minerva).
- Excellent communication skills, written and verbal; strong proficiency in both English and French (written and oral) is preferred. Ability to develop and compose nuanced and precise documents and messaging targeted to multiple internal and external audiences.

- Ability to work independently to realize the Centre's vision, building upon direction from the Dean or Academic Director and input from other key members of the team. Preference will be given to candidates with experience and knowledge of business ethics and equity, diversity and inclusion issues.
- Strong ability to work collaboratively with colleagues and peers. Must operate with discretion, integrity and tact.
- Demonstrated leadership skills and the ability to lead and coach staff as well as collaborate with and advise senior academic and administrative staff.
- Must be performance-oriented, able to meet deadlines and demonstrate high-level leadership and professionalism. Must be an excellent planner while being highly responsive and adaptive to evolving needs and priorities.
- Proficiency with Microsoft Office is required.

Minimum Education and Experience:

Bachelor's Degree 5 Years Related Experience /

Annual Salary:

(MPEX Grade 07) $80,550.00 - $100,680.00 - $120,820.00

Hours per Week:

33.75 (Full time)

Supervisor:

Professor

Position End Date (If applicable):

2023-03-31

Deadline to Apply:

2022-03-24

McGill University hires on the basis of merit and is strongly committed to equity and diversity within its community. We welcome applications from racialized persons/visible minorities, women, Indigenous persons, persons with disabilities, ethnic minorities, and persons of minority sexual orientations and gender identities, as well as from all qualified candidates with the skills and knowledge to productively engage with diverse communities. McGill implements an employment equity program and encourages members of designated groups to self-identify. Persons with disabilities who anticipate needing accommodations for any part of the application process may contact, in confidence, accessibilityrequest.hr@mcgill.ca.

Creating a lasting legacy
Opportunity to establish a Centre for Business Ethics

A proposal for the consideration of
David H. Laidley, BCom 1967

by McGill

The David H. Laidley Legacy

From spearheading Impact Day at Deloitte as part of the United Way Centraide campaign, to serving on the boards of a variety of notable charitable foundations (including your own), you have always made philanthropy a priority. You have volunteered as former President of the McGill Alumni Association, a long-standing member and former Chair of the Desautels International Advisory Board, and as keynote speaker for your 50th class reunion. These roles are a clear demonstration of your loyalty to your alma mater.

David, you are a visionary who knows the time is right to establish a Centre for Business Ethics at McGill.

The Laidley Centre for Business Ethics

Business ethics is not a new topic, but its importance has never diminished over time. Ethical lapses can erode public confidence, tatter personal and corporate reputations, dissolve employee trust, alter careers, and create ruinous legal stakes. Examples like Enron, Wells Fargo, and Purdue Pharma, among others, demonstrate that unsound business ethics have enormous consequences.

It is not enough to educate students to properly balance a budget, analyze an investment, or develop a marketing plan for a product. Institutions of higher learning must train future generations to become ethical business leaders who know how to behave ethically, make effective ethical decisions, and to understand the importance of equity, diversity and inclusion (EDI). Proper training, learning, and insights from leading professors across different disciplines, as well as industry professionals, will instill lasting impressions that serve future Desautels graduates throughout their careers.

As you prepare to create lasting legacies with the social causes and institutions to which you have dedicated a lifetime of service, the Desautels Faculty of Management is honoured to work with you in establishing a Centre for Business Ethics at McGill University. The Centre will play a key role in heightening the profile of business ethics by educating students, engaging researchers, and bringing together alumni and key members of the business community from Montreal and around the world to learn about business ethics - past, present, and future.

Anchored at Desautels, your Centre will be supported by existing Faculty assets like the Edith and Norman Strauss Doctoral Fellowship in Professional Ethics in Business, and internationally known student case competitions such as MMICC and MIPC. It will also leverage a robust group of researchers from other Faculties like Law, Public Policy, Economics and Engineering. Your Centre will help bring to the forefront the topic of business ethics to some of McGill's most prestigious units.

MADE by McGill

The Laidley Centre for Business Ethics will be McGill's central home about ethics in business. The Centre will support **teaching, academic research and community engagement** in a manner that responds to the continuous need for solutions to issues surrounding unethical behavior, unethical decision-making and ethical failures within organizations. It will take a comprehensive, interdisciplinary, and action-oriented approach to improving effective ethical decision-making in current and future Canadian and International business leaders by:

1. **Educating current students to develop future-ready, ethical business leaders:** Develop and support business ethics and academic programming and activities for students from Desautels and across the university to collaborate with a wide network of educational and business institutions.
2. **Promoting excellence in research:** Support the pursuit of values-based business ethics research that will influence and educate scholars, students, and business leaders from across all disciplines; focus on organizational values, strategies, and practices to help foster responsible business within organizations.
3. **Undertaking outreach with community and business partners**: Engagement with the broader McGill community, including alumni, businesses, and other educational institutions to encourage discussion and share business ethics best practices realized through programming and research developed under the Centre's umbrella. This will include public symposia, guest lectures, and social media outreach.

Most importantly, your gift will ensure that business ethics is embedded in the Faculty's mission now and in perpetuity.

Heather Hopkinson
Development Officer
T. 514-209-9110
E. heather.hopkinson@mcgill.ca

McGill | DESAUTELS

Made by McGill: THE CAMPAIGN FOR OUR THIRD CENTURY.

Your generous gift of $5 million - $1 million today, $3 million over the next 4 years and a $1 million bequest commitment - will endow the Laidley Centre for Business Ethics and ensure:

- **Immediate gear-up of program operations; beginning with pedagogy development.**
- **Broad community outreach through public Symposia, McGill and Desautels social media channels, guest lectures and round tables.**
- **Proactive student engagement and learning through projects and case competitions.**
- **Research collaboration among top Faculties.**
- **Guidance and insight through your lifetime seat on the Advisory Board.**

Turbo charging the Laidley Centre for Business Ethics:

An additional $2 million in funding from business partners could support some of the following naming opportunities:

- **Fellows - senior industry experts consulting on Laidley Business Ethics Centre activities and areas of focus.**
- **Symposia - enable broad community outreach through quarterly, semi-annual, or annual public events on current and past business ethics issues and interests.**
- **Case Competitions – establish case competitions that will leverage Desautels expertise, focusing on past and present real-world business ethics cases.**