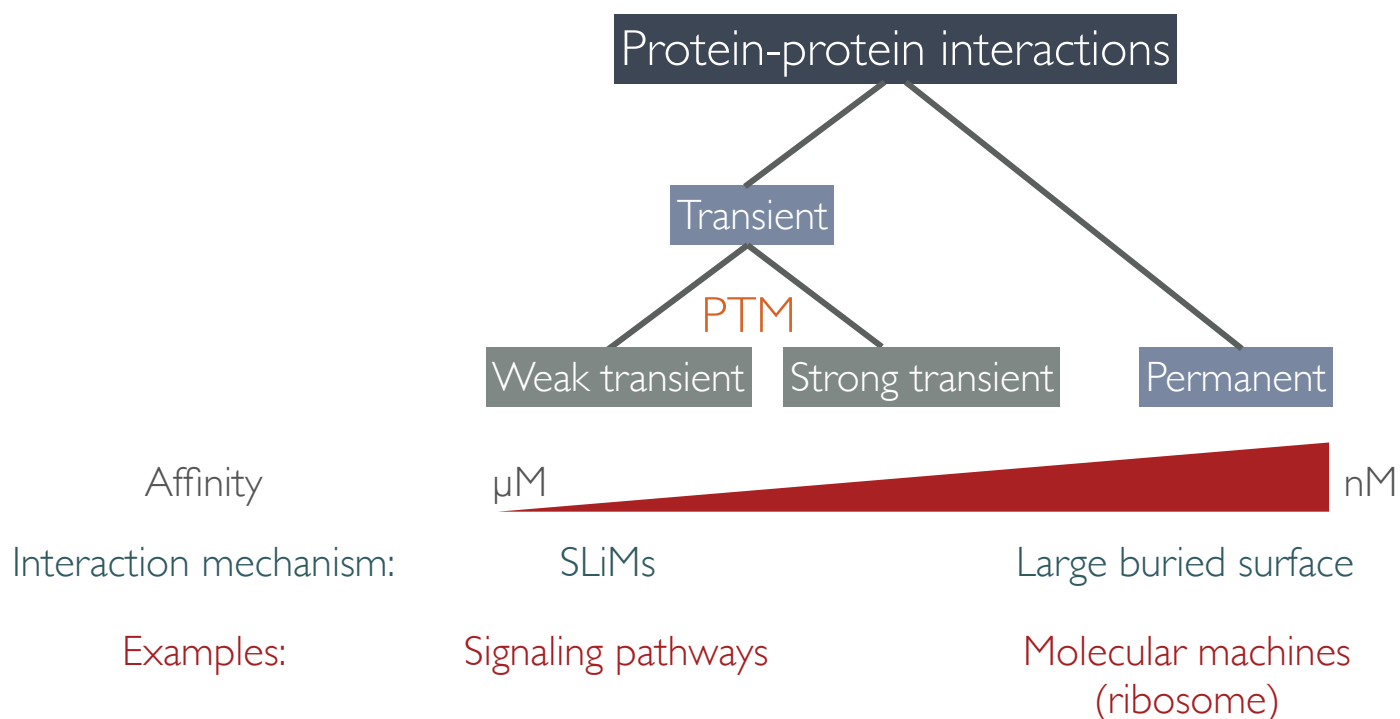


Bulletin



The Canadian Society for Molecular Biosciences
La Société Canadienne pour les Biosciences Moléculaires

2019
www.csmb-scbm.ca



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President's Report 2019

Dr. Tarik Möröy



CSMB President, Tarik Möröy

2018 In 2019 CSMB accelerated the activities covering its main mission, which include the promotion of biomolecular sciences, the fostering of our trainees and students, the organization of scientific meetings with international attendance and visibility, the support of the implementation of equity, diversity and inclusion standards in academic institutions and the general advocacy for science and research towards the federal government. This year, we had the privilege to win over a number of outstanding scientists and biomedical researchers to serve on our board of directors and on our different board committees. Dr. Katey Rayner from the Faculty of Medicine, University of Ottawa and Dr. Vincent Archambault, from the Institut de Recherche en Immunologie et Cancer (IRIC), Université de Montréal joined the board as councillors. Our new Trainee representatives are Matthew David Berg, a Ph.D. candidate from Western University, and Dr. Krysta Coyle, a post-doctoral fellow at Simon Fraser University. We were also very fortunate that we could recruit a number of distinguished colleagues to serve as “at-large” members on our various committees for advocacy, communication, membership, conference organization and the support of trainees. Thanks so much to all of you to help to make our society work and to fulfill our mission. The main events and achievements of our society in 2019 are highlighted here below:

CSMB 62nd annual conference in Montréal

Our 62nd Annual Conference on *Model Systems in Cancer Research* took place in Montreal from June 2-5, 2019, and was hosted this time by the Institute for Research in Immunology and Cancer (IRIC) of the Université de Montréal (UdeM). The CSMB and IRIC both recognize basic research as the basis for understanding the molecular mechanisms of diseases and thus the alliance between both institutions for this annual conference proved to be very fruitful and exciting. Model

organisms, both vertebrate and invertebrate took centre stage at this conference, as well as new and powerful computational tools and chemical approaches to discover new drugs. Of 84 scientific talks, 49 were selected from the submitted abstracts; 39 of these selected were from graduate students and post-docs. The principles of EDI (Equity, Diversity and Inclusion) were on the mind of the organizers, and gender balance was one of the measures implemented at the conference at several levels, such as the composition of the organizing committees and the selection of the speakers and awardees.

Special Workshops at the annual 62nd CSMB conference

The conference included 3 special workshops addressing the principles of EDI, the relationship between science and society, and career planning for trainees. The workshop on *Equity, Diversity & Inclusion (EDI)* aimed to help scientists and researchers of all backgrounds to better understand how we can eliminate unfair treatments in science and foster the development of an environment where everyone can develop their full potential. This workshop had interventions from four, very prominent experts in EDI: Dr. Ève Langelier, Professor in the Department of Mechanical Engineering at Université de Sherbrooke and Chair for Women in Science and Engineering in Quebec, Dr. Imogen Coe, Professor of Chemistry and Biology at Ryerson University and Vice-President of the CSMB, Dr. Michael Hendricks, Professor in the Department of Biology at McGill University, and Roxane de la Sablonnière, Professor in the Department of Psychology at Université de Montréal.

I hosted a session on “*Science and Society*” and had the pleasure to have Kristin Baetz, Professor at the University of Ottawa and past-President of the CSMB, explain how important it is for all of us in academia to engage with politicians, member of parliaments, senators and ministers to explain what we do, and why this is critical for our society. She stressed once again the importance

of the Fundamental Science Review (FSR, also known as the “Naylor report”), the result of a major study done by a high level panel that was requested by the Government of Canada, which laid down the need for increased funding and structural reform of academic research in Canada. A group of activists called Science & Policy Exchange was represented in this session by Marie Franquin, its co-President. She underlined how to bridge the gap between academia, industry, and government to implement evidence-based policy making. As last speaker, Dr. Eric Racine, researcher and professor at the Institut de recherches cliniques de Montréal gave a thoughtful and detailed overview of the ethical implications in practicing science and the place of science in our society.

As were the other two workshops, the third on “Career Planning” was also very well attended; this time in particular by trainees, who had the opportunity to learn first-hand from a senior and a junior principal investigator about the challenges and opportunities of an academic career and the pitfalls when setting up a new lab. The workshop also addressed the many other careers possibilities that exist outside of academia for instance in medical liaison, patenting, science communication or as an editor.

Gender equity and equality in science and medicine

Finding solutions to make science and medicine more inclusive and equitable is at the heart of CSMB’s advocacy efforts. Our Vice-President, Dr. Imogen Coe published a review article in a special issue of *The Lancet* on these topics, which is entitled “*Advancing women in science, medicine and global health*”. Dr. Coe stressed in this article that CSMB surveys approaches and insights that have helped to identify and remove systemic bias and barriers in science and medicine. She went on in her article to indicate that CSMB proposes tools that will help organizational change toward gender equality. These tools include formal legislation and mandated quotas at national or large-scale levels such as gender parity, techniques that increase fairness such as gender equity, through facilitated organizational cultural change at institutional levels, and professional development of core competencies at individual levels. Dr. Coe laid out in other articles she wrote this year, that “this is not only a woman’s issue; this is a human rights issue”.

Awards and distinctions

We were pleased to announce ahead of the 62nd annual conference that we will honor Dr. Sylvain Moineau,

Université Laval as the winner of the 2019 Canadian Science Publishing Senior Investigator Award, Dr. Anne-Claude Gingras, from the Lunenfeld-Tanenbaum Research Institute in Toronto, as the winner of the 2019 CSMB Jeanne Manery Fisher Memorial Lecture, and Dr. Jonathan Schertzer, Associate Professor in the Department of Biochemistry and Biomedical Sciences at McMaster University in Hamilton, as the recipient of the 2019 CSMB New Investigator Award. In the name of the CSMB, I congratulate all the award winners once again for their outstanding work. My congratulations go also to our Vice-President, Imogen Coe, who has received the 2019 Angela Hildyard Recognition Award in Equity, Diversity and Inclusion. Dr. Coe has demonstrated on many occasions over many years that she is an ardent defender of women’s rights, and in particular for the implementation of EDI principles in everyday academic life, in universities, their institutions and committees; she is a strong voice to support in particular female trainees in STEM careers. I would also like to congratulate our secretary James (Jim) Davie for his nomination as a Distinguished Professor for “Outstanding distinction in research and scholarship or in creative professional activity and a significant record in teaching” by the University of Manitoba.

Antibody crisis:

The CSMB trainee committee has addressed a particular problem that is relevant to a wide range of biomedical researchers all over the world; the quality of commercially available antibodies. The trainee committee partnered with BenchSci for a special webinar entitled the “reproducibility crisis”, which generated much attention in the research community. The trainees developed an open-access resource that uses a machine learning algorithm to screen the literature and identify which and how antibodies have been cited. This should ensure that scientists only use antibodies proven to work by peers. This has resulted in the generation of a valuable searchable database that can be interrogated at the BenchSci website and is free for academics. It bears the title: “Run successful experiments with the right antibody”. An excellent initiative of our trainee committee – congratulations!

CSMB as a member of IUBMB

Our general secretary, Dr. James Davie, attended a meeting of the International Union of Biochemistry and Molecular Biochemistry (IUBMB), which took place

August 19-22, 2019 in Kuala Lumpur, Malaysia. One of Dr. Davie's activities at IUBMB will be to link the respective Trainee Committees that are active in the societies affiliated with IUBMB, to promote trainees and their interests at an international level. IUBMB unites biochemists and molecular biologists in 79 countries that belong to the Union as members of a biochemical society, a national research council or an academy of sciences. The mission of IUBMB is very similar to the objectives followed by the CSM; to organize the dissemination of scientific knowledge through conferences of a high international calibre and the promotion of trainees to ensure the next generation of scientists and researchers has the best opportunities for the development of their careers. IUBMB has another mission which is the publication of news, reviews, information, original research and nomenclature. For instance, the well-known journal "Trends in Biochemical Sciences" (TiBS) is published by IUBMB, and is read monthly by over 100,000 scientists across disciplines of biochemistry and molecular biology.

Federal Budget 2019 and Science funding

Budget 2019 was a disappointment to many researchers, who were, and still are, hoping for the full implementation of Canada's Fundamental Science Review. Calls to further #supportthereport have not been successful in initiating a more profound response from the federal government with regard to research funding, and the end of year is a good time to reflect on an effective strategy going forward. CSMB has worked with partners to promote the #VoteScience initiative, which aimed to engage local candidates for political office, to show how science funding is important to all Canadians, and to say that science should be an election issue every time. While most agree that this electoral campaign was not idea-driven, the #votescience campaign was still a success in bringing together like-minded individuals, including 20 organizations from across the country and from different scientific disciplines, all in support of science. This initiative has brought our community together, and makes us hopeful that we can work together again to promote science funding in Canada.

Science as an issue for the 2019 federal election:

Together with my colleague Dr. Katalin Toth, President of the Canadian Association of Neuroscience and Professor at Université Laval, we published an article

in LEDEVOIR and in the National Newswatch, as well as on several online media right after the 2019 election, in which we underlined that Science was not an election issue, but that it should have been one. We outlined that the research community is disappointed that the federal government seems to uphold the position that with the funding increases for science and research in Budget 2018, the issue has been taken care of. It is correct that funding agencies, among them also the CIHR, have received increased funds, but these increases were far from the level and the duration recommended in the Fundamental Science Review. Dr. Toth and I have underlined again in our article that "Science should have been an election issue" and we have formulated three points that the federal government should focus on.

First, the Government must significantly increase investment in science and discovery research. That investment would address the steady decline in research funding in Canada and promote greater international collaboration, multidisciplinary work, and high-risk ventures to prepare our country for the challenges ahead.

Second, the Government must increase investment in the training of the next generation of scientists. This is essential if Canada is to leverage its talent and drive innovation and discovery. Without a commitment to the young researchers of tomorrow, Canada risks seeing its best and brightest be trained elsewhere around the world.

Finally, the Government must increase investment in the Research Support Fund to help institutions across Canada support their researchers as effectively and efficiently as possible. Cutting-edge research happens in universities, hospitals, and research institutes across the country, and their infrastructure is increasingly in need of upgrades and repairs. Our researchers need state-of-the-art infrastructure to continue to do the outstanding work that they do.

Dr. Toth and I have received very positive feedback for our letter from the members of the scientific community, scientists and science administrators alike. We will continue in 2020 to convey the same message, but with Members of Parliament, Ministers and Senators in personal meetings on the Hill.

Celebration of Gairdner week

Phil Hieter, past-President of CSMB, and the trainee representatives of our board of directors Matthew Berg and Krysta Coyle participated in an initiative in celebration of Gairdner week with the Michael Smith Laboratories at U.B.C. and the Gairdner Foundation. Together, they produced a series of documents celebrating the science of this year's Gairdner Award winners. This initiative was aimed at middle/high school students and the general public to explain the science behind each Gairdner Award. The tools are cartoons that are instructive and also funny, and communicate the idea and the value of fundamental discovery-based research to a lay audience. They can be found on our website (csmb-scbm.ca)

CSMB statement on the 30th anniversary of the École Polytechnique de Montreal Massacre

We held our second board meeting in Montreal on December 6th, 2019. This was a particularly important date, because it was the 30th anniversary of the *École Polytechnique de Montréal massacre*. Young women, engineering students, a woman in nursing and a female staff member, were targeted specifically because of anti-feminist hate by a male shooter. The CSMB board of directors issued a statement on that day that such violent misogyny has no place in any of our institutions or our homes in Canada. The CSMB board of directors recognized also in this statement that girls and women continue to face challenges in achieving their full potential in academia and many obstacles in their progress in career pathways. Moreover, the CSMB board of directors also underlined in its statement that any loss of human potential such as this is costly us all, and that gender equity is a goal to be achieved for a better society. The CSMB board has taken this opportunity to emphasize that we as researchers and academic teachers have an obligation to identify and remove misogyny from science – at all levels and in all forms. Therefore, CSMB continues its commitment to support and promote the most inclusive environment for all genders, and members of under-represented and marginalized groups in science, because we recognize inclusive science is in the best interests of all Canadians and for Canadian science.

Outlook

I am writing this report at the end of my second year as president of CSMB and at the height of the COVID-19

crisis that has now spread over the entire world. This pandemic represents an event of a magnitude that none of us has foreseen could happen in our lifetime. In this pandemic, we now face multiple challenges as scientists and academic teachers: our labs and universities are closed and have to be run at a distance using teleconferencing tools such as Zoom or Team. We are used to these types of communication, but not at the level and intensity that has unfolded now at the end of April 2020 as I write this report. We think about how to secure projects, grants, third party funding from various sources, ensuring the well-being of our lab personnel, our students and post-docs, many of them from abroad worrying about their families back home. From the beginning of the crisis we ask ourselves how can we as scientists and researchers act swiftly against SARS-Cov-2, the virus that has caused this pandemic? The virologists among us are already at work trying to understand the intricacies of this new coronavirus variant, as are the chemists and those working in pharmacology who are gearing up to design antivirals, whether it is antibodies or small molecule drug candidates. It becomes clearer every day that we will have to rethink our way of doing science after the pandemic is over and that we will be left with many questions to answer: will we have the same opportunity to travel as much as we used to, have multinational laboratories as we had the privilege to lead in our institutions across the country, will we enjoy the same liberties and freedoms that most of us were accustomed to during our entire lives? How will the pandemic affect government policies, funding institutions and the research enterprise in general? We will have to pull together at a level that we would have never thought possible or necessary before to find the right answers. Despite the big challenges ahead, I am convinced that we will master this as the generations before us mastered similar important crises – in the sense of the slogan that appears all over Montreal these days: It's going to be ok - ça va bien aller!

Incoming Members of the CSMB Executive Board



Dr. Vincent Archambault

Dr. Vincent Archambault, Councillor

Dr. Vincent Archambault is an Associate Professor in the Department of biochemistry and molecular medicine at the Université de Montréal, and a Principal Investigator at the Institute for Research in Immunology and Cancer (IRIC). After undergraduate studies at the Université de Montréal, Vincent completed his Ph.D. at the Rockefeller University in New York City, where he studied cell cycle regulation in yeast. He then conducted post-doctoral work at the University of Cambridge, U.K., where he contributed to a better understanding of mitotic regulation using the fruit fly. Since he opened his lab in 2009, Dr. Archambault has focussed his research on the molecular mechanisms that control mitotic entry and mitotic exit. To this end, his group uses the *Drosophila* system and human cells in culture. The knowledge generated can help understand cancer biology and envision new potential therapeutic avenues.

Dr. Archambault is a strong supporter of basic research. He is convinced that a national organization like the CSMB can play an important role in promoting a vibrant and impactful research ecosystem in Canada. In 2019, Dr. Archambault spearheaded the organization of the CSMB Annual Conference in Montreal.

Le Dr Vincent Archambault est professeur agrégé au Département de biochimie et médecine moléculaire de l'Université de Montréal et chercheur principal à l'Institut de recherche en immunologie et en oncologie (IRIC). Après un baccalauréat à l'Université de Montréal, Vincent a fait son doctorat à la Rockefeller University de New York, où il a étudié la régulation du cycle cellulaire chez la levure. Il a ensuite effectué des travaux post-doctoraux à l'Université de Cambridge, au Royaume-Uni, où il a contribué à mieux comprendre la régulation mitotique à l'aide de la mouche à fruits. Depuis l'ouverture de son laboratoire en 2009, le Dr Archambault a concentré ses recherches sur les mécanismes moléculaires qui contrôlent l'entrée mitotique et la sortie mitotique. À cette fin, son groupe utilise le système de la drosophile et des cellules humaines en culture. Les connaissances générées peuvent aider à comprendre la biologie du cancer et à envisager de nouvelles voies thérapeutiques potentielles.

Le Dr Archambault est un fervent partisan de la recherche fondamentale. Il est convaincu qu'une organisation nationale comme la SCBM peut jouer un rôle important dans la promotion d'un écosystème de recherche dynamique et à haut impact au Canada. En 2019, le Dr Archambault a dirigé l'organisation de la Conférence annuelle de la SCBM à Montréal.



Dr. Katey Rayner

Dr. Katey Rayner, *Councillor*

Katey Rayner is an Associate Professor at the University of Ottawa Heart Institute in the Department of Biochemistry, where she directs the Cardiometabolic microRNA Laboratory. Dr. Rayner obtained her B.Sc. from the University of Toronto, and her Ph.D. from the University of Ottawa. Dr. Rayner's doctoral work focussed on the role of hormones, heat shock proteins and macrophage foam cells in the development of atherosclerosis. After her Ph.D., she pursued a post-doctoral fellowship first at Massachusetts General Hospital, then at New York University School of Medicine, where Dr. Rayner helped to discover a role for microRNAs, specifically microRNA-33, in the regulation of HDL and its atheroprotective effects.

Since establishing her lab at the University of Ottawa, Dr. Rayner's research program focusses on novel mechanisms that underlie the inflammatory processes of plaque progression and vulnerability, with a specific focus on the intersection between macrophage inflammation and microRNAs as drivers of disease. Her group has uncovered a novel role for microRNA control of mitochondrial respiration in macrophage cholesterol efflux. Dr. Rayner's research also examines how extracellular microRNAs are mediating the progression of atherosclerosis in both human and animal models. More recently, her group uncovered a role for programmed necrosis in the development of unstable plaques in mice and how this can be a therapeutic and diagnostic biomarker in humans.

Dr. Rayner is a member of the Royal Society of Canada's College of New Scholars, and has been recognized with awards such as American Heart Association's Irvine H. Page Young Investigator Award and the Canadian Society for Molecular Biosciences New Investigator Award. Dr. Rayner's research is currently funded by the Canadian Institutes for Health Research, the Heart and Stroke Foundation of Canada and the European Cardiovascular Disease Network.



Matthew Berg

Matthew Berg, Councillor, Trainee Representative

Matthew Berg is a Ph.D. candidate in biochemistry at the University of Western Ontario, under the supervision of Dr. Chris Brandl. Broadly, he is interested in mechanisms that control gene expression. He began his research in his undergraduate program, studying transcription regulation and the structure/function of the pseudokinase domain of the transcriptional co-activator Tra1 in yeast. His current research focusses on translation fidelity and tRNA variants that mistranslate the genetic code. Matthew has been supported by an Ontario Graduate Scholarship and currently holds an NSERC Doctoral Research Award.

As a CSMB graduate student representative, Matthew aims to connect Canadian trainees in molecular biosciences and enhance scientific and professional development opportunities. Canadian trainees are the next generation of scientists who will make important discoveries that will shape the world we live in. Matthew plans to advocate for support of fundamental research at all levels and aims to increase visibility of Canadian trainees and their amazing accomplishments.



Dr. Krysta Coyle

Dr. Krysta Coyle, Councillor, Trainee Representative

Krysta Coyle is a post-doctoral fellow at Simon Fraser University in Burnaby, B.C. She completed her Ph.D. at Dalhousie University in Halifax, N.S. in 2018. Her post-doctoral research, working with Dr. Ryan Morin, is focussed on characterizing the effects of regulatory mutations on RNA processing in B cell lymphomas. This work is supported by a CIHR post-doctoral fellowship. Krysta is passionate about helping youth understand how science can help people – inside and outside the lab.

As the CSMB post-doctoral representative, Krysta aims to increase the visibility and appreciation of the contributions that trainees make to fundamental research. She plans to expand opportunities for CSMB trainees to communicate scientific advancements and further develop their professional skills.

Minutes of the 62nd Annual General Meeting 2019

Montreal, QC – Tuesday, June 4, 2019

Attendees: B. Fong, J. Rainey, K. Chan, K. Baetz, J. Davie, B. Stanford, V. Gorbonova, G.D. Gupta, C. Baron, C. Vadnai, F. Sharom, H.-J. Wieden, T. Mörröy, I. Coe, N. Jadavji, M. Scott, P. Hieter, J. Cobb, C. Antonescu, S. Sabatinos, J. Brill, C. Rocheleau, A. Timosheaho, E. Verheyen, L. Alisaraie, J.C. Labbe, D. Barsyte-Lovejoy

1. Welcome (Mörröy)

2. Approval of Quorum and Agenda

Davie declared that quorum was achieved.

Motion: I. Coe moved and K. Baetz seconded that the agenda was appropriate. All members approved.

3. Approval of minutes of the 61st Annual General Meeting in Banff, Alberta, April 12, 2018:

Motion: P. Hieter moved and J. Rainey seconded that the previous Minutes were appropriate. All members approved.

4. Business arising from the minutes:

Davie presented that all action items listed in the previous year's AGM had been achieved. An important goal of the CSMB Board and associated Committees was to ensure gender, language and geographic balance on the Board and Committees. Davie encouraged Society Members who might be interested in joining one of the several CSMB Committees to submit applications to the Board. Meeting updates will be presented later in the meeting.

5. President's Report:

Mörröy reviewed the mandate and vision of the Society. The Canadian Society for Molecular Biosciences is a professional association of active researchers in Biochemistry, Cell Biology, Molecular Biology and Genetics. The CSMB is committed to the promotion of equity, diversity and inclusion in molecular biosciences across Canada. The CSMB plays an important role to foster interaction, communication and collaboration amongst discovery scientists, and to build the next generation of researchers. CSMB sponsors theme-oriented meeting annually. The society participates in science advocacy and science policy activities.

A call is out for At Large members to join one of the CSMB Committees.

Our website is relatively new, and we now have a newsletter. The Board started a new initiative for CSMB members to present highlights of her/his publication. The President and General Secretary will decide which paper will be promoted.

Mörröy reviewed activity of last year, including science advocacy training for CSMB members and Webinars (example, collaboration with BenchSci on antibody crisis). Mörröy reviewed the awards received by the Board members, and highlighted the announcement of Dimensions: Equity, Diversity and Inclusion Canada charter by the honourable Kirsty Duncan and our CSMB champion. The contributions by Imogen Coe were acknowledged. Imogen co-authored a paper "Organisational best practices towards gender and equality in science and medicine" in The Lancet.

6. Secretary's Report:

Davie as Chair of the Awards Committee reported on the Committee's activities this year, including writing new descriptions for CSMB awards. CSMB acknowledges the body of evidence that clearly demonstrates inherent and implicit bias in various aspects of awards processes and commits to ensuring that those evaluating awards fully understand bias and take it into account while considering all nominations. The new descriptions of the awards will soon be on the CSMB website. The CSMB Jeanne Manery Fisher Memorial Lecture award will be offered every year instead of alternate years. Davie asked attendees to nominate their colleagues for these awards. Davie reviewed the CSMB support for graduate student activities, and the Biochemistry and Cell Biology (BCB) Student Article award. The poor uptake of the latter award was highlighted. Davie mentioned the new initiatives of CSMB including the Newsletter. E. Verheyen noted that the visibility of the BCB Student Article award was poor.

Action item: to improve the visibility of the BCB Student Article award.

- a) Davie presented the Membership report (prepared by P. Marignani). Revenue from membership was increased; however, membership numbers had dropped. The fees for the various membership categories was presented. CSMB will introduce a new category for undergraduates wanting to join the Society. Davie requested that members help build membership and any strategies to do so would be most welcomed by the Board.

Davie highlighted the new CSMB activity of a promotional video to be prepared by SlidesLive.

- b) The Trainee report was delivered by Jadavji, who reviewed the Trainee Committee membership and activities, including the Webinars, Science and Policy Exchange Survey, introduction of a CSMB Slack community, Budget 2019 summary/highlights was sent to CSMB trainees and BenchSci Webinar on antibody crisis. Partnership with BenchSci will continue next year on new initiatives. New activities proposed for next year were highlighted.

7. Treasurer's Report:

- a) Presentation of the Accountant's Reviewed Financial Statement:
Rainey provided a detailed analysis of expenses and income for the Society. Efforts were underway on multiple fronts to constrain expenses and improve sustainability.
- b) Acceptance of the Reviewed Financial Statement (2018):
Motion: I. Coe moved and F. Sharom seconded that the Financial Statement submitted by the Society be accepted. All members approved.
- c) Approval of Signing Officers:
Motion: T. Mörröy moved and H.-J. Wieden seconded that Rainey and Davie be approved as Signing Officers on behalf of the Society for the 2019-2020 year. All members approved.

8. Board Membership for 2019-2020:

- a) Councillors and Executive:
Hieter reviewed openings on the Board and nominations earlier received and noted that the quality of applicants was very high, making choices difficult. An important goal was to ensure gender, language and geographic balance. After detailed consideration by the Board, a slate of nominees was recommended for consideration by Members:
Departing Board Members: K. Baetz; C. Baron; B. Fong; N. Jadavji
Renewing Board Members (2-year terms): P. Marignani
New Board Members (2-year terms): V. Archambault; K. Rayner; M. Berg; K. Coyle.
- b) Call for nominations from the Floor:
Hieter called for nominations from the Floor, and none was received. Nominations were closed.

Motion: K. Baetz moved and E. Verheyen seconded that the slate recommended by the Board be approved. All members approved.

9. Board Committees and call for volunteers:

Möröy reviewed Committees (Executive, Advocacy & Communication, Membership & Diversity, Finance & Development, Awards, Conference, Nomination and Trainee) and mandates. Möröy encouraged Society Members who might be interested to submit applications to the Board for membership.

10. Meeting Reports (Wieden):

Wieden reviewed the activities of the Conference Committee, including requesting calls for conference proposals. The goal was to have a better planning horizon for future meetings.

a) **June 2-5, 2019: Montreal**

Model Systems in Cancer Research

b) **May 13-15, 2020: Toronto**

Focussed meeting: A New Vision for Education and Career Development

c) **June 10-12, 2020: Ottawa**

Metabolic Regulation of Cell Signaling

d) **2021: Toronto**

Protein Homeostasis in Health and Disease

e) **2022: Banff**

Membranes

In moving forward, there will be a mail out for proposals for the 2023 meeting and allows better planning. Wieden encouraged Society Members who might be interested to submit a proposal for a meeting to send the proposal to him.

Baetz presented the highlights of the June 2020 Ottawa meeting on “Metabolic Regulation of Cell Signaling”.

11. Other Business/Adjournment

Möröy thanked N. Jadavji, B. Fong, K. Baetz and C. Baron for their dedicated and excellent work for CSMB. No other business noted. Adjournment.

Independent Practitioner's Review Engagement Report

To the Members of
Canadian Society for Molecular Sciences

I have reviewed the accompanying financial statements of Canadian Society for Molecular Sciences (Canadian Society for Molecular Biosciences) that comprise the statement of financial position as at December 31, 2019, and the statements of operations and changes in net assets and cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with Canadian accounting standards for not-for-profit organizations, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Practitioner's Responsibility

My responsibility is to express a conclusion on the accompanying financial statements based on my review. I conducted my review in accordance with Canadian generally accepted standards for review engagements, which require me to comply with relevant ethical requirements.

A review of financial statements in accordance with Canadian generally accepted standards for review engagements is a limited assurance engagement. The practitioner performs procedures, primarily consisting of making inquiries of management and others within the entity, as appropriate, and applying analytical procedures, and evaluates the evidence obtained.

The procedures performed in a review are substantially less in extent than, and vary in nature from, those performed in an audit conducted in accordance with Canadian generally accepted auditing standards. Accordingly, I do not express an audit opinion on these financial statements.

Conclusion

Based on my review, nothing has come to my attention that causes me to believe that the financial statements do not present fairly, in all material respects, the financial position of Canadian Society for Molecular Sciences as at December 31, 2019, and the results of its operations and its cash flows for the year then ended in accordance with Canadian accounting standards for not-for-profit organizations.

Numeris CPA

Numeris CPA Chartered Professional Accountant
Licensed Public Accountant
Ottawa, Ontario June 11, 2020

CANADIAN SOCIETY FOR MOLECULAR BIOSCIENCES

Financial Statement

STATEMENT OF FINANCIAL POSITION

As at December 31, 2019

UNAUDITED

	2019	2018
<hr/>		
ASSETS		
CURRENT		
Cash	\$ 29,900	\$ 11,186
Marketable securities - short term (note 3)	301,950	266,255
Accounts receivable	20,738	7,156
Prepaid expenses	14,158	13,566
	<hr/>	<hr/>
	\$ 366,746	\$ 298,163
	<hr/>	<hr/>
LIABILITIES		
CURRENT		
Accounts payable and accrued liabilities	\$ 12,146	\$ 7,154
Deferred membership fees - short term	22,717	8,799
	<hr/>	<hr/>
	34,863	15,953
DEFERRED MEMBERSHIP FEES - LONG TERM		
	-	9,186
	<hr/>	<hr/>
	34,863	25,139
	<hr/>	<hr/>
	331,883	273,024
	<hr/>	<hr/>
BALANCE		
	\$ 366,746	\$ 298,163
	<hr/>	<hr/>

STATEMENT OF OPERATIONS AND CHANGES IN NET ASSETS

Year ended December 31, 2019

UNAUDITED

	2019	2018
REVENUES		
Annual meeting revenue	\$ 120,722	\$ 115,873
Membership fees	28,029	25,529
Investment income	7,576	6,642
Miscellaneous	1,125	768
	<u>\$ 157,452</u>	<u>\$ 148,812</u>
EXPENDITURES		
Annual meeting (note 4)	69,691	86,229
Science advocacy	14,450	5,771
Administration and communications services	14,361	14,505
Board meetings, AGM, and teleconferencing	13,236	19,457
Student PDF events and travel awards	6,100	6,000
Bank, credit card, and investment management fees	5,861	4,712
Professional fees	2,684	2,375
Society awards	2,087	4,457
Insurance	1,730	1,723
Bulletin	750	-
Office expenses	299	764
International Genetics Conference	-	15,570
Website	-	8,111
	<u>131,249</u>	<u>169,674</u>
(DEFICIENCY) EXCESS OF REVENUES OVER EXPENDITURES BEFORE OTHER ITEMS	<u>26,203</u>	<u>(20,862)</u>
OTHER INCOME		
Gain on sale of marketable securities	6,618	5,219
DEFICIENCY OF REVENUES OVER EXPENDITURES	<u>32,821</u>	<u>(15,643)</u>
NET UNREALIZED GAIN ON MARKETABLE SECURITIES	<u>26,038</u>	<u>(17,934)</u>
DEFICIENCY OF REVENUES OVER EXPENDITURES	<u>58,859</u>	<u>(33,577)</u>
BALANCE, BEGINNING OF YEAR	<u>273,024</u>	<u>306,601</u>
BALANCE, END OF YEAR	<u>\$ 331,883</u>	<u>\$ 273,024</u>

STATEMENT OF CASH FLOWS

Year ended December 31, 2019

UNAUDITED

	2019	2018
OPERATING ACTIVITIES		
Excess (deficiency) of revenues over expenditures	\$ 58,859	\$ (33,577)
Adjustment for gain on sale of marketable securities	(6,618)	(5,219)
	52,241	(38,796)
Change in non-cash working capital items		
Marketable securities – short term	(29,077)	(24,921)
Accounts receivable	13,582	43,633
Prepaid expenses	(592)	11,466
Accounts payable and accrued liabilities	4,991	991
Deferred membership fees – short term	13,918	5,540
	27,900	(2,087)
FINANCING ACTIVITY		
Deferred membership fees - long term	(9,186)	3,412
NET (DECREASE) INCREASE IN CASH	18,714	1,325
CASH, BEGINNING OF YEAR	11,186	9,861
CASH, END OF YEAR	\$ 29,900	\$ 11,186

NOTES TO THE FINANCIAL STATEMENTS

DECEMBER 31, 2019, UNAUDITED

1. NATURE OF OPERATIONS

Canadian Society for Molecular Biosciences (was incorporated without share capital in 1979 under Part II of the Canada Corporations Act and is recognized as a not-for-profit organization for income tax purposes. The main objective of the Society is to foster research and education in the molecular biosciences in Canada.

2. SIGNIFICANT ACCOUNTING POLICIES

The organization applies the Canadian accounting standards for not-for-profit organizations.

(a) Revenue recognition

The organization follows the deferral method of accounting for contributions. Restricted contributions are recognized as revenue in the year in which the related expenditures are incurred. Unrestricted contributions are recognized as revenue when received or receivable if the amount to be received can be reasonably estimated and collection is reasonably assured.

(b) Capital assets

Capital assets purchased at a cost of less than \$2,000 are expensed in the year of purchase. The Society does not own capital assets at this time.

(c) Use of estimates

The preparation of financial statements in conformity with Canadian accounting standards for not-for-profit organizations requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. By their nature, these estimates are subject to measurement uncertainty. The effect of changes in such estimates on the financial statements in future periods could be significant.

(d) Financial instruments

The Society initially measures its financial assets and financial liabilities at fair value.

The Society subsequently measures all its financial assets and financial liabilities at amortized cost, except for investments in equity instruments that are quoted in an active market, which are measured at fair value. Changes in fair value are recognized in the statement of operations.

Financial assets measured at amortized cost include cash and accounts receivable. Financial liabilities measured at amortized cost include accounts payable. The organization's financial assets measured at fair value include quoted shares.

3. MARKETABLE SECURITIES – SHORT TERM

CSMB investments are recorded at market value. As required by CICA Section 3856 unrealized gains or losses on the portfolio as a whole at December 31 are recorded as “Net unrealized gains on marketable securities” and included on the Statement of Operations and Changes in Net Assets.

All amounts below are quoted in Canadian dollars.

	2019	2018
Cash and short term investments	1,572	1,145
Fixed income	103,422	106,662
Common equity	128,141	92,141
Cash and short term investments (US account)	493	756
Common equity (US account)	68,322	65,551
	<u>\$ 301,950</u>	<u>\$ 266,255</u>

4. ANNUAL MEETING

	2019	2018
Exhibit and facility expenses	30,389	4,688
Speakers travel and expenses	16,912	35,621
Receptions and banquets	14,226	32,502
Other annual meeting expenses	5,764	326
Awards - Posters	2,400	1,800
Meeting organizer fees	-	8,930
Meeting supplies	-	2,358
	<u>\$ 69,691</u>	<u>\$ 86,229</u>

5. FINANCIAL INSTRUMENTS RISKS AND UNCERTAINTIES

The organization’s financial instruments consist of cash, short-term investment, accounts receivable, and accounts payable and accrued liabilities. Unless otherwise noted, it is management’s opinion that the organization is not exposed to significant interest rate, currency, credit, liquidity or cash flow risks. The fair value of these financial instruments approximate their carrying values, unless otherwise noted.

Market risk is the risk that the value of a financial instrument will fluctuate as a result of changes in market prices, whether the factors are specific to the instrument or all instruments traded in the market. The CSMB is exposed to market risk due to the volatile nature of equity investments.

6. COMPARATIVE AMOUNTS

The financial statements have been reclassified, where applicable, to conform to the presentation used in the current year. The changes do not affect prior year earnings.

Meeting Report: The 62nd Annual Meeting of the CSMB

Model Systems in Cancer Research

Vincent Archambault

Institute for Research in Immunology and Cancer, Department of Biochemistry and Molecular Medicine, Université de Montréal, Montréal, Canada. vincent.archambault.1@umontreal.ca

Overview

The 62nd Annual Conference of the Canadian Society for Molecular Biosciences (CSMB) took place in Montreal from June 2nd to 5th, 2019. It was hosted by the Institute for Research in Immunology and Cancer (IRIC) of the Université de Montréal (UdeM). For this edition of the meeting, the chosen theme was *Model Systems in Cancer Research*. Understanding the biological bases of cancer as an extremely diverse family of diseases requires a wide range of experimental approaches and model systems. The CSMB and IRIC both recognize basic research as a necessary undertaking for understanding diseases before truly novel approaches can be developed to treat them. Nearly 300 participants, mostly academic researchers and trainees, converged to the conference from across Canada and abroad.

A central stage was given to research using model organisms, both vertebrate and invertebrate. History has shown that they are extremely powerful in accelerating discovery regarding signaling pathways, cell division, cell migration, development and other biological aspects that are perturbed in cancer. Innovative *in vitro*, *in silico* and chemical approaches also took an important place. Research using cell, tissue and patient-derived models was included. In an effort to keep the focus on basic cancer research,

clinical or therapy-oriented research was not prioritized in this meeting.

Most oral sessions were run in parallel, in order to maximize the number of talks. Of the 84 scientific talks, 49 were selected from the submitted abstracts and of these, 39 were from trainees (graduate students and postdocs). Thirty-one accomplished invited speakers selected mostly from Canada gave fascinating talks. All Canadian regions were represented among invited speakers and registered participants. Some of them also came from the U.S.A., U.K. and Germany. The conference was also gender-balanced in all aspects. The program included a keynote lecture, talks by the 2019 CSMB Awardees, poster sessions, special workshops and a festive dinner at a downtown venue.

Keynote Lecture by Helen McNeill

On the first evening, a keynote lecture was delivered by Helen McNeill from Washington University, St. Louis, MO, U.S.A. Dr. McNeill recently moved south after leading her research group in Canada for several years. Over the years, she has made important contributions to topics including the functions of Fat Cadherins, planar cell polarity and the Hippo pathways, using fruit flies, mice and

hydra as models. In her lecture, *Coordinating tissue growth and organization*, Dr. McNeill focused on the role of the Hippo pathway in the regulation of kidney cell proliferation through YAP/TAZ-dependent transcription. She presented much unpublished work showing that the loss of Hippo leads to overproliferation, inflammation, fibrosis and renal cancer in mice.

CSMB 2019 Awardee Lectures

The 2019 New Investigator Award went to Jonathan Schertzer from McMaster University. His talk, entitled *Glucose symbiosis between microbiota and host*, presented research aimed at understanding the central role played by glucose metabolism in the bidirectional relationship between the microbiota and its host in health and disease.

The 2019 Jeanne Manery Fisher Memorial Lecture Award was given to Anne-Claude Gingras of the Lunenfeld-Tanenbaum Research Institute and University of Toronto. In her talk, *A proximity map of a human cell*, Dr Gingras presented her group's colossal efforts in developing and applying tools for the comprehensive identification of interactions and close functional proximity between proteins inside the cell. This ongoing endeavor involves several collaborations with other labs in Canada and abroad.

Sylvain Moineau of Université Laval was the recipient of the 2019 Canadian Science Publishing Senior Investigator Award. His talk, entitled *Phages and CRISPR-Cas Systems: The ongoing battle*, was a remarkable illustration of how basic research can lead to unexpected revolutionary applications in science and medicine. Dr. Moineau's group contributed to the discovery and understanding of a novel bacterial defense mechanism against viral infections. First of interest to the dairy product industry, the CRISPR-Cas system can now be used to modify the genome in virtually any cell type, and it is being exploited in numerous fields of molecular biology and biotechnology. It holds a huge potential for human disease prevention and treatment. Dr. Moineau's enthusiastic talk was highly inspiring for Principal Investigators (PIs) and trainees alike.

Oral sessions

The bulk of the conference was composed of 16 parallel oral sessions, most of them containing 2 talks by invited speakers and 3 shorter talks selected from abstracts submitted by registered participants. The names and affiliations of the speakers in each session, and the titles of their talks can still be found on the conference website (<https://www.fourwav.es/view/1174/customtab831/>).

This meeting gave a fair spotlight on work in yeast as a model organism. Two dedicated sessions together added up to 10 yeast talks, plus a few more comprised in the other sessions. Many aspects of cell biology were explored, all with a relevance to cancer.

Three sessions gave the stage to cancer-related research using "Invertebrates". This meant, of course, a lot of work done with the worm, *Caenorhabditis elegans* (5 talks), and fruit flies, *Drosophila melanogaster* and its cells in culture (9 talks). The meeting organizers also intended to attract researchers who use emerging invertebrate model organisms, but unfortunately Canada hosts very few of them and those who were invited could not attend the conference. Nevertheless, invited speaker Bob Goldstein from the University of North Carolina in Chapel Hill (U.S.A.) talked about his work on understanding how tardigrades (water bears) manage to survive extreme conditions, in particular, how their genome can remain stable even under extreme radiation and desiccation.

Two oral sessions were dedicated to work in mice. In this mammalian model organism, many aspects of cancer biology are very close to humans, and powerful cancer models are constantly being developed and refined. One additional session presented work done in vertebrate models other than mice. Two talks studied development and tissue integrity using zebrafish. Another speaker used the salamander axolotl to study tissue regeneration. In a remarkable talk, invited speaker Vera Gorbunova (University of Rochester, NY, U.S.A.) presented her work to decipher why some animals, including the naked mole rat, live so long and apparently never develop cancer.

In addition to an obvious focus on model organisms, the conference was wide open to other types of model systems and various emerging powerful disciplines in basic cancer research. There were sessions on Biochemical & Biophysical Models, Chemical Biology, Patient-derived Models, Models of Hematopoiesis and Cancer Immunity, Cellular and Tissue Models, Computational Modelling, Stem Cells and Synthetic Biology and Genome Engineering. The parallel session format allowed each participant to choose the sessions that interested them most.

Special Workshops

The conference included 3 special workshops that were all very well attended. Summarized below, the first two took place in consecutive plenary sessions at the opening of the meeting, while the third one was held on a different day in parallel to the CSMB Annual General Assembly.

Equity, Diversity & Inclusion (EDI). Recent years have brought an accelerated increase in our collective awareness of the difficulties faced by various groups that have been historically less included in science. The goal of this EDI workshop was to help scientists of all career stages, identities and backgrounds, to understand the complex sources of these difficulties, and to identify effective ways by which we can eliminate unfair treatments in science and foster the development of everyone to their full potential. The workshop had 4 panelists. First, Ève Langelier, Professor in the Department of Mechanical Engineering at Université de Sherbrooke and Chair for Women in Science and Engineering in Quebec, presented her perspective on the barriers often faced by women in science and technology. Imogen Coe, Professor of Chemistry and Biology at Ryerson University and Vice-President of the CSMB, is a leading expert in EDI matters in Canada. Her talk provided a broad overview of the issues, with some specific paths to solutions. Michael Hendricks, Professor in the Department of Biology at McGill University and founder of the Association of Canadian Early Career Health Researchers, also gave a well-researched presentation, including an explanation of how even funding initiatives may be intrinsically

biased. Finally, Roxane de la Sablonnière, Professor in the Department of Psychology at Université de Montréal, helped understand the psychological and sociological challenges associated with integration, from the points of view of both the minority and dominant groups.

Science & Society. This session was hosted by Tarik Mörröy, President of the CSMB. First, Kristin Baetz, Professor at the University of Ottawa and past-President of the CSMB, pleaded vigorously for academic researchers of all career stages to engage in discussions with politicians to explain the urgent need to invest more public funds in independent academic research. This need was clearly demonstrated in 2017 by the Fundamental Science Review, the result of a major study requested by the Government of Canada; however, the Government has not yet implemented its recommendations. Marie Franquin, Co-President of Science & Policy Exchange, presented how this group of young activists is acting to bridge the gap between academia, industry, and government to inspire evidence-based policy making. Finally, Éric Racine, Researcher in biomedical ethics at the Institut de Recherches Cliniques de Montréal, offered a thoughtful philosophical outlook on the place of science in our lives and in society. Of note, Mona Nemer, Chief Science Advisor of Canada, had agreed to participate in this workshop, but had to cancel due to unforeseen circumstances.

Career Planning. This workshop was very well attended by trainees. Two PIs shared their thoughts and advice. Claude Perreault, group leader at IRIC and full Professor in the Department of Medicine at UdeM, explained the challenges and sources of fulfilment that come with a successful career in academic biomedical research. Stephanie Weber, Assistant Professor in the Department of Biology, McGill University, shared her recent experience in setting up a lab and getting started as an independent researcher. Importantly, the workshop also provided selected windows on the many careers possibilities that exist outside of academia. Michel Paré presented an overview of what it is like to work in Medical Science Liaison for a private company.

Julie Lambert, Senior Advisor, Government and Institutional Relations, UdeM, presented one of several possible avenues in the public sector. Finally, Martin Primeau, Journalist/ Researcher/ Content Creator/ Editor, explained how stimulating it is to develop a career aimed at communicating science to various audiences through different media.

Poster Sessions

The conference also gave a stage to 98 poster presentations by trainees and PIs, which were divided between two sessions. These extended the themes of the oral sessions and gave the opportunity to all participants who wished to present to do so. The best poster presentations were recognized with prizes (see below).

A great success for all involved

The IRIC and UdeM were honoured to host the CSMB's Annual Conference. In return for the amazing work of its staff in organizing, publicizing and running the event, IRIC benefited from a formidable scientific conference of national scale within its walls. All revenues generated by the conference will allow the CSMB to continue to develop its activities aimed at advocating for research, promoting collaboration, supporting trainees and celebrating achievements in the molecular biosciences in Canada.

Rapport d'événement: 62e congrès annuel de la SCBM

Systèmes modèles en recherche sur le cancer

Vincent Archambault

Institute for Research in Immunology and Cancer, Department of Biochemistry and Molecular Medicine, Université de Montréal, Montréal, Canada. vincent.archambault.1@umontreal.ca

Aperçu

Le 62^e Congrès annuel de la Société canadienne pour les biosciences moléculaires (SCBM) a eu lieu à Montréal du 2 au 5 juin 2019. Il a été organisé par l'Institut de recherche en immunologie et en oncologie (IRIC) de l'Université de Montréal (UdeM). Pour cette édition, le thème choisi était les *Systèmes modèles en recherche sur le cancer*. Comprendre les bases biologiques du cancer en tant que famille de maladies extrêmement diversifiée nécessite un large éventail d'approches expérimentales et de systèmes modèles. La SCBM et l'IRIC reconnaissent tous deux que la recherche fondamentale est nécessaire pour comprendre les maladies avant de pouvoir développer des approches véritablement nouvelles pour les traiter. Près de 300 participants, pour la plupart des chercheurs universitaires, étudiants gradués et postdoc, ont convergé à la conférence en provenance de partout au Canada et même de l'étranger.

Une place centrale a été donnée à la recherche utilisant des organismes modèles, vertébrés comme invertébrés. L'histoire a montré qu'ils sont extrêmement puissants pour accélérer les découvertes concernant les voies de signalisation, la division cellulaire, la migration cellulaire, le développement et d'autres aspects biologiques

perturbés dans les cancers. Des approches innovatives *in vitro*, *in silico* et chimiques ont aussi pris une place importante. La recherche utilisant des modèles dérivés de cellules, de tissus et de patients a été incluse au programme. Les recherches cliniques ou à visées thérapeutiques n'ont pas été priorisées lors de ce congrès, de manière à maintenir l'accent sur la recherche fondamentale reliée au cancer.

La plupart des séances orales se sont déroulées en parallèle, afin de maximiser le nombre de présentations orales. Sur les 84 exposés oraux scientifiques, 49 ont été sélectionnés parmi les résumés soumis et 39 d'entre eux provenaient d'étudiants gradués et postdocs. Trente et un conférenciers invités accomplis, choisis principalement au Canada, ont fait des présentations fascinantes. Toutes les régions du Canada étaient représentées parmi les conférenciers invités et les participants inscrits. Certains sont venus aussi des États-Unis, du Royaume-Uni et d'Allemagne. La conférence était aussi équilibrée entre les genres dans tous ses aspects. Le programme comprenait une conférence d'ouverture, des séminaires par les lauréats des prix 2019 de la SCBM, des séances de présentations par affiches, des ateliers spéciaux et un souper festif dans un restaurant au centre-ville.

Conférence d'ouverture par Helen McNeill

Le premier soir, la conférence d'ouverture a été donnée par Helen McNeill de l'Université de Washington, St. Louis, MO, U.S.A. La Dre. McNeill a récemment déménagé au sud après avoir dirigé son groupe de recherche au Canada pendant plusieurs années. Au fil des ans, elle a apporté d'importantes contributions à des sujets tels que les fonctions des cadhérines Fat, la polarité cellulaire planaire et les voies Hippo, en utilisant la mouche à fruits, la souris et l'hydre comme modèles. Dans sa conférence, *Coordinating tissue growth and organization*, Dre. McNeill s'est concentrée sur le rôle de la voie Hippo dans la régulation de la prolifération des cellules rénales via la transcription dépendante de YAP/TAZ. Elle a présenté de nombreux travaux encore non publiés, montrant que la perte d'Hippo conduit à une prolifération excessive, une inflammation, une fibrose et un cancer du rein chez la souris.

Conférences des récipiendaires des prix SCBM 2019

Le prix du Nouveau chercheur 2019 a été décerné à Jonathan Schertzer de l'Université McMaster. Son exposé, intitulé *Glucose symbiosis between microbiota and host*, a présenté des recherches visant à comprendre le rôle central joué par le métabolisme du glucose dans la relation bidirectionnelle entre le microbiote et son hôte dans des contextes sains et de maladie.

Le prix Conférence d'honneur Jeanne Manery Fisher 2019 a été décerné à Anne-Claude Gingras de l'Institut de recherche Lunenfeld-Tanenbaum et de l'Université de Toronto. Dans sa présentation, *A proximity map of a human cell*, la Dre. Gingras a présenté les efforts colossaux de son groupe dans le développement et l'application d'outils pour l'identification à grande échelle des interactions et des relations fonctionnelles étroites entre les protéines à l'intérieur de la cellule. Ce grand projet implique plusieurs collaborations avec d'autres laboratoires au Canada et à l'étranger.

Sylvain Moineau de l'Université Laval a été le récipiendaire du Prix du Scientifique chevronné de Canadian Science Publishing. Son exposé intitulé, *Phages and CRISPR-Cas Systems: The ongoing battle*, était une illustration remarquable de

la façon dont la recherche fondamentale peut conduire à des applications révolutionnaires inattendues en science et en médecine. Le groupe du Dr. Moineau a contribué à la découverte et à la compréhension d'un nouveau mécanisme de défense bactérienne contre les infections virales. D'abord d'intérêt pour l'industrie des produits laitiers, le système CRISPR-Cas peut désormais être utilisé pour modifier le génome dans pratiquement tous les types de cellules, et il est aujourd'hui exploité dans de nombreux domaines de la biologie moléculaire et de la biotechnologie. Il tient un énorme potentiel pour la prévention et le traitement des maladies humaines. La présentation enthousiaste du Dr. Moineau a été très inspirante pour tous.

Séances orales

La majeure partie de la conférence était composée des 16 séances orales parallèles. La plupart d'entre elles contenaient 2 présentations par des conférenciers invités et 3 présentations plus courtes choisies parmi les résumés soumis par les participants inscrits. Les noms et les affiliations des orateurs de chaque session, ainsi que les titres de leurs exposés peuvent toujours être consultés sur le site Web du congrès (<https://www.fourwav.es/view/1174/customtab831/>).

La conférence a mis des projecteurs sur les recherches avec les levures comme organismes modèles. Deux séances dédiées aux levures ont totalisé 10 présentations, plus quelques autres aux saveurs de levures comprises dans les autres séances. De nombreux aspects de la biologie cellulaire ont été explorés, tous en rapport avec le cancer.

Trois séances ont mis en vedette la recherche sur le cancer en utilisant des "Invertébrés". Cela signifiait bien sûr beaucoup de travail avec le ver, *Caenorhabditis elegans* (5 présentations), et la mouche à fruits, *Drosophila melanogaster* et ses cellules en culture (9 exposés). Les organisateurs de la réunion avaient l'intention d'attirer aussi des chercheurs qui utilisent des organismes modèles invertébrés émergents, mais malheureusement, le Canada en héberge très peu et ceux qui ont été invités n'ont pas pu être présents au congrès.

Néanmoins, le conférencier invité Bob Goldstein de l'Université de Caroline du Nord à Chapel Hill (États-Unis) a parlé de son travail pour comprendre comment les tardigrades parviennent à survivre dans des conditions extrêmes; en particulier comment leur génome peut rester stable même sous des radiations extrêmes et la dessiccation.

Deux séances orales ont été consacrées aux travaux chez la souris. Dans cet organisme modèle mammifère, de nombreux aspects de la biologie du cancer sont très proches de l'humain, et de puissants modèles de cancer sont constamment développés et affinés. Une séance supplémentaire a présenté des recherches effectuées sur des modèles de vertébrés autres que les souris. Deux présentations ont porté sur le développement et l'intégrité des tissus chez le poisson zèbre. Un autre orateur avait utilisé la salamandre axolotl pour étudier la régénération tissulaire. Dans une présentation remarquable, la conférencière invitée Vera Gorbunova (University of Rochester, NY, U.S.A.) a présenté son travail pour comprendre pourquoi certains animaux, incluant le rat taupe nu, vivent si longtemps et ne développent apparemment jamais de cancer.

En plus d'une focalisation évidente sur les organismes modèles, le congrès était grand ouvert à d'autres types de systèmes modèles et à diverses disciplines émergentes puissantes en recherche fondamentale sur le cancer. Il y avait des séances sur les modèles biochimiques et biophysiques, la biologie chimique, les modèles dérivés de patients, les modèles d'hématopoïèse et d'immunité contre le cancer, les modèles cellulaires et tissulaires, la modélisation informatique, les cellules souches et la biologie synthétique et l'ingénierie génomique. Le format par séances parallèles a permis à chaque participant de choisir la séance qui l'intéressait le plus.

Ateliers spéciaux

Le congrès comprenait 3 ateliers spéciaux qui ont tous été très suivis. Résumés ci-dessous, les deux premiers ont eu lieu en séances plénières consécutives à l'ouverture de l'événement, alors que le troisième a eu lieu un autre jour en parallèle de l'Assemblée générale annuelle de la SCBM.

Équité, Diversité et Inclusion (ÉDI). Les dernières années ont amené une accélération de notre prise de conscience collective des difficultés rencontrées par divers groupes historiquement moins inclus en science. Le but de cet atelier ÉDI était d'aider les scientifiques de tous les stades de carrière, identités et origines, à comprendre les sources complexes de ces difficultés, et à identifier des moyens efficaces par lesquels nous pouvons éliminer les traitements injustes en science et favoriser le développement de chacun vers son plein potentiel. L'atelier comptait 4 panélistes. Tout d'abord, Ève Langelier, professeure au Département de génie mécanique à l'Université de Sherbrooke et titulaire de la Chaire pour les femmes en sciences et en génie au Québec, a présenté son point de vue sur les barrières auxquelles les femmes font souvent face en science et en technologie. Imogen Coe, professeure de chimie et de biologie à l'Université Ryerson et Vice-présidente de la SCBM, est une experte de premier plan en matière d'ÉDI au Canada. Son exposé a donné un large aperçu des problèmes, avec quelques pistes spécifiques de solutions. Michael Hendricks, professeur au Département de biologie de l'Université McGill et fondateur de l'Association des chercheurs canadiens en santé en début de carrière, a également donné une présentation recherchée, expliquant notamment comment même des initiatives de financement peuvent être intrinsèquement biaisées. Enfin, Roxane de la Sablonnière, professeur au Département de psychologie à l'Université de Montréal, a aidé à comprendre les défis psychologiques et sociologiques liés à l'intégration, à la fois des points de vue des minorités et des groupes dominants.

Science et société. Cette séance était animée par Tarik Möröy, Président de la SCBM. Premièrement, Kristin Baetz, professeure à l'Université d'Ottawa et ancienne présidente de la SCBM, a vivement incité les chercheurs universitaires à tous les niveaux de carrière à engager des discussions avec les politiciens pour expliquer l'urgence d'investir davantage de fonds publics dans la recherche universitaire indépendante. Ce besoin a été clairement démontré en 2017 par l'Examen du soutien fédéral aux sciences, résultat d'une étude

importante commandée par le gouvernement du Canada; toutefois, le gouvernement n'a toujours pas mis en œuvre ses recommandations. Marie Franquin, Co-présidente de Science & Policy Exchange, a expliqué comment ce groupe de jeunes militants agit pour construire des ponts entre le monde universitaire, l'industrie et le gouvernement de manière à inspirer des politiques fondées sur des évidences scientifiques. Enfin, Éric Racine, Chercheur en éthique biomédicale à l'Institut de Recherches Cliniques de Montréal, a offert une réflexion philosophique sur la place de la science dans nos vies et dans la société. Il est à noter que Mona Nemer, Conseillère scientifique en chef du Canada, avait accepté de participer à cet atelier, mais a dû annuler en raison de circonstances imprévues.

Planification de carrière. Cet atelier a été très bien suivi par les étudiants gradués et postdocs. Deux chercheurs principaux ont partagé leurs réflexions et leurs conseils. Claude Perreault, chercheur principal à l'IRIC et professeur titulaire au Département de médecine de l'UdeM, a expliqué les défis et les sources d'épanouissement qui découlent d'une carrière réussie dans la recherche biomédicale universitaire. Stephanie Weber, professeure adjointe au Département de biologie de l'Université McGill, a partagé son expérience récente dans le démarrage d'un laboratoire comme chercheure indépendante. Fait important, l'atelier a également exploré quelques-unes des nombreuses possibilités de carrière qui existent en dehors du monde universitaire. Michel Paré a présenté un aperçu de ce que c'est que de travailler en liaison médicale pour une entreprise privée. Julie Lambert, Conseillère principale aux relations gouvernementales et institutionnelles à l'UdeM, a présenté l'une des nombreuses pistes possibles dans le secteur public. Enfin, Martin Primeau, Journaliste/ chercheur/ créateur de contenu/ éditeur, a expliqué comment il est stimulant de développer une carrière visant à communiquer la science à différents publics à travers différents médias.

Séances par affiches

La conférence a également donné lieu à 98 présentations par affiches qui ont été réparties entre deux séances. Celles-ci ont élargi les thèmes des séances orales et ont donné l'occasion à tous les participants qui souhaitaient présenter de le faire. Les meilleures présentations par affiches ont été récompensées par des prix (voir ci-dessous).

Un grand succès pour tous les acteurs

L'IRIC et l'UdeM ont eu l'honneur d'accueillir le Congrès annuel de la SCBM. En contrepartie du travail remarquable de son personnel dans l'organisation, la publicité et la coordination de l'événement, l'IRIC a bénéficié en son sein d'un formidable événement scientifique d'envergure nationale. Tous les revenus générés par la conférence permettront à la SCBM de continuer à développer ses activités visant à promouvoir la recherche, favoriser la collaboration, soutenir la relève scientifique et à reconnaître les accomplissements dans les biosciences moléculaires au Canada.

Scenes from the 62nd Annual Meeting Montréal, 2019

All photos by James Davie unless otherwise noted



The Institute for Research in Immunology and Cancer (IRIC) of the Université de Montréal/L'Institut de recherche en immunologie et en cancérologie (IRIC) de l'Université de Montréal (photos: Christian Brault)



Registration desk



Participants enjoying their lunch break



Conference participants visited the booths of the conference exhibitors



Dr. Marc Therrien, Scientific Director of IRIC/Dr. Marc Therrien, Directeur scientifique de l'IRIC (photo: Christian Charbonneau)



Dr. Tarik Möröy, President of the CSMB, opens the conference



Participants enjoying a scientific discussion/ Participantes en pleine discussion scientifique (photo: Christian Brault)



Participants attending an oral session/Participantes assistant à une séance de présentations orales (photo: Christian Brault)



Conference participants at the oral sessions



Keynote speaker, Dr. Helen McNeill (Washington University, St. Louis) gives her talk on "Coordinating tissue growth and organization"



Dr. Jonathan Schertzer, winner of the CSMB New Investigator Award for 2019, with Dr. Tarik Möröy, CSMB President



CSMB President, Dr. Tarik Möröy, congratulates Dr. Anne-Claude Gingras, the 2019 Jeanne Manery Fisher Memorial Award Lecturer



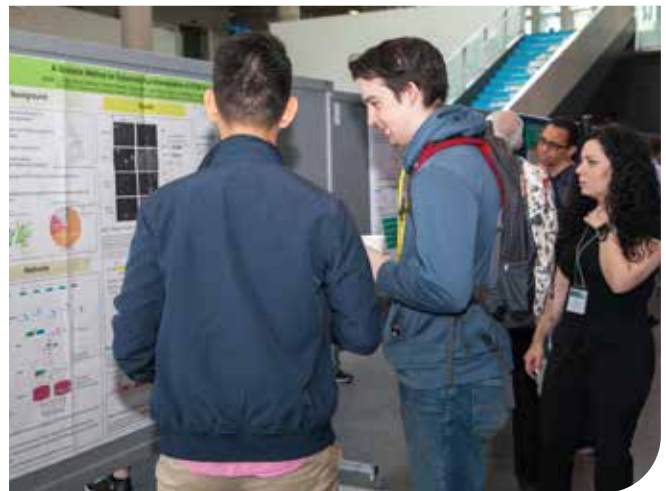
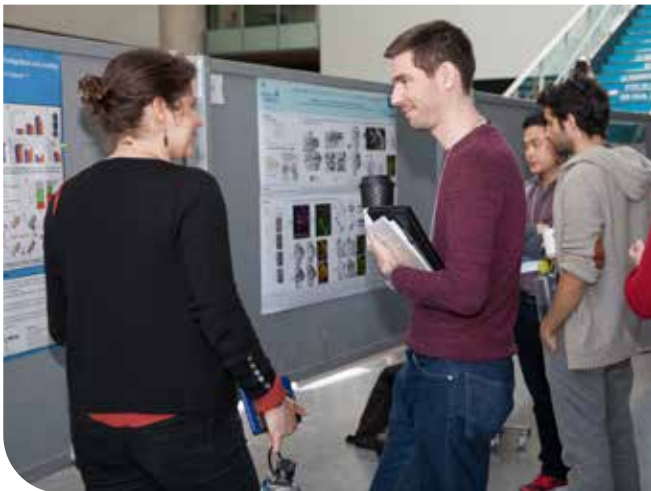
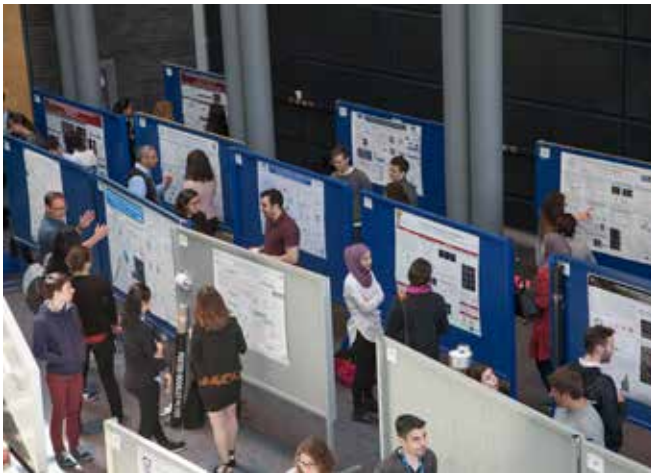
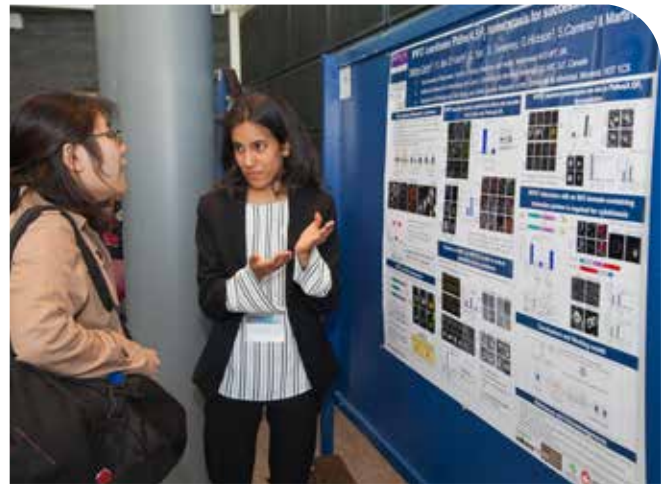
Dr. Sylvain Moineau, winner of the 2019 Canadian Science Publisher Award, is congratulated by Dr. Imogen Coe, CSMB Vice President



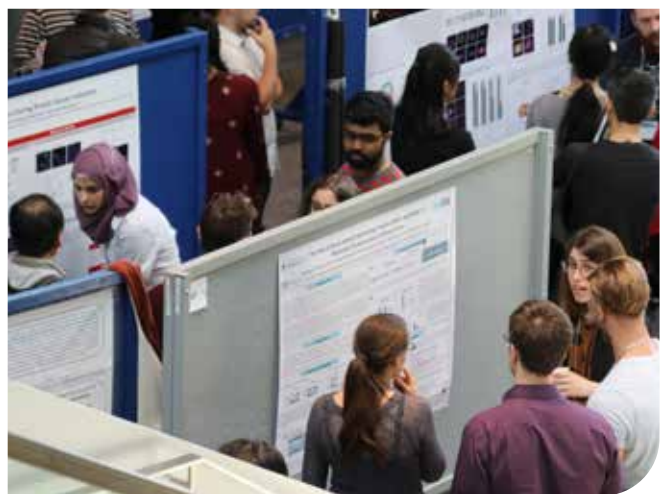
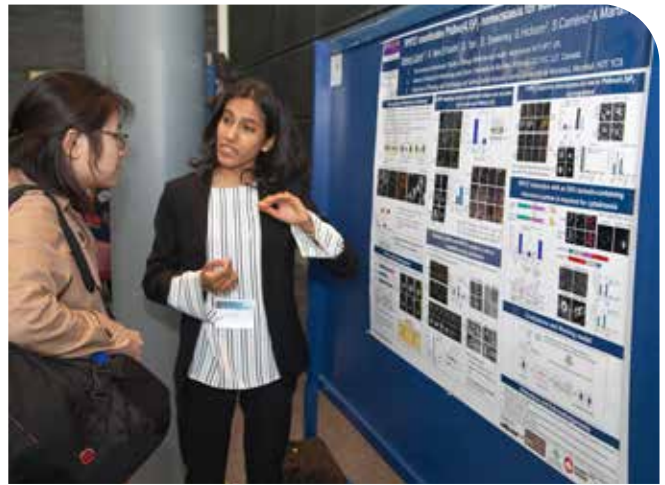
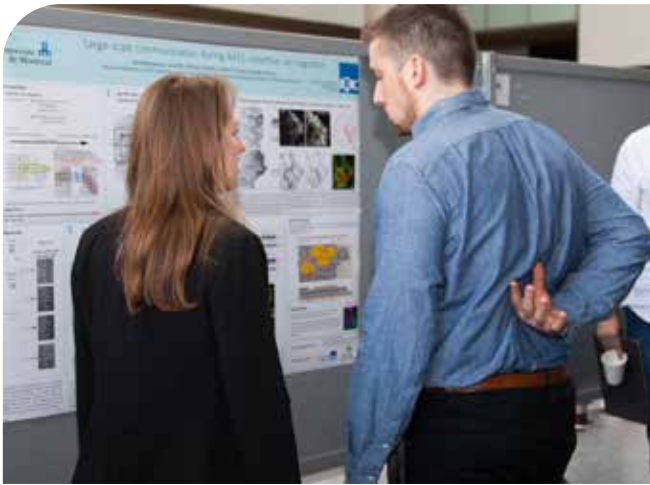
Panelists of the Equity, Diversity and Inclusion Workshop/Panélistes de l'atelier Équité, Diversité et Inclusion. From left to right/De gauche à droite: Imogen Coe, Ève Langelier, Michael Hendricks and Roxane de la Sablonnière (photo: Christian Brault)



Questions from the audience at the Equity, Diversity and Inclusion Workshop



Discussions at the poster sessions (photos: Christian Brault)



Conference attendees presenting their posters (top 4 photos: Christian Brault)



The Science & Society Workshop was presided over by a panel of experts with expertise on different aspects of these interactions



Dr. Tarik Mörröy acting as moderator for the Science & Society Workshop/Dr. Tarik Mörröy agissant comme modérateur de l'atelier Science & Société (photo: Christian Brault)



Marie Franquin, Co-President of the Science and Policy Exchange



Kristin Baetz, Professor at the University of Ottawa, and Past-President of the CSMB



Eric Racine, Researcher in Biomedical Ethics at the IRCM (Institut de Recherches Cliniques de Montréal)



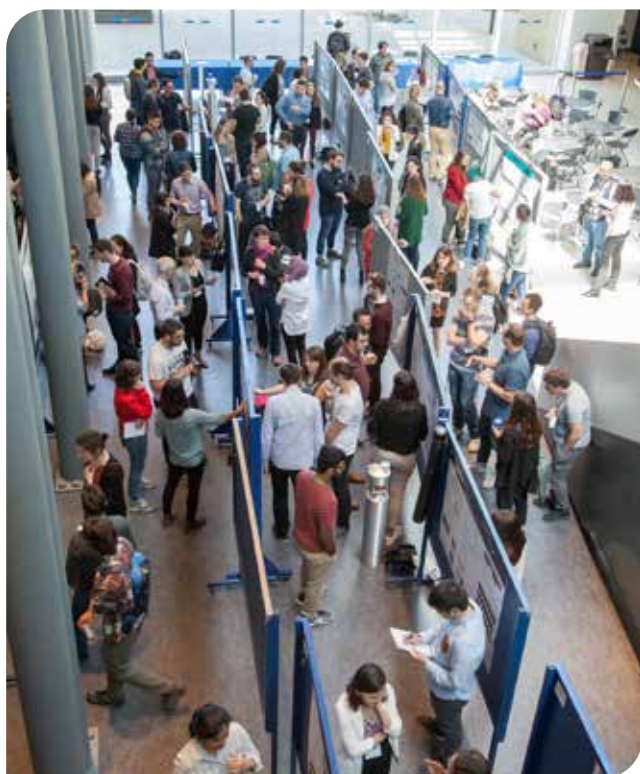
Poster award winners with Dr. Imogen Coe, Vice-President of the CSMB



Poster award winners with Dr. Vincent Archambault, Université de Montréal, Co-Chair of the Local Organizing Committee



Recipients of poster awards/Gagnants des prix pour présentations par affiches. Top row, from left to right/Rangée du haut, de gauche à droite: Imogen Coe (Vice-President of the CSMB/Vice-Présidente de la SCBM), Nicholas Iannantuono, Wayne Stallaert, Sarah Marullo, Antoine Bouchard, Marion Lacroix, Camille de Jamblinne, Audrey Paillé. Bottom row, from left to right/Rangée du bas, de gauche à droite: Julie Lessard (co-organiser/co-organisatrice), Laura Orofiamma, Keerthana Harwalkar, Sabrya Carim, Maxime Uriarte, Kumar Sampath Loganathan, Myreille Larouche, Vincent Archambault (co-organiser/co-organisateur) (photo: Christian Charbonneau)



Bird's eye view of the poster presentation venue/Vue d'oiseau d'une séance de présentations par affiches (photos: Christian Charbonneau)

Poster and Travel Award Recipients

2019 CSMB Annual Scientific Meeting, Montréal, QC

POSTER AWARD RECIPIENTS

AWARDEE	UNIVERSITY
Audrey Paillé	Université de Sherbrooke
Camille de Jamblinne	IRIC, Université de Montréal
Myreille Larouche	IRIC, Université de Montréal
Marion Lacroix*	Institut de Recherches Cliniques de Montréal
Kumar Sampath Loganathan*	Lunenfeld-Tanenbaum Research Institute
Maxime Uriarte	Centre de Recherche de l'Hôpital Maisonneuve-Rosemont, Université de Montréal
Sarah Marullo	IRIC, Université de Montréal
Antoine Bouchard	IRIC, Université de Montréal
Sabrya Carim	University of Manchester, U.K.; Centre de recherche de l'Hôpital Ste-Justine, Université de Montréal
Keerthana Harwalkar	Goodman Cancer Research Centre, McGill University
Laura Orofiamma	Ryerson University
Wayne Stallaert	University of North Carolina at Chapel Hill
Nicholas Iannantuono	IRIC, Université de Montréal
*ex aequo	

TRAVEL AWARD RECIPIENTS

AWARDEE	UNIVERSITY
Louis-Alexandre Fournier	University of British Columbia
Gizem Esra Genc	Ryerson University
Laurence Faucher-Giguère	Université de Sherbrooke
Elizabeth Walden	University of Ottawa
Stephen Kinsey	Simon Fraser University
Vy Ngo	University of Western Ontario

Trainee Committee Activities 2019

Meet your 2019 CSMB Trainee Representatives

Krysta Coyle, post-doctoral fellow, Simon Fraser University
Matthew Berg, Ph.D. candidate, Western University



Dr. Krysta Coyle



Matthew Berg

Other at-large Trainee Committee members: for 2018 were:
Karina Baksh, Ph.D. candidate, University of Toronto
Rebecca Cabral-Dias, Ph.D. candidate, Ryerson University
Sarah Chadwick, Ph.D. candidate, University of Western Ontario

Dr. Priyanka Mishra, post-doctoral fellow, Simon Fraser University

Farah Qaiser, Ph.D. candidate, University of Toronto
Shawn Shortill, M.Sc. candidate, University of British Columbia



Karina Baksh



Rebecca Cabral-Dias



Sarah Chadwick



Dr. Priyanka Mishra



Farah Qaiser



Shawn Shortill

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The Trainee Committee held several meetings in 2019 to plan and execute a number of initiatives, as outlined below:

Budget 2019 summary for scientific trainees

The trainee committee prepared a summary of the 2019 Federal Budget and its impact on scientific research for trainees. We welcomed several advances in funding graduate students, support for Indigenous trainees, increased attention paid to trainees from low-income backgrounds, and increased parental leave coverage for trainee members awarded federal Tri-Council scholarships and fellowships.

We also identified several missed opportunities, including investments in training of post-doctoral fellows and full implementation of the Fundamental Science Review (i.e. the Naylor Report).

Professional development webinars

The trainee committee held two webinars which were open to all CSMB members. In March 2019, Drs. Nafisa Jadavji and Imogen Coe shared “Presenting your data at Scientific Meetings,” which included tips on poster presentations, scientific talks, and handling questions.

In May 2019, the trainee committee partnered with BenchSci for a webinar titled, “The Antibody Crisis: Leveraging machine learning for evidence-based antibody search”. This session tackled the importance of antibodies in performing reproducible research and the resources available through BenchSci.

An active Slack community

As part of our ongoing efforts to build community among trainees and scientists in the molecular biosciences, the trainee committee continued to share career profiles and professional development opportunities, promote scientific advocacy initiatives, and humorous scientific content. Please contact current trainee representatives for more information on joining us!

2020 CSMB Award Designates



CSMB New Investigator Award

The CSMB New Investigator Award recognizes meritorious research in one or more of the fields of biochemistry, molecular or cellular biology in Canada. Recipients have ten years or less of independent research experience, and demonstrate outstanding research accomplishments.

Dr. Greg Fairn

Staff Scientist, St. Michael's Hospital, Unity Health Toronto; Associate Professor, Departments of Surgery and Biochemistry, University of Toronto

Greg Fairn received his Ph.D. from Dalhousie University in 2007 after studying yeast genetics, lipid biochemistry, and cell biology in the lab of Dr. Chris McMaster in the Department of Biochemistry and Molecular Biology. He then moved to the Hospital for Sick Children in Toronto to work with Dr. Sergio Grinstein. His post-doctoral work focused on macrophage biology, phagocytosis, cell polarity, and advanced microscopy. Dr. Fairn's research program continues to focus on lipid and membrane biochemistry and its importance to cell biology and physiology. Ongoing projects involve studying the role of ER-phagosome contact sites, phagocytosis of pathogens and apoptotic cells, protein lipidation,

membrane nanodomains, and vesicular trafficking. These processes are studied in the context of heart disease, cancer biology, infection and inflammation. Previously, Dr. Fairn received the Walter Shaw Young Investigator Award from the American Society for Biochemistry and Molecular Biology, an Early Researcher Award from the Ministry of Innovation Ontario, and a New Investigator Award from the Canadian Institutes for Health Research. Dr. Fairn's research is currently funded by the Canadian Institutes for Health Research and the Natural Sciences and Engineering Research Council of Canada, and previously by the J.P. Bickell Foundation and the Canadian Consortium on Neurodegeneration in Aging.

NRC Research Press Senior Investigator Award

This award recognizes a record of outstanding achievement in research in one or more of the fields of biochemistry, molecular or cellular biology, undertaken in Canada by a Canadian scientist.



Dr. Daniel Durocher

Senior Investigator and Director of the Biomedical Program, Lunenfeld-Tanenbaum Research Institute; Professor, Department of Molecular Genetics, University of Toronto; Thomas Kierans Chair in Molecular Mechanisms of Cancer Development; Canada Research Chair (Tier 1) in Molecular Genetics of the DNA Damage Response

Dr. Durocher grew up near Montréal and obtained a B.Sc. degree in Biochemistry at Université de Montréal before graduating with a Ph.D. degree in Experimental Medicine from McGill University. Dr. Durocher undertook his post-doctoral training and established his group at the Lunenfeld-Tanenbaum Research Institute in Toronto, where he has been ever since. Dr. Durocher's overarching interest lies in understanding how cells maintain genome integrity, with an emphasis on the detection, signalling and repair of DNA double-strand breaks.

Dr. Durocher has received numerous awards for his work, including the 2015 Paul Marks Prize from Memorial Sloan-Kettering. Dr. Durocher also co-founded Repare Therapeutics, an oncology drug discovery company that aims to discover new drugs based on the principle of synthetic lethality that target genome instability in cancer based in Montréal.

Jeanne Manery-Fisher Memorial Award

This award is given in honour of the late Jeanne Manery Fisher, Professor of Biochemistry, University of Toronto. Dr. Fisher was not only an outstanding biochemist, but a remarkable teacher. She was instrumental in creating the Society's Equal Opportunity Committee and fought diligently for the position of women in science. This award recognizes an eminent Canadian woman scientist who has a distinguished career in the fields of biochemistry, molecular or cellular biology or genetics, resulting from her outstanding contributions to research, teaching or society.



Dr. Susan Cole

Bracken Chair in Genetics and Molecular Medicine and Allie Vibert "Vi" Douglas Distinguished University Professor, Queen's University

Dr. Susan Cole joined Queen's faculty after her B.Sc. (Biochemistry), Ph.D. (Pharmacology), and post-doctoral training at the National Institutes of Health (Molecular Biology). She has been a Cancer Care Ontario Scientist, a Tier 1 Canada Research Chair, and served as Queen's first Deputy Provost. Using multidisciplinary approaches, her lab has been devoted to understanding the biochemical mechanisms that limit the effectiveness of cancer chemotherapy. Dr. Cole is best known for her discovery and characterization of MRP1/ABCC1, an ATP-binding cassette membrane protein that acts as a multidrug and physiological organic anion efflux pump. She has published >240 research articles that have been cited >28,000 times, and has been primary mentor to >60 graduate students and post-doctoral fellows. Dr. Cole has also made

significant contributions to the American Association for Cancer Research, and the American Society for Pharmacology and Experimental Therapeutics. She was Deputy and Senior Editor of Molecular Cancer Therapeutics and was on the Editorial Board of the Journal of Biological Chemistry, Cancer Research, and Molecular Pharmacology. Dr. Cole has received multiple recognitions of her research including: the National Cancer Institute of Canada Diamond Jubilee Award; the Pfizer Senior Scientist Award (Pharmacological Society of Canada); and PARTEQ Innovations 25th Anniversary Award for "Most Licensed Technology". She is an elected fellow of the Royal Society of Canada and the Canadian Academy of Health Sciences, and received a Queen Elizabeth II Diamond Jubilee Medal. Dr. Cole is the admiring mother of three adult children.

CSMB Arthur Wynne Gold Medal

The CSMB Arthur Wynne Gold Medal is presented to one or more individuals who have made a major contribution to biochemistry, molecular and cell biology in Canada over their career. The recipients of this life-time achievement award typically have attained an international profile in research, have played a major role in the development and promotion of the discipline in Canada, and have a long-standing record of service to the academic community. The Medal is named in honour of Professor Arthur M. Wynne, the first President of the Society, and was initiated in 2007 to celebrate the 50th Anniversary of CSMB.



Anne-Marie Mes-Masson

Professor, Department of Medicine, University of Montréal; Associate Director, Basic and Translational Research, Centre de recherche du Centre hospitalier de l'université de Montréal (CRCHUM); Director of the Réseau de recherche sur le cancer du Fonds de recherche du Québec - Santé (FRQS); Quebec node coordinator for the Terry Fox Research Institute

Dr. Mes-Masson trained as a molecular oncologist, and obtained her Ph.D. from the Department of Microbiology and Immunology at McGill University in 1984. From 1984-1986, she completed post-doctoral studies at the Molecular Biology Institute, University of California Los Angeles, in the laboratory of Dr. Owen Witte, where she was the first to clone the full length BCR-ABL transcript implicated in Chronic Myelogenous Leukemia. After a short period as a research associate at the Biotechnology Research Institute, Dr. Mes-Masson joined the Institut du cancer de Montréal and the Department of Medicine at the Université de Montréal in 1989. A full professor since 2001, Dr. Mes-Masson was the scientific director of the Institut du cancer de Montréal and Director of cancer research at the Centre de recherche du Centre hospitalier de l'université de Montréal (CRCHUM) from 2003-2018 and in 2017 accepted the position of Associate Director, Basic and Translational Research, at the CRCHUM. In 2003, Dr. Mes-Masson was named the Director of the Réseau de recherche sur le cancer du Fonds de recherche du Québec - Santé

(FRQS), a provincial cancer network of over 100 scientists focussed on translational and clinical cancer research (www.rrcancer.ca). Dr. Mes-Masson is a founding member of the Canadian Tumour Repository Network that focusses on enhancing capacity and quality of biobanking to support research (www.ctrnet.ca). In 2008 Dr. Mes-Masson was named the Quebec node coordinator for the Terry Fox Research Institute (TFRI).

Dr. Mes-Masson has authored over 250 publications in cancer research. In addition to her pioneering work in biobanking, the major focus over her research in the last three decades has been ovarian and prostate cancer. While maintaining an active basic research program that focusses on the molecular events that contribute to cancer initiation and progression, Dr. Mes-Masson has also established a translational research program largely focussed on delivering personalized medicine in oncology. Her recent fundamental research focusses on the prediction of therapeutic responses and the development of new therapeutic agents for ovarian and prostate cancers.

2019 Jeanne Manery Fisher Memorial Lecture

Connecting proteins: shareable tools for reproducible interaction mapping

Anne-Claude Gingras

Lunenfeld-Tanenbaum Research Institute, Sinai Health System,
Toronto

gingras@lunenfeld.ca



Summary of the Jeanne Manery Fisher Memorial Lecture presented at the CSMB annual meeting held in Montréal in June 2019

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Proteins do not work alone: they associate with one another, for example to form molecular machines such as the ribosome, or to relay signals transmitted notably through kinase cascades. Fundamentally, interactions within molecular machines and across signalling pathways are different in their stability and affinity, and structures such as the ribosome are characterized by high-affinity interactions that tend to bury large interfaces (**Figure 1**). These interactions are stable, which enables biochemical purification of these complexes and the characterization of their constituents. By contrast, many of the contacts between signalling molecules involve lower affinity interactions between domains and short linear motifs, and the regulation of many of these interactions through post-translational modifications. Techniques that have been used successfully for the isolation of stable complexes may not always work for capturing these weaker interactions, especially if the purification approach involves several steps that result in exchange with the environment.

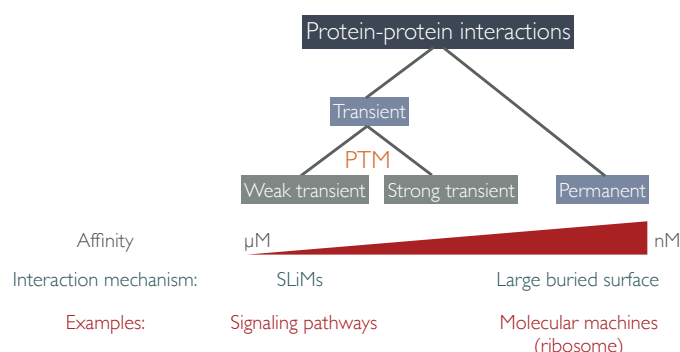


Figure 1. Characteristics of different protein-protein interactions

While “molecular machines”, for example the ribosome, are characterized by high affinity and large buried surfaces, interactions in signalling pathways must be dynamically regulated, often by post-translational modifications (PTMs), and are usually weaker. They are also often mediated by the interaction of a folded domain with short linear interaction motifs (SLiMs) that can be modified post-translationally. Methods designed for the purification and analysis of molecular machines often fail at capturing weaker or more transient interactions. See Perkins et al. 2010 for extended discussion.

In the early 2000s, when I began my post-doctoral fellowship in the Aebersold lab in Seattle, I established in mammalian cells, a version of the then-popular “Tandem Affinity Purification”, or TAP-tagging. TAP-tagging consists of purification and re-purification of a bait and its binding partners, followed by their identification by mass spectrometry. This approach had already led Anne-Claude Gavin and others to systematically define stable complexes in yeast (Gavin et al. 2002), and indeed it enabled me to uncover new and evolutionarily conserved stable protein phosphatase complexes (Gingras et al. 2005), on which basis I started my own research group in Toronto at the end of 2005. The beauty of the approach was that the samples that were recovered were very clean, with distinct bands detectable on protein gels. Data analysis of the mass spectrometry results was therefore relatively simple, and many (and often most) of the proteins detected were true binding partners of the bait protein. Yet, what was missing from the complexes that I was identifying were the lower affinity interactors, which in the case of phosphatases would have included regulators and substrates.

What became clear is that to identify these lower affinity interactions we needed to revert to “dirtier” purifications, that would maintain the interactions through purification. However, this presented a challenge at the time, as there were no reliable computational methods to discriminate between true interactors and background contaminants. We, therefore, used to maintain our own “contaminant” lists, with proteins on this list systematically subtracted from the list of detected proteins, or we would use several arbitrary cut-offs to define which proteins would make it to our final lists. Because my group was at the time running reasonably small projects, this was still doable, and we systematically cloned the interactors we were recovering to perform reciprocal affinity purification/mass spectrometry (AP-MS) experiments and functional validation. Here, I need to give kudos to my lab members at the time, particularly to my first two Ph.D. students, Ginny Chen and Michelle Kean, and to my lab manager (and right arm), Marilyn Goudreault, whose scientific rigor and dedication enabled our early successes (Chen and Gingras 2007; Chen et al. 2008; Goudreault et al. 2009; Kean et al. 2011; Kean et al. 2012; Nakada et al. 2008).

My relatively peaceful life “in small-scale interaction proteomics” was abruptly stopped, however, when a colleague then at the Lunenfeld, Mike Tyers, asked me to help him on the analysis of a large project on the

interactomes of yeast kinases and phosphatases. About 1500 pulldowns were performed in this study (almost all of them by a single technician, Zhen-Yuan Lin who is still in my group), but no systematic negative controls were embedded in the experimental design, which precluded simple solutions to discriminate between true interaction partners and contaminants. Fortunately (there is always an element of luck), I had met during my post-doctoral training Alexey Nesvizhskii, a physicist and fellow post-doc in the Aebersold lab who was then a new PI at the University of Michigan. Just as fortunately, Alexey had recruited a biostatistician, Hyungwon Choi, as a graduate student. With input from the entire team, Hyungwon implemented a non-supervised Bayesian statistical approach that enabled us to score each possible pairwise interaction across very large datasets, and he created the first version of Significance Analysis of INteractome (SAINT), which we used on the yeast kinase-phosphatase network (Breitkreutz et al. 2010). [A related approach to scoring high confidence interactions in large and disconnected datasets, CompPASS, was independently developed at around the same time by the Harper and Gygi group (Sowa et al. 2009)]. These tools used quantitative information embedded in each mass spectrometry experiment (at the simplest level, spectral counts, which are the number of times a peptide corresponding to a given protein is selected for fragmentation and identification by the mass spectrometer) to compare the recovery of a given candidate interactor (the “prey”) in a purification of a bait to that of the same prey across all baits in the dataset (**Figure 2**). Importantly, this statistical framework enables unbiased scoring, and selection of a cut-off could be guided by precision-recall analysis from published interactions, such as those deposited in the BioGRID database designed by Mike Tyers (Oughtred et al. 2019).

This unsupervised version of SAINT, like CompPASS, did not, however, work on small datasets, nor on highly connected datasets such as those we were generating through our iterative purifications of mammalian phosphatases. Very rapidly, Hyungwon and Alexey helped us develop a different, semi-supervised version of SAINT, which would train itself on the negative controls that were generated as part of every experiment (Choi et al. 2011; Choi et al. 2012). This turned out to be precisely what my lab needed; we could analyze small, medium or large datasets with this version of SAINT, obtaining good discrimination between true interactors and contaminants as long as the negative controls properly mimicked the behaviour of the

contaminants (**Figure 2**). One of the first applications of this “new SAINT” was on a difficult case, that of scoring true interactions with chaperones such as HSP90 (Skarra et al. 2011), which has enabled us to embark on this type of projects in a collaborative manner, notably with Mikko Taipale, now a new colleague in Toronto (Taipale et al. 2014). Hyungwon, who now has his own lab in Singapore, has been continuously improving SAINT, in particular to make it faster and more robust (Teo et al. 2014) and to adapt it with different types of quantitative data (Teo et al. 2016), including some tools that we helped co-develop for Data Independent Acquisition (Tsou et al. 2015; Wang et al. 2015).

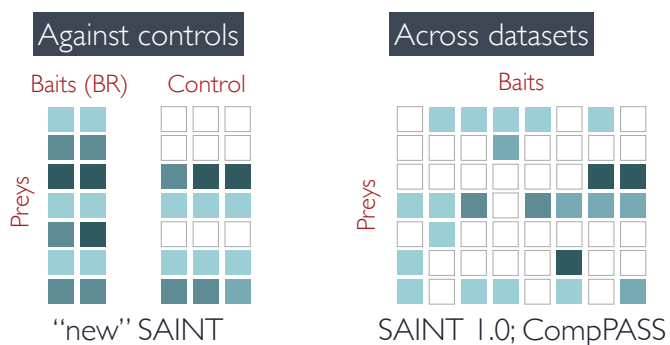


Figure 2. Scoring protein-protein interactions using quantitative mass spectrometry data

In current versions of Significance Analysis of INteractome (SAINT), quantitative information for a prey in replicate biological (BR) purifications of a bait are scored against several negative control samples (Choi et al. 2011). When datasets are sufficiently large and the baits not connected to one another, scoring can also be performed across the entire dataset in the absence of specific negative controls. This type of scoring was exploited in the unsupervised early version of SAINT and in the popular CompPASS tool (Breitkreutz et al. 2010; Sowa et al. 2009).

What these exercises in developing scoring mechanisms and other computational tools for managing mass spectrometry data made clear was that these resources were not just needed by our own groups, but that they would benefit the entire research community. We, therefore, took an early decision to make all our computational tools freely available, and we were able to provide researchers with an efficient data management system (LIMS) for interaction proteomics, ProHits-LIMS, in another successful collaboration with Mike Tyers (Frank Liu and Jian Ping Zhang are still working on improvements in ProHits (Liu et al. 2016; Liu et al. 2012; Liu et al. 2010)). A talented post-doc (now a computational research

associate in my group), James Knight, then helped us to tackle another challenge in interaction proteomics, that of data visualization. He created ProHits-viz (<https://prohits-viz.lunenfeld.ca>), a web-based tool to transform quantitative interaction lists into different simple visualizations, notably through dotplots that display at a glance the “raw” abundance values (how much prey is detected in the purification of a bait), the relative abundance value (how much prey with bait 1 versus bait 2), and the confidence of the bait-prey interaction (SAINT False Discovery Rate estimation). After an initial methods paper, James expanded his tools to include several different functions, such as correlation analysis, which is also supported by automated gene annotations within ProHits-viz (Knight et al. 2015; Knight et al. 2017). The next hurdle we were facing was the massive amount of data generated by our interaction proteomics screens; in each experiment (and particularly for the proximity-dependent biotinylation experiments discussed below), we identify as high confidence interactors hundreds of proteins. Retrieving information on these proteins through searching multiple databases became the bottleneck, and prompted James (with post-doctoral fellow Payman Samavarchi-Tehrani) to develop yet one more tool, this time a web browser plugin (Knight et al. 2019) that enables us to retrieve key and user-defined information by double-clicking on an identifier such as a gene name, directly on the webpage (e.g. NCBI PubMed or all the resources that our group developed).

Besides sharing software tools, we worked on disseminating our own proteomics data. We continue to work within the framework of existing repositories, including for mass spectrometry data deposition (our LIMS ProHits facilitates deposition of our proteomics results in the ProteomeXchange consortium (Deutsch et al. 2017) through partner MassIVE), and deposition of interaction data to BioGRID (Oughtred et al. 2019) and the IMeX consortium member IntAct (Orchard et al. 2014). Through my role as a Deputy Editor for the leading proteomics journal *Molecular and Cellular Proteomics*, I continue to advocate for sharing through these public repositories, but also realized that specialized databases are sometimes also critical. For instance, when we deposit our interaction data in databases such as BioGRID, most of the underlying quantitative information is lost, which means that as long as we deem an interaction to be of “high-confidence”, it will be annotated the same way for stoichiometric and vastly sub-stoichiometric interactions. This limits the conclusions that can be drawn from the data. To circumvent this, we created a simple interaction

repository (which we structure per project/publication) where we deposit all the interaction proteomics data in simple tabular formats that can be searched across all published datasets (we also have a “collaborative” area of the database where unpublished data can be accessed in a password-protected manner). Launched at the time of the publication of our interactome for the Hippo tumour suppressor pathway (Couzens et al. 2013), this resource (at prohits-web.lunenfeld.ca) now contains public data for multiple publications from our group and collaborators (14 independent projects are publicly available as of Aug 2019). Besides reporting the high confidence interactors for our own projects, however, we also realized that it would be crucial for the scientific community at large to have access to data that helps them scoring their own protein-protein interactions. Again in collaboration with Alexey Nesvizhskii’s lab, we created a Contaminant Repository for Affinity Purification

(CRAPome.org), a resource that collates well-annotated and well-executed negative controls from the literature and enables researchers to either browse the resource, or upload their own experiments for analysis through some of the tools including SAINT (Mellacheruvu et al. 2013). Like most of the other tools that we have been creating, we have continued to improve this repository based on requests from users, and have now separated the Contaminant Repository from the analytical tools that are now within REPRINT (Resource for Evaluation of PRotein INTERactions; accessible at reprint-apms.org; Mellacheruvu et al. *in prep*). Our current computational pipeline is summarized in **Figure 3B**.

With these tools in hand – and a robust and shareable experimental pipeline (**Figure 3A**) – we and our collaborators have been able to explore the interactions for multiple signaling molecules. We aimed at

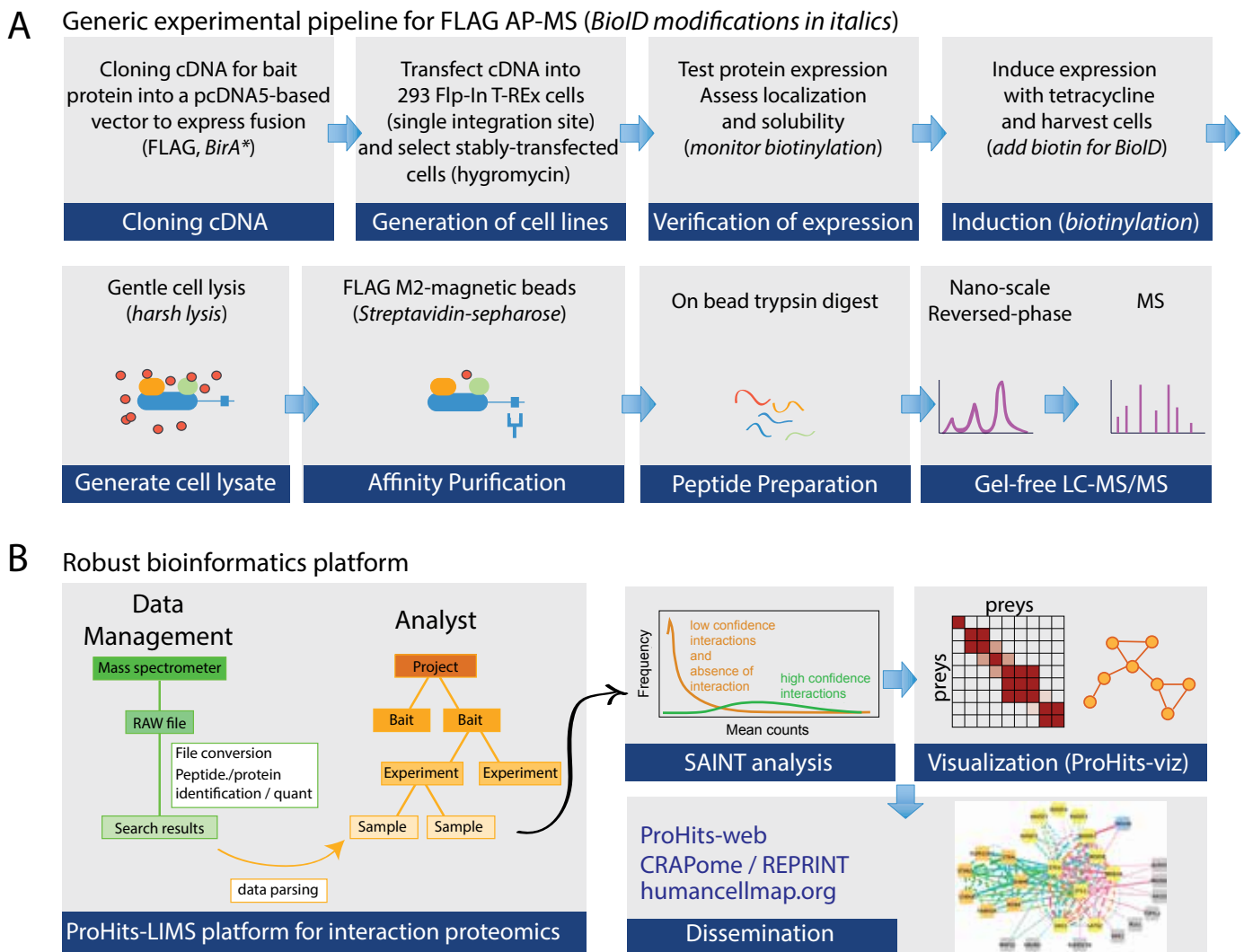


Figure 3. Workflow of our current FLAG AP-MS and BioID pipelines

understanding the interactome differences associated with cancer mutations and the regulation of protein-protein interactions by treatment with extracellular stimuli or pharmacological compounds (notably through the work of my ex post-doctoral fellow, JP Lambert, who currently heads his own group in Québec (Lambert et al. 2013; Lambert et al. 2019; Lambert et al. 2015; Lambert et al. 2014)). Yet, we (like everyone in the field) also noted some significant limitations with the AP-MS approach. AP-MS is defined by cell lysis and affinity purification of proteins that must both be solubilized and remain associated with their interactors throughout purification for proper detection. Poor solubility of some compartments, loss of weaker binding partners throughout even the single cell purifications, and the possibility of post-lysis artefacts are all drawbacks of standard AP-MS. Importantly, spatial resolution is also lost. Therefore, when the first in a series of methods describing biotinylation of proteins proximal to a bait in living cells was published (Roux et al. 2012), we (with Stéphane Angers and Brian Raught) were rapid in adopting the approach. BioID (as this approach is called) utilizes an abortive biotin ligase fused to a bait of interest that is expressed at near endogenous levels in living cells. The substrate (biotin), added extracellularly, is transported and then activated to a reactive intermediate by the biotin ligase; this intermediate covalently labels lysine residues, providing a handle for purification of proteins that came in proximity to the bait within living cells. Importantly, the entire computational pipeline we had developed for AP-MS could be directly repurposed for the analysis of BioID data, facilitating the adoption of this approach and its thorough benchmarking.

While multiple lab members simultaneously applied BioID to their projects, then post-doc Amber Couzens was the first in my lab to publish with the approach in the context of her Hippo signalling project (Couzens et al. 2013). Besides confirming that “insoluble” structures (as was first demonstrated by Roux et al. (Roux et al. 2012)) such as centrosomes, plasma- and endo-membranes, were amenable to BioID, Amber noted that phosphorylation-dependent and condition-specific interactions could be picked up in the absence of stimuli in BioID. This was particularly obvious for the okadaic acid-sensitive interaction between MOB1 and the Hippo kinase MST1. MST1 kinase autophosphorylates to create a docking site for the phosphopeptide-binding pocket in MOB1, a process that is opposed by an okadaic acid sensitive phosphatase (as we further structurally explored with the lab of Frank Sicheri (Couzens et al. 2017; Xiong et al. 2017; Xiong et al. 2018)). In standard AP-MS, the interaction between these proteins is only detectable following phosphatase

inhibition, yet this relationship was readily picked up in BioID, without any inhibition necessary. Why is this? The long incubation times for BioID (Amber was performing a 24 h labelling) could provide an explanation; interactions between MST1 and MOB1 must constantly be cycling in cells (MST1 autophosphorylates, but at steady-state, the phosphatase “wins”). However, every time MST1 becomes phosphorylated, it has a chance to interact with the MOB1-bait become biotinylated: over 24 hours, and providing that the protein is stable, an accumulation of biotin can be detected on the pool of MST1 protein. We now refer to this phenomenon as signal amplification (see our recent review (Gingras et al. 2019)), and have since harnessed this approach for our studies of stress granules (Youn et al. 2018), which are dynamically formed membraneless organelles, while Brian Raught has applied it for the detection of substrates for E3 ubiquitin ligases (Coyaud et al. 2015).

Armed with this BioID pipeline, we have been exploring different projects in increasingly ambitious or complex scales, notably the definition of the composition, specificity and overall organization of P-bodies and stress granules by Ji-Young Youn, who will soon be starting her independent position in Toronto (Youn et al. 2018). An ongoing project led by Ph.D. student Christopher Go characterized all major membrane-bound and membraneless organelles in the cells by generating 234 stable cell pools, each expressing a BioID “marker” bait. 192 of these markers yielded useable data, which were used to draft a “proximity map” of a human cell, in this case, an HEK293 cell (Unpublished data, available from <https://www.biorxiv.org/content/10.1101/796391v1>). Importantly, however, this project again made us revisit data analysis, visualization and data sharing, and again, computational research associate James Knight designed a user-friendly solution. [Humancellmap.org](https://humancellmap.org) (which we opened as a resource prior to submission of the manuscript) provides all data associated with this project in different searchable and navigable formats, greatly facilitating data exploration. Additionally, building on our experience with REPRINT and the CRAPome (and in fact, compatible with scoring through REPRINT), we provide the users with an easy interface for uploading their own BioID data and comparing it to the humancellmap data. This can help reveal the subcellular localization of the bait (by similarity to baits in the humancellmap) and enable identifying proteins that are specifically enriched over an organelle (or the entire humancellmap) background. The concepts behind our organelles and global static proximity interactome labs have propelled new avenues of research led by different students and post-doctoral fellows in the group, as well

as by our numerous collaborators. We are exploring alternative cellular models through the development of lentiviral delivery tools (Payman Samavarchi-Tehrani) and are applying the concept of compartment sensors to revisit the spatial aspect of cellular signalling (post-doc Geoff Hesketh). These exciting new developments (and others I don't have the space to discuss here) are enabling us to explore the spatio-temporal aspects of subcellular regulation, and open new areas of research in health and disease.

In summary, I have had a circuitous journey through protein-protein interactions, which has taken me very far from my initial comfort zone (biochemistry and phosphatases) but has been most rewarding. The tools we are collaboratively developing, alongside protocols and reagents, are made available to the scientific community, which enable others to improve scoring and analysis of their own interaction datasets, hopefully resulting in overall more reproducible and reusable research results.

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Success in science is certainly not a one-man (or woman) affair. Besides my own extremely patient academic mentors (André Darveau, Nahum Sonenberg and Ruedi Aebersold), I need to acknowledge all my colleagues throughout my career and particularly in Toronto, and the numerous collaborators that make it fun to come to work. As described in this article, the collaborations with Alexey Nesvizhskii, Hyungwon Choi and Mike Tyers have shaped the proteomics bioinformatics efforts of our group, and I have been fortunate to work with (and live with) Brian Raught for over 20 years (and 35 publications). However, it is my trainees and other employees (a.k.a. HQPs) that keep the lab alive and productive. Each and every one of them has contributed in some way to make me grow as a scientist and a mentor. Lastly, none of this would have been possible without funding, particularly from CIHR, but also from Genome Canada/Ontario Genomics, NSERC and the NIH, alongside other grants for applications of our methods to study diseases, and in particular cancer, from the CCSRI, TFRI and CRS.

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Commentary

Dwindling funding for Canadian science

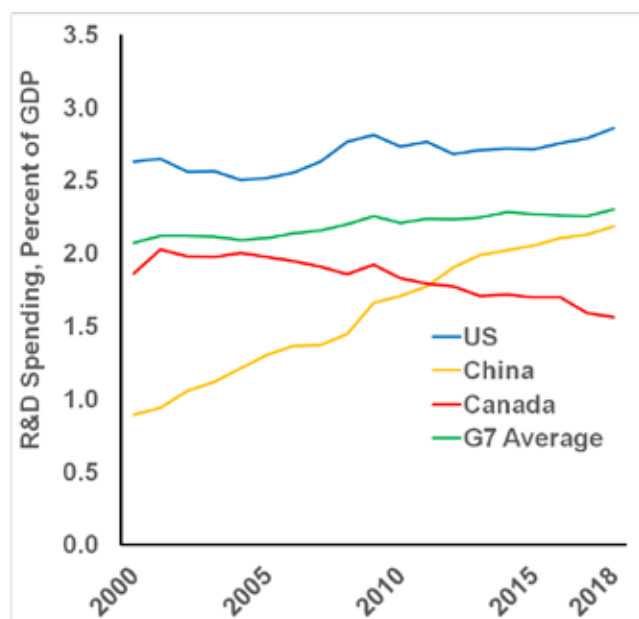
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Abstract:

Since the year 2000, federal research funding for Canadian scientists has decreased to the point that Canada is falling behind other developed nations. If this trend is not reversed by the current government, Canada will lose a generation of young scientists.

Canadian science is under-funded. According to the OECD, Canada now spends less of its GDP on science than any other G7 country except for Italy (Figure 1). As a result, many scientists do not have funding to conduct the work they were hired to do. A generation of young Canadian scientists are being left behind and Canada is losing its competitive advantage. In contrast, rising world powers such as China are now rapidly surpassing Canada in terms of financial support for science, and the resulting innovation that comes with a healthy scientific community.



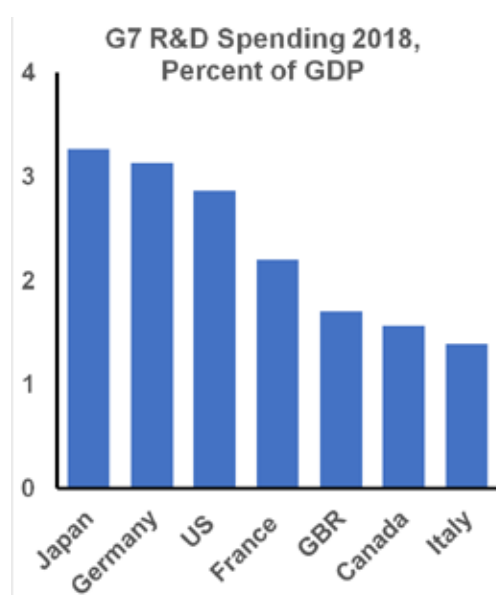
Government R&D funding 2018 as a percentage of GDP

Data compiled from the OECD (<https://data.oecd.org/rd/gross-domestic-spending-on-r-d.htm>)

Why must governments increase their support for science? Charities do support some science, but this tends to be in very focussed areas and less exploratory in nature. As for the private sector, there is no incentive to engage in basic fundamental exploratory research, as it does not provide a short-term financial gain. But that is not to say that basic research has no benefit. Engaging in basic research is critical on several fronts. It generates new unexpected findings that help fuel applied research and thus promotes private sector R&D. It trains our university students, both at the undergraduate and graduate levels, by allowing them to be engaged in cutting-edge research and to use the newest technology to solve problems and explore new frontiers. These students then go on not only to become the next generation of scientists, but importantly other jobs in the knowledge economy, where critical thinking and problem-solving are required skills. The University of Toronto recently published the results of the 10,000 Ph.D. Project which reports that these highly-trained individuals end up not only as researchers in academia but also bring their considerable skills to the public, private and charitable sectors¹. They become the next generation of policy analysts, doctors, lawyers, and business entrepreneurs. Overall, most economists agree that federally-funded research in American universities helped the U.S. economy grow by an additional 50% in the 60 years after World War II². In the U.K., it was estimated that for every pound spent on funding in cardiovascular, cancer and muscular dystrophy research, the British public saw a 7-10% yearly return on investment in increased health benefits, and an additional 15% in “spillover” effects on the general economy³. Other studies have found similar rates of returns^{4,5}. The Covid-19 pandemic brought many of these issues into focus. This new

threat could only be fully understood when society has an army of well-trained scientists. Citizens from around the world looked to scientists to explain what coronaviruses are, to guide public policy, and to develop new diagnostics and therapies.

The scientific community in Canada has been suffering under both Conservative and Liberal governments who have overseen a recent trend of de-funding research (Figure 2). Calls for change by the scientific community have resulted in misguided reforms of how the federal granting agencies distribute research dollars⁶. But the true heart of the problem has not been addressed – a lack of adequate financial support for the sciences. Canadian funding per capita is a little more than half of the funding provided to the U.S. and is losing ground on China as well. This funding gap was highlighted by a special report, commissioned by the federal government and headed by the former president of the University of Toronto, C. David Naylor⁷. Released in 2017, the Naylor report clearly stated that science in Canada was under threat, and that it would need long-term support from the federal government. The federal government responded with a one-time 5% increase to the three Canadian science funding agencies. However, besides this one event, science funding has remained static under the Trudeau government, not even keeping up with the rate of inflation. As a result, Canada is no longer seen as a world leader in science.



Government R&D funding 2000-2018 as a percentage of GDP

Data compiled from the OECD (<https://data.oecd.org/rd/gross-domestic-spending-on-r-d.htm>)

If Canada is to continue its transition from a resource-based economy to one driven by innovation, the Canadian government needs to increase its investment in research, but most importantly increase the budget of the federal research councils. A commitment to a measured and reasonable 7% annual increase would double the current science research council budget in a decade, allowing Canada to continue to train the next generation of scientists and compete globally. With this modest increase in support, Canada, where insulin and stem cells were discovered, where the Blackberry and the CanadArm were developed, can once again be seen as a world leader in science and discovery. This becomes critical if we want to have a science-literate society that can overcome all the new unexpected challenges that we will face in the near and distant future.

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News from Member Departments

Dalhousie University

Department of Biochemistry and Molecular Biology

Correspondent: Stephen L. Bearne

During the 2019-20 academic year, the Department of Biochemistry and Molecular Biology continued to celebrate and recognize the accomplishments of faculty and trainees. Notably, **Ford Doolittle**, Professor Emeritus, received the 2019 **McLaughlin Medal** from the Royal Society of Canada (RSC). Established in 1978, this medal is awarded for important research of sustained excellence in any branch of medical sciences. Dr. Doolittle's insightful studies on the "endosymbiont hypothesis" for the origin of chloroplasts, his proposal that most DNA is "selfish" or parasitic, and his cogent arguments that gene-swapping was the driving force in early evolution, challenged and changed paradigms in comparative genomics.



Dr. Ford Doolittle (photo courtesy of Daniel Abriel)

Shannon Sibbald, a graduate student with **John Archibald** and **Andrew Roger**, worked with other graduate students and post-doctoral fellows to organize a successful student research day that featured poster presentations, 3-minute thesis presentations, a popular science writing workshop, and a seminar by Dr. John McCutcheon (University of Montana). The department continued to celebrate the successes of its students, post-doctoral fellows, and research associates during the past year. **Gregory McCluskey**, a graduate student with **Stephen Bearne**, was awarded the *Patrick Prize* for best Ph.D. thesis. **Dr. Ryan Holloway**, a postdoctoral fellow

with **Paola Marignani**, and **Jeffrey Simmons**, a graduate student with **Jan Rainey**, both received *Beth Gourley Conference Awards*, which were kindly established by **Catherine Lazier** and her husband John Lazier. **Shannon Sibbald**, a graduate student with **John Archibald** and **Andrew Roger**, received the *Doug Hogue Award*, recognizing "exceptional dedication and achievement in research and intradepartmental student activity".



Dr. Gregory McCluskey received the *Patrick Prize* for best Ph.D. thesis and is pictured with his supervisor Dr. Stephen Bearne (photo courtesy of Heidi MacKinnon)



Drs. Stephen Bearne and Catherine Lazier present the *Beth Gourley Conference Award* to Dr. Ryan Holloway (right), a post-doctoral fellow with Dr. Paola Marignani (photo courtesy of Heidi MacKinnon)



Drs. Catherine and John Lazier present the Beth Gourley Conference Award to Jeff Simmons, a Ph.D. student with Dr. Jan Rainey (photo courtesy of Heidi MacKinnon)



Shannon Sibbald received the Doug Hogue Award and is pictured with Calla Hogue (right), Zoe Hogue (left), Dr. Stephen Bearne (right), and her supervisors Drs. John Archibald (centre) and Andrew Roger (left) (photo courtesy of Joyce Chew)

Our alumni (and anyone else interested) are invited to find out about the latest news and events of the Department of Biochemistry and Molecular Biology at www.biochem.dal.ca.

Hospital for Sick Children Research Institute, Toronto

Molecular Medicine Program

Correspondent: Charles Deber



Khosrow Adeli

Dr. Khosrow Adeli, Division of Molecular Medicine, Research Institute, Hospital for Sick Children, has received the 2019 AACC American Association of Clinical Chemistry (AACC) Outstanding Research Award. The Award recognizes his contributions to the CALIPER project to close the evidence gap in pediatric reference standards for laboratory biomarkers of pediatric disease (www.caliperproject.org). The CALIPER data are now being used by hundreds of hospitals in Canada, the U.S., and over 100 other countries around the world. The award was presented at the opening ceremony of the AACC Annual Meeting in Anaheim, California in August of 2019. Dr. Adeli is one of only two Canadians who have ever received this award, which is presented annually in the U.S.



Chaim Roifman

Dr. Chaim Roifman, Senior Scientist, Molecular Medicine Program, has been invested as a Member of the Order of Canada (September 2019). The Order of Canada, established in 1967, is Canada's highest merit for individuals who have made outstanding contributions to Canada with their service and dedication in their sector. Dr. Roifman's citation cites "his advancements to the field of immunology, notably in the diagnosis and management of paediatric primary immunodeficiency."

Dr. Jean-Philippe Julien, Senior Scientist, Molecular Medicine Program, has been recognized on the Web of Science 2019 Highly Cited Researchers List (2019). This list recognizes researchers selected for their exceptional research performance, demonstrated by production of multiple highly cited papers that rank in the top 1% by



Jean-Philippe Julien

citations for field and year in the Web of Science. In further distinctions, Dr. Julien has received the Early Researcher Award (2019-2024) from the Ontario Ministry of Research, Innovation and Science, and has been elected a Member of the College of New Scholars, Artists and Scientists of the Royal Society of Canada (2019-2026). Dr. Julien's laboratory

focusses on the characterization of B cell receptors using a combination of biochemical, biophysical, immunological and structural techniques.



Charles Deber

Dr. Charles Deber, Senior Scientist, Molecular Medicine Program, was awarded the 2019 TRAM Guest Professorship at Goethe University and the Max-Planck Institute for Biophysics in Frankfurt am Main, Germany. The TRAM Professorship is presented biannually "to outstanding scientists in the field of Transport and Communication across Biological Membranes".

In this capacity, Dr. Deber delivered four lectures on his research, including topics relating to membrane protein folding in disease states, and the design of membrane-active therapeutics.



John Rubinstein

Dr. John Rubinstein, Senior Scientist, Molecular Medicine Program, was selected as the 2020 National Lecturer for the Biophysical Society of Canada. As a further accolade, he has also received an honorary doctorate awarded by Stockholm University, Sweden. Dr. Rubinstein is a pioneer in the study of the structure and function of macromolecular assemblies using electron

cryomicroscopy (cryo-EM), with recent projects focussing on the mitochondrial ATP synthase, and the vacuolar-type ATPase.



Lewis Kay

Dr. Lewis Kay, Senior Scientist, Molecular Medicine Program, has been elected as an International Member to the U.S. National Academy of Sciences for his remarkable work on multidimensional NMR.

McGill University

Department of Biochemistry

Correspondent: Lawrence Kazak, Natasha Chang, and Maria Vera Ugalde (with Martin Schmeing, Maxime Denis, Jason Young, Marlene Gilhooly and with photos from Christine Laberge)

2019 was an eventful year for the Department of Biochemistry at McGill University. Exciting research and teaching continue to drive the department's activities.

Faculty news:

The department recruited **Maria Vera Ugalde** (previously a post-doctoral fellow with Robert H. Singer, Albert Einstein College of Medicine), **Natasha Chang** (previously a post-doctoral fellow with Michael Rudnicki, Ottawa Hospital Research Institute) as Assistant Professors, and **Selena Sagan** now has a joint-appointment and was promoted to Tenured Associate Professor in the departments of Microbiology & Immunology, and Biochemistry. Biochemistry faculty member **Thomas Duchaine** was promoted to the rank of full Professor and **Sidong Huang** was promoted to tenured Associate Professor.

Research news:

Notable breakthroughs published this year include:

A study spearheaded by Janice Reimer and Maximilian Eivaskhani in **Martin Schmeing's** lab produced long-awaited views of very large functional segments of the megazymes that make antibiotics like penicillin, daptomycin and gramicidin. A series of structures and accompanying solution data (including collaborations with the lab of Alba Guarné) reveal nonribosomal peptide synthetases to be exceedingly flexible macromolecular machines (*Science*. 2019 Nov 8; 366(6466)).

An exciting study led by **Alba Guarné** showed that the interaction between the sliding beta clamp and the DNA

mismatch repair machinery is species-specific (*Nucleic Acids Research*. 2019 May 21; 47(9):4831-4842).

The impact of specific lymphoma onco-genotypes on the biogenesis of polycistronic microRNAs was revealed by the lab of **Thomas Duchaine** (*Molecular Cell*. 2019 Jul 25;75(2):340-356).

Previous work from **Jerry Pelletier's** lab collaborated to discover a novel class of natural products, called rocaglates, with robust anti-malarial activity. In two recent publications, the Pelletier lab has now further developed their rocaglates program with a new chemical series (*JACS*. 2019 141(32):12891-12900) and (*Cell Chem Biol*. 2019 Nov 21;26(11):1586-1593).

Work led by Colin Ratcliffe from **Morag Park's** lab revealed that microexon switching in the Arf6 guanine nucleotide exchange factor, cytohesin-1, controls Met-dependent cell migration (*J Cell Biol*. 2019 Jan 7;218(1):285-298).

The lab of **Sidong Huang** dominated last year with two back-to-back first author papers (*Nat Comm*. 2019 Feb 4;10(1):557) and (*Nat Comm*. 2019 Feb 4;10(1):558). The first author, Yibo Xue, demonstrated that SMARCA4-deficient ovarian and lung cancers, both with poor outcome and lacking effective treatments, may be treated with FDA-approved CDK4/6 inhibitors. Based on Yibo's findings, the Canadian Cancer Trial Group has added a new arm to the ongoing CAPTUR trial (NCT03297606) to treat SMARCA4-deficient cancers using palbociclib.

William Muller's lab made a big splash in 2019 with four publications. Harvey Smith led a study that demonstrated the role of the ErbB2/c-Src axis in mammary tumorigenesis (*Nat. Comm*. 2019 Jul 1; 10(1):2901). The Muller lab also published back to back articles. Alison Hirukawa led the way delineating the role of ERBB2-targeted therapy mediated by the type 1 interferon response (*Cell Reports*. 2019 Oct 8; 29(2):249-257), and a second article led by T. Bui on mTORC1 signaling in ErbB2-driven breast cancer (*Cell Reports*. 2019 Oct 15; 29(3):589-602).

Faculty honours and awards:

These and other research successes were recognized by honours including the 2019 Canadian Cancer Society Robert Noble Award to **Jerry Pelletier**.

Trainee awards:

Lauralicia Sacre (Alba Guarné lab) was awarded a Vanier Canada Graduate Scholarship. **Elena Kuzmin** (Morag Park lab) was awarded a Banting post-doctoral fellowship for her work on triple negative breast cancer.

Teaching news:

The Biochemistry graduate program continued to do well in 2019. Our numbers are stable; in Fall 2019 we had 117 students, with 23 new admissions. Of our total students, 47 were Masters students and 70 were Doctoral students; 61 were Canadian and 56 international. There were 64 female and 53 male students. Thus, we have a diverse and well-balanced student body which is the heart of the department. The Masters and Doctoral programs proceeded smoothly. Seminar attendance policies were firmly established for graduate students, as well as a system for streaming of seminars off-campus. Our graduate and post-doctoral trainees continue to excel, publishing many first-author papers, and winning scholarships and presentation awards.

Student life:

Both graduate and undergraduate students are organized into societies. The McGill Biochemistry Undergraduate Society (BUGS) organizes a number of academic events each year, including: a Career Symposium, Research Awareness Day, How to Get Involved in Research, and a Journal Club. They also have social activities such as "meet and greet" for new students, and skiing and skating events. Furthermore, BUGS has recently implemented a "buddy" system in which freshman students are teamed up with a senior biochemistry student.

The Biochemistry Graduate Student Society (BGSS) similarly organizes events for the graduate students and post-doctoral fellows in the Department. Activities include career mentoring and preparation sessions for comprehensive exams and thesis writing. Of course, a number of social events are also organized by BGSS.



BUGS 2019-2020 Executive

McMaster University

Department of Biochemistry and Biomedical Sciences

Correspondent: John Whitney

This past year was highlighted by many outstanding discoveries by members of the Department of Biochemistry and Biomedical Sciences (BBS). BBS members belonging to the Michael DeGroote Institute for Infectious Disease Research (IIDR) made many seminal contributions to the fields of infectious disease and antimicrobial resistance. **Brian Coombes'** lab identified dephostatin as an inhibitor of *Salmonella* virulence that may act through two-component signalling pathways (*Cell Chemical Biology*, 2020). **Gerry Wright's** lab discovered a new glycopeptide antibiotic, carbomycin, that inhibits bacterial growth via direct interaction with the peptidoglycan cell wall, preventing access to this critical molecule by remodelling enzymes required for bacterial growth and division (*Nature*, 2020). During **John Whitney's** groups' studies of bacterial competition, they discovered a new enzyme that synthesizes the closely related 3N-pyrophosphorylated nucleotides ppApp and pppApp (*Nature*, 2019). This bacterial enzyme acts as an antibacterial weapon by depleting susceptible target bacteria of the essential nucleotides ATP and ADP. **Eric Brown's** lab found that the concentration of biotin is much lower in human plasma compared to mouse plasma, making bacterial biotin biosynthesis an attractive target for the development of novel antimicrobials (*Nature Microbiology*, 2020). For his work on antibacterial drug discovery, Dr. Brown was awarded a prestigious Killam Fellowship.



Dr. Eric Brown was awarded a Killam Research Fellowship from the Canada Council for the Arts, which will allow him to focus his efforts exclusively on research

Faculty in our Stem Cell and Cancer Research Institute (SCC-RI) also made significant contributions to their

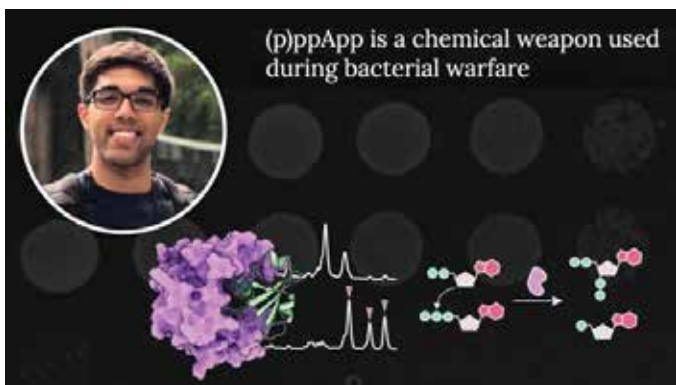
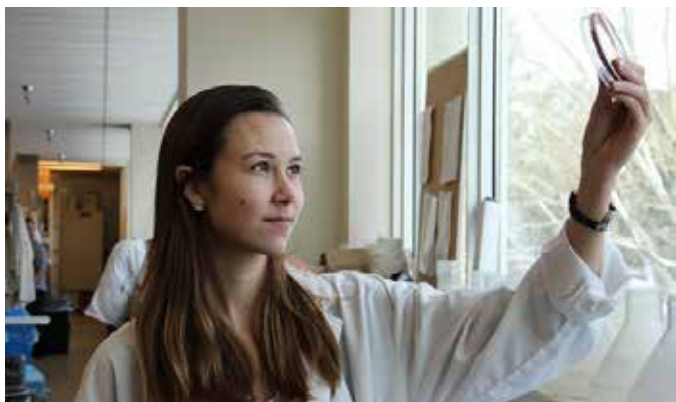
field. For example, **Kristin Hope** discovered that aryl hydrocarbon receptor signalling is suppressed in leukemic stem cells, indicating that the activation of this pathway may be a new therapeutic avenue for treating acute myeloid leukemia (*Cancer Research*, 2019).

2019 also marked the opening of the David Braley Centre for Antibiotic Discovery - a new research institute made possible by a generous gift from philanthropist and former Canadian senator, David Braley. This new centre will operate alongside the IIDR and will provide much-needed support for projects that tackle the ever-increasing threat of antibiotic resistance.



Unveiling of the new David Braley Centre for Antibiotic Discovery took place in June 2019. Shown are founding faculty members (from left to right) Mike Surette, Dawn Bowdish, Jake Magolan, Eric Brown, Sara Andres, Andrew McArthur, Gerry Wright, Lori Burrows, Brian Coombes, John Whitney, Deborah Yamamura, Amy Gillgrass and Zeinab Hosseini-Doust. Also present is Karen Mossman (middle), Associate Vice-President (Research).

BBS graduate students continue to be the driving force behind our research enterprise. Every year, our graduate committee awards three BBS Impact Awards to recognize outstanding student publications. This year's winners were Ph.D. candidate **Elizabeth Culp** for her paper in *Nature* entitled "Evolution-guided discovery of antibiotics that inhibit peptidoglycan remodelling", Ph.D. candidate **Shehryar Ahmad** for his paper in *Nature* entitled "An interbacterial toxin inhibits target cell growth by synthesizing (p)ppApp" and Ph.D. candidate **Nicholas Waglechner** for his paper in *Nature Microbiology* entitled "Phylogenetic reconciliation reveals the natural history of glycopeptide antibiotic biosynthesis and resistance".



High-impact publications by BBS Ph.D. students Elizabeth Culp (top) and Shehryar Ahmad (bottom), who published first author manuscripts in Nature

The Karl Freeman awards, given out to students who were deemed to have given the best presentations in our graduate student seminar series were awarded to **Elizabeth Culp** (1st place, Wright lab) and **Elizabeth Chau** (2nd place, Coombes Lab) in the Ph.D. category and **Celeste Suart** (1st place, Truant Lab) and **Timothy Klein** (2nd place, Whitney Lab) in the M.Sc category. At our Institute of Infectious Disease Research Annual Trainee Day, BBS students **Elizabeth Culp** (Ph.D., Wright Lab) and **Rachel Tran** (Undergraduate, McArthur/Whitney Labs) were awarded Michael Kamin Hart Memorial Scholarships. These awards are made possible by the generous support of the Hart family.

BBS is known not only for its outstanding research, but also for the strong spirit of our student body. This is highlighted by various social and academic events that our students participate in throughout the year. In June, we had our annual departmental picnic at Dundas Driving Park, which is located 20 minutes from the McMaster campus. The most entertaining part of the picnic is the Biochemistry Olympics where students, staff, and faculty compete in teams of five in a science-themed pentathlon race. The labs that place in this event win awards and

claim bragging rights for the following academic year. Dr. Eric Brown's lab entered two independent teams and captured both the gold and bronze medals, while a team of Biochemistry professors secured second place, earning them the silver medal. Other notable events during the year are our Halloween pumpkin carving and costume contests as well as the gingerbread house contest that we hold before Christmas. This Halloween, Dr. Yingfu Li's lab won the costume competition for their recreation of RuPaul's Drag Race, which featured Dr. Li in the role of RuPaul. Dr. Lori Burrow's lab won the pumpkin carving competition with a Finding Nemo-themed gourd. At Christmas, the award for the gingerbread house contest went to Ray Truant's lab for their creative masterpiece of a hobbit hole, along with a cookie version of Dr. Ray Truant as Frodo Baggins.



Students participate in our annual Biochemistry Olympics held during our departmental BBS summer picnic. Shown is the long-range pipette tip ejection station.

In March, BBS held its first research symposium to celebrate the hard work and dedication of our trainees. The inaugural BBS Research Symposium had nearly 150 attendees, including researchers from every lab in our department as well as some of our outstanding corporate sponsors. The morning keynote talk was given by science communicator extraordinaire, Dr. Samantha Yammine, who spoke about the dangers of misinformation and the importance of science communication in the 21st century. Our second keynote talk was by Dr. Yu Seon Gadsden-Chung, an intellectual property lawyer at Torys LLP, and McMaster BBS alumnus. Dr. Gadsden-Chung talked about her unique career path and how her graduate studies have helped her practice law. The most important and exciting part of the symposium was that our trainees had the opportunity to share their research with the BBS

community in our poster and oral presentation sessions. In total, we had 19 oral presentations and 50 posters. Top prizes went to Monica Warner (M.Sc. poster), Victoria Coles (M.Sc. oral), Evan Shepherdson (Ph.D. poster), Luke Yaeger (Ph.D. oral), and Dr. Nicole Barra (post-doctoral fellow). Our inaugural BBS Research Symposium was a resounding success and we look forward to hosting it again next year.



BBS faculty members (left to right) Lesley MacNeil, Sara Andres, Gerry Wright, Lori Burrows, Alex Hynes and Deb Sloboda enjoy a break between talks at our BBS Research Day



BBS Research Symposium poster and oral presentation award winners. Shown left to right are Evan Shepherdson (Ph.D. candidate, Elliot Lab), Caitlyn Rotondo (Ph.D. candidate, Wright Lab), Victoria Coles (M.Sc. candidate, Burrows Lab), Luke Yaeger (Ph.D. candidate, Burrows Lab), Monica Warner (M.Sc. candidate, Andres Lab) and Ali Zhang (M.D./Ph.D. candidate, Miller Lab).

Ryerson University

Department of Chemistry and Biology

Correspondent: **Michael Olson**

The Department of Chemistry and Biology encompasses multi-disciplinary interests in research and education and is home to almost 40 faculty. Our Chemistry research programs are generally focussed on macromolecular, synthetic and medicinal chemistry. The research interests in Biology enjoy strengths ranging from biochemistry, molecular and cell biology, to genetics, microbiology and environmental biology. The breadth and variety of research interests creates an exceptional environment that permits cross-pollination of ideas and an open- concept milieu for learning and teaching. We are also the home department for the Molecular Science Graduate Program, which now hosts over 50 graduate students in the Ph.D. and M.Sc. programs.

Graduating students:

Congratulations to students graduating from the Molecular Science Graduate Program in 2019. Graduating with Master's degrees were: Tasnim Abukar, Yasmin Awadeh, Vanessa Bairos, Ivan Boras, Liza Calhoun, Zhuo Zhen Chen, Veronica Cojocari, Matthew Davis, Dehi Joung, Adam Khan, Julie Loungxay, Steve Naraine, Vivekkumar Patel, Biprajit Sanyal, Rachel Shum, Selvyn Simoes, and Farhan Yusuf. Graduating with Ph.D. degrees were: Stephen Bautista, Ralph Delos Santos, Farnaz Fekri, Victoria Hipolito, Stefanie Lucarelli, Ruby Rose Rafanan, Golam Saffi and Kruti Shukla,

Student awards:

Victoria Hipolito won the Ryerson's Governor Gold Medal, Ryerson's most prestigious academic award, which is awarded annually to the graduate student who achieves the highest academic standing in a graduate degree program. **Melissa Iazzi** placed in the top 15 of the NSERC, "Science, Action!" video contest, in which students explain their research to the general public, and show why science matters. Melissa also received the Ryerson Molecular Science Outstanding Research Contribution and Global Learning Awards. **Mackenzie Brauer** received the Bill Cott Teaching Excellence Award, which is given out annually to two graduate students in the Department of Chemistry and Biology who were nominated by an undergraduate student and have demonstrated teaching excellence.

Featured publications and awards:

"Modulation of flotillin-dependent endocytosis directs efficacy of drug uptake and cell viability". (Scientific Reports. 2019 9(1):17768). Work from the **Costin Antonescu** lab

showed that after sensing the nearby effects of ultrasound and microbubbles, cells accelerated their own natural process of flotillin-dependent endocytosis which resulted in large increases in drug uptake and cancer cell death.

“Enhanced translation expands the endo-lysosome size and promotes antigen presentation during phagocyte activation”. (PLoS Biology. 2019 17(12):e3000535). The **Roberto Botelho** lab discovered and characterized a role for enhanced translation as a mechanism to expand lysosome size, increasing antigen holding capacity, and antigen presentation.

“Organisational best practices towards gender equality in science and medicine”. (The Lancet. 2019 393(10171):587-593). **Imogen Coe** and co-authors highlight actions that could achieve gender equality in science and medicine. They also survey approaches and insights that have helped to identify and remove systemic bias and barriers in science and medicine, and propose tools that will help organizational change toward gender equality.

“Oligomerization of equilibrative nucleoside transporters: a novel regulatory and functional mechanism involving PKC and PP1”. (FASEB Journal. 2019 33(3):3841-3850). The **Imogen Coe** lab analyzed changes in the oligomeric status of hENT1 and hENT2, and how they rapidly modify the uptake profile for nucleosides and nucleobases and allow cells to respond promptly to external signals or changes in the extracellular environment.

“Migration through physical constraints is enabled by MAPK-induced cell softening via actin cytoskeleton re-organization”. (Journal of Cell Science. 2019 132(11):jcs224071). **Michael Olson** and his team demonstrated that Ras/MAPK signalling plays a significant role in regulating cell biomechanical properties, in addition to its well-characterized and central contributions to proliferation.

“Directed evolution of bacterial polysialyltransferases”. (Glycobiology. 2019 29(7):588–598). The **Warren Wakarchuk** team investigated a biochemical way to increase polysialic acid addition onto proteins on the surface of cells, to make those cells repel other cells and allow for migration.

Faculty news:

Roberto Botelho renewed his Tier II Canada Research Chair to study “Organelle Function and Adaptation”. In addition, the Botelho Lab was awarded a CIHR project entitled “Translation regulation and lysosome expansion

in immune function” to investigate how translational mechanisms link to organelle adaptation during infection stress in immune cells.

Sarah Sabatinos and Cyclica Inc were awarded an NSERC Engage grant (2019-20). They will explore assays and inhibitors defining genome instability by leveraging the Sabatinos lab’s expertise in molecular and cell biology with Cyclica’s AI-augmented drug discovery. They plan to build protein-inhibitor algorithms and translate compounds for pancreatic cancer research and future therapies. Also the Sabatinos lab, along with co-investigators **Bryan Koivisto** and **Russell Viirre** (Chemistry, Ryerson University), were awarded a Mitacs Accelerate grant with Bartek Ingredients Inc to explore novel industrial pipelines for malic and fumaric acid.

New faculty:

The Department of Chemistry and Biology welcomes the newest member **Dustin Little**, who received his B.Sc. in Biochemistry from the University of Waterloo. He then worked for one year in the food science industry before completing his Ph.D. in Biochemistry at the University of Toronto and The Hospital for Sick Children under the supervision of Dr. Lynne Howell. Following this, he then conducted his post-doctoral work in the Department of Biochemistry and Biomedical Sciences at McMaster University in the lab of Dr. Brian Coombes. In late 2019, he was appointed by Ryerson University to establish his lab in the Department of Chemistry and Biology in January 2020, investigating how bacteria regulate virulence determinants through post-translational modifications. Merging his interest in structural biology and infectious disease pathogenesis, the Little Lab will tackle important problems related to microbial pathogenesis at the host-pathogen interface.



New faculty member Dustin Little

Special events:

Our department continues to be a key participant in Ryerson's "Science Rendezvous" that ran in May 2019. This was the 12th Science Rendezvous hosted at nearby Yonge-Dundas Square, arguably the busiest intersection in Toronto. Open to the public, it easily attracted several thousand visitors by showcasing research, hands-on activities, displays and stage shows that delighted the audience, and demonstrated how science plays a part in our everyday lives.

We also hosted our 8th Annual Research Symposium with more than 90 poster presentations and talks. These showcased our exciting research activities across various disciplines and highlighted both undergraduate and graduate-based research activities. Dr. Kristin Hope from the Stem Cell and Cancer Research Institute (SCC-RI) at McMaster University was the keynote speaker, who spoke about dissecting the molecular regulation that underlies the self-renewal of normal hematopoietic stem cells and their malignant leukemia stem cell counterparts.

CSMB incoming president Imogen Coe

As Vice-President of CSMB, Dr. Imogen Coe was busy during 2019 and involved in the many activities of the society. She is looking forward to taking over as President of CSMB in 2020. Her research at Ryerson, with international collaborators in South Africa, Spain and the U.S. resulted in a number of high-impact contributions in 2019, including a major publication in a special issue on global health and gender equity in science and medicine *The Lancet*. She was also invited to London, U.K. for the global launch of this special issue. Her advocacy in support of these issues was also recognized by the Senior Women Academic Administrators of Canada with a major award presented at their annual meeting at the University of Waterloo in April 2019. With collaborators at Johns Hopkins and elsewhere, she was co-author on a Nature Chemistry paper highlighting novel binding partners for the drug transporters her group studies, and a number of trainees completed their time in the lab with successful publications of major projects and happy transitions to new careers - primarily in industry.

Simon Fraser University

Department of Molecular Biology and Biochemistry

Correspondent: Christopher Beh

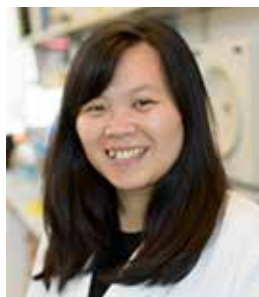
This year the Molecular Biology and Biochemistry (MBB) Department at SFU proudly reports several new faculty joining our ranks, as well as the many accomplishments of established faculty and our students. In addition to all these new happenings, we would also like to reach out to all our MBB Department alumni to ask you to contact us at mbbalumni@sfu.ca so we can continue to keep in touch.

New faculty appointments:

In 2019, several new faculty members arrived to complement the growing number of researchers in our department. **Dr. Mani Larijani** joined the MBB Department as the new *Shrum Chair in Biological Mechanisms of Disease*. Dr. Larijani studies DNA/RNA mutational processes that enable immune diversification but also affect bystander genes that can initiate cancer.



Dr. Mani Larijani joins the MBB Department at SFU as the Shrum Chair in Biological Mechanisms of Disease



Dr. Ly Vu

We also welcomed **Dr. Ly Vu** who started her lab at SFU this year as an Assistant Professor. Dr. Vu studies mechanisms of post-transcriptional and translation regulation during hematopoiesis and in leukemia.

Department highlights:

Dr. Fiona Brinkman was honoured as an *SFU Distinguished Professor* for her work on bioinformatics and computational tools for studying infectious and microbial disease. Our new hire, **Dr. Ly Vu**, was also awarded an early career *Scholar Award from the American Society of Hematology* for her work seeking new therapeutic targets for Acute Myeloid Leukemia (AML).

Faculty retirements:

We thank several colleagues who retired this year for their dedication and service that contributed to the

successes of our Department. **Dr. William (Willie) Davidson** retired after a career of conducting pioneering studies in salmonid genomics. Dr. Davidson was also a former Dean of the Faculty of Science. **Dr. Claire Cupples** retired after a successful career investigating DNA repair and mutagenesis. Dr. Cupples was also a former Dean of the Faculty of Science. We thank them both for their foresight and planning through the years, which moulded the Department and the SFU Faculty of Science into their current form. This past year, **Dr. Jamie Scott** also retired from her position at SFU, where her distinguished career involved research into vaccine design, immunity, and phage display libraries.

Student awards and other news:

Congratulations again go out this year to **Dr. Eric Hall** (MBB graduate of 2018), whose article ("Actomyosin contractility modulates Wnt signaling through adherens junction stability (2019) *Mol Biol Cell* **30**, 411) was selected by the editorial board as the "Paper of the Year" by the journal *Molecular Biology of the Cell*. As a graduate student, Dr. Hall worked in **Dr. Esther Verheyen's** lab investigating Wnt signaling in *Drosophila*. Dr. Hall is now a post-doctoral fellow at St. Jude Children's Research Hospital in Memphis, Tennessee.

We offer our congratulations to our many graduate students who earned external studentship award winners, including **Baofeng Jia** and **Venus Lau** who were awarded *Frederick Banting and Charles Best Canada Graduate Scholarship Doctoral Awards*.

Trent University

Molecules, Cells and Systems Research Group

Correspondent: Carolyn Kapron

In 2019, Trent's new Molecules, Cells and Systems Research Group was formalized, and **Dr. Robert Huber** (Biology) and **Dr. Carolyn Kapron** (Biology) were elected Co-Directors. A membership invitation was circulated, with faculty and student membership now spanning five academic departments. Several planning sessions were held, most notably for a graduate student research day, which was to have been held in April 2020, but is unfortunately now postponed to a later date.

Dr. Sanela Martić (Forensic Science) received an award from CFI JELF to help purchase several instruments for a new lab that is part of a proposed cutting-edge biomedical

and biosensor research program. The requested infrastructure will include optical and electrochemical bench-top instruments, and will make significant contributions to the development of biomedical tools to better protect Canadians while reducing economic costs associated with healthcare, by enabling novel research using interdisciplinary techniques.

Dr. Karen Thompson (Sustainable Agriculture and Food Systems, School of the Environment) received a CFI/ORF award to establish a new molecular biology lab, named the Agricultural Soil Health (ASH) lab (see <https://sites.google.com/trentu.ca/ashlab/home?authuser=0>). The equipment will support molecular work, such as qPCR, sequencing prep, and gel imaging, along with stable isotope analysis (DNA/RNA-SIP) and soil analyses and greenhouse gas measurements in-field. Dr. Thompson's lab is actively recruiting grad students to the group, as she has also received her first NSERC-DG, titled "Linking Microbial Functioning to the Fate of Carbon in Soil".

Dr. Robert Huber was awarded the 2019 Dictyostelium Junior Faculty Award from the International Dictyostelium community. This award recognizes exceptional contributions to the field. Dr. Huber's lab also received a 5-year Project Grant from CIHR, for research investigating a novel approach to studying the function of the Batten disease protein, CLN5.

Université de Montréal

Department of Biochemistry and Molecular Medicine

Correspondent: Pascale Legault

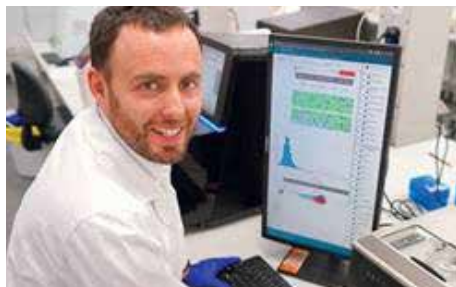
The Department of Biochemistry and Molecular Medicine of the Faculty of Medicine at the Université de Montréal is a dynamic environment for research and teaching in biochemistry, molecular medicine, human genetics and bioinformatics. There are more than 350 students enrolled in undergraduate programs in biochemistry and bioinformatics, and each student has the opportunity to engage in a research experience as part of laboratory internship courses. The scientific platforms and laboratories located within the department on the main campus, as well as in the various affiliated research institutes, are equipped with state-of-the-art technology. They offer ideal scientific conditions for the development of the more than 175 students enrolled in graduate programs in biochemistry and bioinformatics. Our department is also home to the only post-doctoral

training program in clinical biochemistry in the province of Quebec.

In June 2019, **Professor Pascale Legault** was appointed as the Director of the Department of Biochemistry and Molecular Medicine. We would like to thank our colleague **Professor Luc DesGroseillers** for serving as Director of the Department for the past 4 years.

New faculty members:

We are delighted to welcome **Professor Martin Smith** to the Department of Biochemistry and Molecular Medicine. **Professor Smith** is a specialist in computational RNA and genome biology, with a deep interest in understanding the mechanisms underlying gene expression regulation. As a post-doctoral researcher, he developed new applications for high-throughput sequencing technologies, including the early adoption of nanopore sequencing. His research currently focusses on improving the characterization and profiling of transcriptomes by combining the development of bioinformatics methods with state-of-the-art single molecule real-time sequencing. His laboratory is located at the CHU Sainte-Justine Research Centre.



Professor Martin Smith in action

Promotions:

Professor Marlene Oeffinger, director of the Ribonucleoprotein Biochemistry research unit at the Montreal Clinical Research Institute, was promoted to Associate Research Professor, and **Professor Daniel Zenklusen**, who investigates the spatio-temporal regulation of RNA metabolism, combining single molecule and super-resolution microscopy approaches with genetics and biochemistry, was promoted to Associate Professor with tenure.

Awards, nominations and distinctions:

Professor Karim Benkirane, clinical biochemistry Professor in the department, was awarded a prize for excellence by the Société Québécoise de Biologie Clinique (SQBC) during the 40th annual congress of the SQBC, held in Quebec City, November 6-8, 2019. This

award is granted once every five years to a member of the Society to highlight and recognize his or her exceptional contribution to the influence of the SQBC. This distinction was given to Professor Benkirane for his great contribution to the teaching of clinical biochemistry, his involvement in the certification of the specialty in clinical



Professor Benkirane receiving the prize of excellence from the SQBC

biochemistry issued by the Ordre des Chimistes du Québec, as well as his great participation in the reform of the Post-doctoral Training Program in Clinical Biochemistry at the Université de Montréal.

As part of the drug discovery consortium, **Professor Michel Bouvier** was awarded the Prix Regroupements sectoriels de recherche industrielle at the ADRIQ Innovation Awards gala. This project, which aimed to evaluate the efficacy of drugs at the cellular level, was undertaken in partnership with several pharmaceutical companies and highlights the strength of the linkages between the research community and industry.

Professor Nathalie Grandvaux was awarded two prizes in 2019. On May 29th, she was awarded the National Paul Man Lectureship Award by the Alberta Respiratory Centre



Professor Nathalie Grandvaux

of the Faculty of Medicine of the University of Alberta, following her lecture entitled "Fight against respiratory viruses: oxidative stress, friend or foe?" This is the second time, since 2004, that the award has been given to a Canadian, and the second time that it has been given to a professor from the Université de Montréal. In November, she received the International Mentoring Excellence Award from

the Society for Redox Biology of Medicine (SFRBM). She received this award in Las Vegas during the 26th annual SFRBM2019 conference that took place from November 20-23. This is the first time, since 2014, that the award has been presented to a Canadian, and the first time to a woman from the Université de Montréal.

Professor Alain Moreau was nominated for a second 3-year mandate as Director of the Network for Canadian Oral Health Research and has been awarded a \$1.4 M grant to direct the Interdisciplinary Canadian Collaborative Myalgic Encephalomyelitis (ICANCEM) Research Network.

Departmental program awards and distinctions:

Our Post-doctoral Training Program in Clinical Biochemistry received special attention. The certification for our Post-doctoral Training Program in Clinical Biochemistry was renewed for 5 years (2019-2024) by the Canadian Association for Clinical Biochemistry. This is the only non-medical specialty program in Quebec. As part of its Annual Conference Banquet, the CSCC awarded the “The University of Montreal Post-doctoral Training Program in Clinical Biochemistry” the “2019 CSCC Award for Excellence in Education”, sponsored by Beckman Coulter Canada. This award was given in recognition of the excellent redesign of the post-doctoral program. It is a first time since its inception in 1990 that this award was given to a training program.



Frame of the 2019 CSCC Award for Excellence in Education

Events:

Several social and scientific events marked 2019.

On March 5th, we celebrated the 30th anniversary of the *Journée Simon-Pierre Noël*, a yearly event that commemorates a previous professor from the department, **M. Simon-Pierre Noël**. A foundation was set up in his name to support graduate student training by providing funds for prizes awarded during this event. We would like to congratulate the 2019 prize winners: **Mr. Lionel Condé** (best presentation and Simon-Pierre Noël Fellow), **Mr. Louis Gauthier** (best presentation for a Ph.D. student) and **Ms. Isabel Gamache** (best presentation for an M.Sc. student).

A major event of the year was our First Symposium in Structural Biology, which was held on May 3rd. The event gathered over 100 attendees and included a guided tour of our new Structural Biology Platform, scientific presentations from eminent researchers, including a keynote lecture from **Professor Lewis E. Kay**, from the University of Toronto, as well as student poster presentations. Through major investments from the Canada Foundation for Innovation, the department acquired state-of-the-art equipment to create this new Structural Biology Platform, which is directed by **Professor Pascale Legault**, and managed by **Dr. Normand Cyr**. The platform includes nuclear magnetic resonance (NMR) spectrometers, a biological size-exclusion chromatography system coupled to a small angle X-ray scattering system (SEC-SAXS) and a size-exclusion chromatography system coupled to a multi-angle light scattering detector (SEC-MALS), which are all available to academic and industrial researchers.



Guided tour of the NMR platform by university officials, First Symposium of Structural Biology

During the week of May 6-10, we were pleased to host a group of five graduate students from the University of Hokkaido in Sapporo, Japan, accompanied by their professor, **Professor Kazuyasu Sakaguchi**. These students had the opportunity to participate in a week-long practical course in protein purification and to give presentations on their research as part of the 2nd Hokkaido-Montreal Graduate Student Symposium, both organized by **Professor James G. Omichinski**.

We also remained very active during the summer period! Between July 13-27, the department participated in the very first edition of the Université de Montréal summer school for international students. We organized a workshop entitled “DNA and Molecular Biology” for students between the age of 15 and 17, which began with an extraction of banana DNA, its

study by gel electrophoresis and its observation by fluorescence microscopy. The workshop was organized by an experienced team of undergraduate and graduate students: **Justina Chu**, **Simon Del Testa**, **Kevin Lanthier**, **Joëlle Latreille** and **Lila Naouelle Salhi**. Following student satisfaction surveys, their workshop stood out as one of the top 3 out of 30 proposed workshops!

We celebrated with our alumni in the Fall! Graduates of the B.Sc. Biochemistry - Class of 1989 met at the "Medical Graduate Reunion Brunch Cruise" on September 29th. It was a pleasure for them to meet and celebrate their 30-year reunion on a wonderful sunny day. This was the initial event of its kind for the Faculty of Medicine, but this event will happen again in 2020!



Graduates of the B.Sc. Biochemistry - Class of 1989, who gathered for their 30th-year reunion

Université de Sherbrooke

Département de biochimie

Correspondent: Michelle Scott

2019 saw important changes and additions in the department including a name change from the Department of Biochemistry to the Department of Biochemistry and Functional Genomics, to better reflect the research interests of its members.

New faculty members:

The department welcomed two new members: **Dr. Mariano Avino**, who heads the newly created bioinformatics platform, and **Dr. Jean-Philippe Brosseau**, our newest associate professor. Recently arrived in Sherbrooke from a post-doctoral position at the University of Texas Southwestern Medical Center, Dr. Brosseau is interested in elucidating gene expression programs involved in tumorigenesis, with a



New associate member of the Biochemistry and Functional Genomics department, Dr. Jean-Philippe Brosseau

particular focus on the tumour microenvironment. His group is also developing molecules (antisense oligonucleotides) to reduce tumour growth in pre-clinical models. He is currently building his group and welcomes enquiries of interested trainees. Our 25th annual graduate

symposium held in March 2019, co-organized by our two graduate student representatives, Joël Simoneau and Tiphane Cavé, as well as by Professor Pierre Lavigne, was a success. Professor Brian Wilhelm from the Université de Montréal, our keynote speaker, discussed the study of pediatric leukemias using genomic and chemogenomic approaches, while Marie-Camille Rowell, invited Ph.D. student from the Université de Montréal, presented on tumoral suppression by ERK 1/2 in pancreatic cancer. Nine UdeS graduate students from the Biochemistry and Functional Genomics Department presented their research. The finalists were the following: **Gabrielle Deschamps-Francoeur** from the Scott group won the first prize, **Fanny Thuriot** from the Lévesque group won the second prize, while **Philia Bouchard-Bourelle** and **Yann Vanrobaeys** from the Scott and Bachand groups, respectively, shared the third prize.



25th Annual Symposium of the department, prizewinners: From top right: Prof. Benoit Laurent (judge), Philia Bouchard-Bourelle (3rd prize), Prof. Pierre Lavigne (organizer), Yann Vanrobaeys (3rd prize), Prof. Brian Wilhelm (invited speaker and judge). From bottom right: Marie-Camille Rowell (invited speaker and judge), Ariane Brault (judge), Fanny Thuriot (2nd prize), Gabrielle Deschamps-Francoeur (1st prize).

Prizes and distinctions:

Ph.D. student Gabrielle Deschamps-Francoeur from the Scott group won the Pierre-Chailler departmental prize for best student of the year. Several department faculty and staff were recognized and celebrated throughout the year. Professor Guylain Boissonneault received the RECMUS prize for the best graduate student director, while Professor François Bachand was awarded the Jean-de-Margerie prize for the best publication in the Faculty. Professor Martin Bisaillon received the Marcel-Bastin prize for the quality of his teaching.

Université Laval

Department of Molecular Biology, Medical Biochemistry, and Pathology

Correspondent: Jean-Yves Masson

Our department is composed of professors working on medical biochemistry and pathology, and mostly on basic research and molecular and cellular biology. The department is headed by Yves Giguère. This year, Patrick Laprise was nominated as an associate director. Patrick is helping fundamental researchers for career promotion and teaching duties in the department. Congratulations Patrick!

Principal investigators and their trainees participated in the third scientific day of our department on November 19, 2019. Our guest speaker, Morag Park, gave a beautiful and inspiring talk on tumour zonation and immune microenvironments in triple negative breast cancer. It was also a perfect occasion to know our colleagues better, and a “scientific speed dating” session was organized where 10 researchers gave a 5 minute outline of their work. Darren Richard was named Professor of Excellence 2019 of our department. Darren is a dedicated director for the Biomedical Sciences Baccalaureate program at Université Laval. His efforts were rewarded by this distinction, but also by the fact that his program received a successful evaluation by external referees.

Several research accomplishments were achieved in 2019, only a few of which can be highlighted here.

With a combination of *in vitro*, *ex vivo*, and *in silico* approaches, **François Bordeleau** demonstrated that cancer cell collective invasion is regulated by the energetic states of leader–follower cells (PNAS 116: 7867-7872). Again in PNAS, Amélie Fradet-Turcotte and

her team highlighted part of the process by which the human papillomavirus (HPV) causes the formation of cancer cells (PNAS 116: 19552-19562). In Molecular Cell (72: 920-924), **Steve Bilodeau** gave a new perspective on how genes are part of complex ecosystems within the chromosome architecture and share transcriptional resources. Marc-Étienne Huot’s team, in collaboration with Samer Hussein, described how the SAM68 protein through interaction with U1A modulates U1 snRNP recruitment and regulates mTor pre-mRNA splicing (NAR 47: 4181-4197). A study by the teams of **Jean-Yves Masson**, **Guy Poirier** and Michael J. Hendzel (University of Alberta) was published in Nature Communications. The article reveals the mode of action of PARP-1 inhibitors in DNA double-strand break resection, and clarifies the profile of patients who should best respond to these treatments with irradiation. A collaboration between **Jacques Côté** and Tatiana Kutateladze (University of Colorado), published in Nature Communications (10: 4724), identified the native MORF complex as a histone H3K23-specific acetyltransferase and elucidated its mechanism of action.

2019 was another rewarding year for our students, with successful M.Sc. graduations and Ph.D. defences. Several Ph.D. students moved to new challenges: Dr. Alexandra Dallaire (Director: Martin Simard) is now a post-doctoral fellow in Eric Miska’s lab at the University of Cambridge, Dr. Jonathan Bergeman (Director: Marc-Étienne Huot) is now a post-doctoral fellow in Eric l’Ecuyer’s lab at IRCM, Dr. Xue Cheng (Director: Jacques Côté) is now a research specialist at Feldan Therapeutics, Dr. Suryasree Subramania Gangadhara (Director: Marc-Étienne Huot) is now in Sidhu Sachadev’s lab at the University of Toronto. Congratulations to students for another year of exemplary achievements.

Finally, **Normand Marceau** won the Diamond Award from the CHU de Québec-Université Laval for his research career. **Jacques Huot** was appointed Professor Emeritus at Laval University. Notably, his work has led to a better understanding of signalling pathways that control cell resistance to stress, metastatic processes, and cell migration during the formation of new blood vessels. Both Drs. Marceau and Huot were examples of generous and helpful professor-researchers. They retired from academia in 2018 – these recognitions are a nice finishing touch for the end of their academic careers!

University of Alberta

Department of Biochemistry

Correspondent: Joe Casey

Promotions:

Joanne Lemieux was promoted to full Professor, effective July 2019.

Graduate milestones:

Ph.D. graduates from our department were Drs **Erin Garside (Andrew Macmillan)**, **Vrajeshkumar Pandya (Ing Swie Goping)**, **Sereana Wan (Dennis Vance)**, **Darpan Malhotra (Joe Casey)**, **Claudia Acevedo-Morantes (Holger Wille)**, **Luana Leitao (Richard Fahlman)**, and **Jasdeep Mann (Ing Swie Goping)**. Congratulations to M.Sc. graduates **Emmanuella Takyi, (Joanne Lemieux)** and **Laine Lysyk (Joanne Lemieux)**.

Events:

Career Celebration for Joel Weiner:

The Department of Biochemistry and the Faculty of Medicine and Dentistry at the University of Alberta hosted a career celebration symposium in honour of **Joel Weiner**. Joel became Professor Emeritus in July 2019.

Attendees were treated to talks by Joel's former trainees **Raymond Turner** (University of Calgary) and **Justin Fedor** (post-doctoral fellow, Cambridge University). **Natalie Strynadka** (University of British Columbia), one of Joel's key collaborators including publication of the nitrate reductase crystal structure, also presented some of her work on structures of important drug targets in bacteria. Important to Joel's career were ten years as Vice Dean, Research in the Faculty of Medicine and Dentistry. **Lorne Tyrell**, who was Dean while Joel was Vice Dean, reminisced about Joel and presented an account of his work to develop anti-hepatitis drugs.

Joel Weiner was born in Montreal in 1946. He obtained his B.Sc. from McGill University in 1968 and then completed his Ph.D. at Cornell University in 1972. After serving as a post-doctoral fellow to Arthur Kornberg at Stanford from 1968-1972, Joel first joined the University of Alberta as an Assistant Professor in 1976.

Fast forward 53 years and Joel is currently Distinguished University Professor Emeritus, former Professor of Biochemistry and Adjunct Professor of Medical Microbiology & Immunology. During his career he served as Associate Dean of Research for the Faculty of

Medicine and Dentistry from 1993-2005, and Lead of the nascent School of Molecular and Systems Medicine from 2009-2011. Joel's research has focussed on the function and structure of membrane-bound energy-conserving enzymes with emphasis on molybdoenzymes and flavoenzymes. He has published over 200 peer-reviewed papers, with over 10,000 citations and has made major contributions to our understanding of membrane protein assembly and translocation, cofactor biosynthesis, subunit communication in membrane-bound enzymes and the role of electron transfer relays in redox enzymes.

Joel was the past Director of the Medical Research Council Group in the Molecular Biology of Membrane Proteins and was PI of Project CyberCell, a major initiative funded by the Canada Foundation for Innovation and partners. Joel has also served the community as President of the Canadian Society for Biochemistry, Molecular Biology and Cell Biology, and was on the Council of the Medical Research Council of Canada (1996-2000) and the Council of Scientists of the Human Frontiers Science Program (1998-2001). He chaired the CIHR Institute of Genetics Advisory Board from 2000-2008. He has served on several journal editorial boards and is Editor of BMC Biochemistry (Enzymes & Proteins).

In addition to this, Joel has organized several international meetings and was President of the 19th International Congress of Biochemistry and Molecular Biology held in Toronto. He has been recognized with the Malcolm Brown award from the MRC Canada, a Killam Annual Professorship, the Distinguished Service award of the International Union for Biochemistry & Molecular Biology, and is a Fellow of the Royal Society of Canada.

Russell Bishop, 2019 Bridger Lecturer:

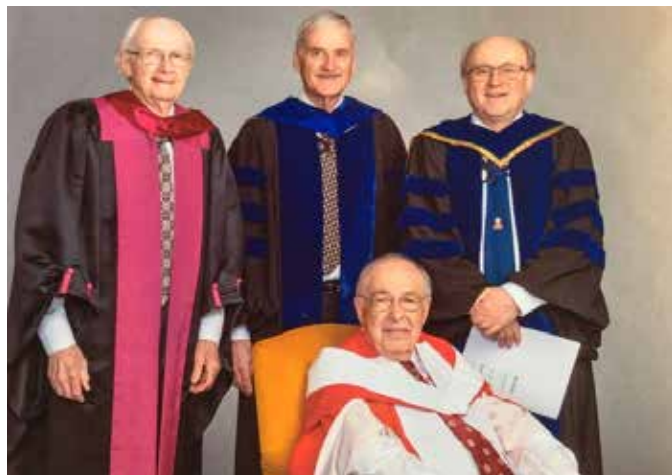
Joel Weiner's Ph.D. student, **Russell Bishop** (McMaster) spoke at Joel's Career Celebration on May 9 2019 as the 13th annual William Bridger Lecturer in Biochemistry. Russell's talk "The multifunctional enzymology of PagP" was a fascinating walk through the multiple roles of this protein.

Russell is a graduate of Ross Sheppard Composite High School in Edmonton and received his B.Sc. in Biochemistry from the University of Alberta in 1989. Russell received three summer studentships from AHFMR and this support enabled his identification, with Joel Weiner, of a molybdopterin cofactor in the enzyme DMSO reductase. Russell then received an AHFMR graduate studentship, again working with Joel, to study the signal transduction

mechanism governing transcriptional induction of the AmpC cephalosporinase. During his graduate studies, Russell was also supported by the German Academic Exchange Service, which allowed him to spend a year with the late Joachim Volker-Höltje at the Max Planck Institute for Developmental Biology in Tübingen, Germany, where he studied cell wall muropeptide recycling. Subsequently, Russell discovered three novel outer membrane lipoproteins in *E. coli*.

Honorary Degrees for two Emeritus Biochemistry members, Cyril Kay and Carol Cass:

Emeritus biochemistry professors **Cyril Kay** and **Carol Cass** received honorary Doctoral degrees at the University of Alberta Fall 2018 Convocation.



Cyril Kay (sitting), Doug Wilson (former Dean of Medicine and Dentistry), Bill Wolodko (Bill Bridger's Research Director) and Charles Holmes (Chair, Department of Biochemistry), at the honorary degree ceremony for Cyril Kay



Lewis Kay (University of Toronto) and Brian Sykes with Department of Biochemistry Chair, Charles Holmes and Cyril Kay in background, at the celebration for Cyril Kay and Carol Cass receiving honorary doctorates



Mike Schultz and Michael James at the celebration for Honorary Doctorate degrees (2019 Spring convocation) for Carol Cass and Cyril Kay

Brian Sykes, Order of Canada:

In July 2019, Brian Sykes (Professor Emeritus) was named an Officer of the Order of Canada.



Three of the Department of Biochemistry's Fellows of the Royal Society: Michael James, Cyril Kay and Brian Sykes (the other FRS, Joel Weiner, not available for the photo)

University of British Columbia

Department of Biochemistry and Molecular Biology

Correspondent: Leonard Foster

Our department continues its commitment to the principles of equity, diversity and inclusion towards continued development into a well-rounded, world-class research facility.

New faculty:

In July, **Dr. Annie Ciernia** (University of California, Davis) joined the department. Dr. Ciernia holds a full-time faculty appointment and is also an Investigator at the Djavad Mowafaghian Centre for Brain Health, UBC.



Annie Ciernia

Our department's joint candidate search (with B.C. Children's Hospital) for an Assistant Professor specializing in metabolomics came to a successful conclusion this year. **Dr. Seth Parker** will join the department in July, 2020. Dr. Parker completed his Ph.D. in Bioengineering at the University of California, San Diego, where he developed quantitative methods to study cancer metabolism under the supervision of Dr. Christian Metallo. He is currently a post-doctoral fellow at New York University School of Medicine in the laboratory of Dr. Alec Kimmelman, where he studies alanine transport in pancreatic cancer. He is interested in understanding how specific transporters permit acquisition of nutrients from the tumour microenvironment, and how targeting these transporters may restrict tumor growth by limiting access to anabolic substrates.

In late 2019, Biochemistry and Molecular Biology launched an extensive search for an Assistant Professor

and received over 260 applications. We were delighted to offer the position to **Dr. Ethan Greenblatt**. Dr. Greenblatt is a post-doctoral fellow at the Carnegie Institution for Science. He received his doctoral training in the laboratory of Ron Kopito at Stanford University, where he worked on cellular protein quality control mechanisms, showing a central role for membrane 'pseudo'-proteases in the proteasomal degradation of misfolded secretory proteins. Dr. Greenblatt went on to join the laboratory of Allan Spradling at the Carnegie Institution for Science's Department of Embryology in Baltimore, Maryland, for post-doctoral training. He utilized the developmental biology of the *Drosophila* ovary to uncover mechanisms of post-transcriptional gene regulation underlying prolonged oocyte function, including a role for the fragile X mental retardation 1 (*Fmr1*) gene in activating the translation of large proteins critical for homeostasis. We are happy to announce he will be joining our department in January, 2021.

Faculty honours and awards:

In other news, several faculty members had outstanding years: **Leonard Foster** won a Killam Award for Excellence in Mentoring, and **Jason Read** won a Killam Teaching Award. **Sheila Teves** received Scholar Awards from both the Michael Smith Foundation for Health Research and the Peter Wall Institute. **Annie Ciernia** was awarded a Canada Research Chair in Understanding Gene Expression in the Brain, Tier 2.

Sriram Subramaniam will hold the Gobind Khorana Canada Excellence Research Chair (CERC) in Precision Cancer Drug Design. The Chair, supported by the CERC program and a substantial philanthropic gift made to the VGH and UBC Hospital Foundation, is named after the late, Nobel Prize-winning UBC biochemistry professor, Har Gobind Khorana.

Pieter Cullis' NanoMedicines Innovation Network (NMIN) has been awarded \$18.5 million in new funding from the Networks of Centres of Excellence (NCE). This funding is matched by more than \$22 million from industry and other not-for-profit agencies.

Retirements:

In November 2019, Administrator **Sabrina Cheng** retired after 30 years. The administration areas of the departments of Biochemistry and Molecular Biology and Cellular and Physiological Sciences were merged. **Zaira Khan** was promoted to Director of Administration for both departments.

University of Calgary

Department of Biochemistry and Molecular Biology

Correspondent: Randal Johnston

2019 has been another successful year for the Department of Biochemistry and Molecular Biology at the University of Calgary.

Faculty news:

The department had a change in leadership with **Dr. Sarah Childs** appointed as the new department head effective



Department Chair,
Dr. Sarah Childs

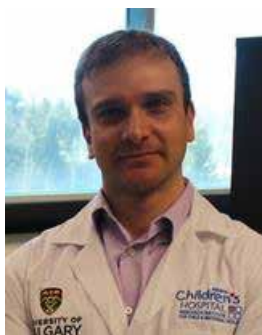
July 1st 2019. Dr. Childs has been a member of the department since 2001. As well as running a very successful laboratory studying angiogenesis, including vascular patterning, stabilization, and microRNA control of smooth muscle differentiation, Dr. Childs was the Director of the BMB Graduate Program for 6 years.



Former Department
Chair, Dr. Jonathan
Lytton

Many thanks to **Dr. Jonathan Lytton**, who completed two very successful terms as department head. Dr. Lytton's contributions to the department have been vast, including the appointment of many of the department's current members, contributions to the BMB Graduate program, the renewal of the departmental annual retreat (or "Advance" as we prefer to call it), and mentorship to faculty members,

trainees and staff. He is currently on a well-deserved administrative leave and is focussed on the continuing success of his laboratory.



Dr. Marco Gallo

The department had no new hires during 2019, but did see a joint member become a primary member. **Dr. Marco Gallo**, a 2019 Top 40 under 40 recipient, studies genetic mutations in brain tumours, findings that will be critical for developing precise, individualized treatments for these cancers.



Dr. Pinaki Bose

Dr. Pinaki Bose became a joint member with a primary appointment in Oncology. Dr. Bose has been affiliated with the department as an adjunct assistant professor, with a specialization in bioinformatics and cancer.

Retirements:

2019 saw two long serving faculty members retire:

Dr. Frans van der Hoorn's contributions to the Cumming School of Medicine and the department were huge. His roles in leadership included Associate Dean in Graduate Sciences Education from 2003-2013, and the



Dr. Frans van der Hoorn

Interim Senior Associate Dean of Education for the Faculty in 2010. During this time, Dr. van der Hoorn ran a successful research lab, was active in the Cancer Biology Research Group, and sat on countless faculty leadership groups within the University, provincially, nationally and internationally.

Dr. Randal Johnston has had a long and distinguished career with the University since 1984, first in Biological Sciences and then with the department since 1991. Dr. Johnston is the recipient of multiple awards and honours for teaching, cancer research and leadership. Dr. Johnston was a founding member and Director of the Southern Alberta Cancer Research Centre (now the Charbonneau Cancer Research Institute) for 10 years, then Associate Vice-President (Research) for the University, subsequently President of Genome Prairie/Alberta for 6 years, and



Dr. Randal Johnston

then General Secretary of the CSMB for 8 years. He has contributed to major course development and served as the program director of the Master in Biomedical Technology (MBT) graduate program for 6 years, which became the top-ranked such program in the University.

Graduate student news:

Dr. Fintan Stanley was awarded the Governor General's Academic Gold Medal for his thesis work on radon gas and its impacts on DNA damage and repair. Fintan completed his Ph.D. under the supervision of **Dr. Aaron Goodarzi**, Canada Research Chair for Radiation Exposure Disease.



Dr. Fintan Stanley

The BMB program had 9 M.Sc. and 5 Ph.D. students successfully defend their thesis work in 2019.

Department news:

Dr. Mayi Arcellana-Panlilio continues to excel in her role as Senior Instructor in the Bachelor of Health Sciences program. The team of students that Mayi co-supervises was once again awarded gold medals at the International Genetically Engineered Machine (iGEM) Foundation's Giant Jamboree in Boston in November. The team was nominated for 10 awards, winning in 3 of the categories.



Dr. Mayi Arcellana-Panlilio

The annual departmental Advance, held in May, recognized the following faculty and staff members for their excellence in research, educational and leadership achievements: **Maja Tarailo-Graovac** – “Leon Browder Rising Star Award”, **Savraj Grewal** – “Associate Professor Award”, **Justin MacDonald** – “Schultz Award for General Excellence”, **Aaron Goodarzi** – “Education Award”, **Sarah Childs** – Hans van de Sande Leadership & Service Award, **Theodore Verhey** – “Postdoctoral Award”. The following graduate students were also recognized for their

excellent contributions: **Shaun Moore**, **Nabila Bahrami**, **Nancy Adam**, **Craig Jacobs** and **Michael Li**.

Please visit the BMB website to see additional information and updates at <https://cumming.ucalgary.ca/departments/bmb/home>.

University of Calgary

Department of Biological Sciences

Faculty of Science

Correspondent: Vanina Zaremborg

The Biological Sciences Department at the University of Calgary is currently organized in four clusters based on general research and teaching interests. They include Biochemistry, Microbiology, Cell Development & Physiology, and Ecology & Evolutionary Biology.

During this year, several colleagues from Biochemistry have been devoted to service in our department: **Sergei Noskov** continued in his role of Associate Head – Research, **Elmar Prenner** replaced **Ken Ng** as chair of the Biochemistry cluster, and **Marie Fraser** continued as chair of the Biochemistry program.

This has been a successful year in both research and teaching activities for Biochemistry. Many of our members were involved in securing important sources of funding to support the development of multidisciplinary initiatives. Several of our graduate students have been recognized with distinctions/awards for their excellent research and teaching achievements.

These are the highlights of the year:

On the research side, **Raymond J. Turner** took early retirement in September 2019, although he will continue as an active researcher well into the foreseeable future. Ray was invited again to lecture in an international Genomics course at the University of Bologna, Italy, in the Fall of 2019, where he also participated in the Institute of Advanced Studies, giving several seminars to the academic community and the general public. This activity led him to be nominated to the Institute as an honorary fellow. Ph.D. students Elena Piacenza and Natalie Gugala successfully defended their theses studying Biophysical chemistry and biochemistry of metal-microbe interactions; both of their theses were nominated for awards.

The **Tieleman** group continues to work on computational models for biological membranes and applications of these models to biophysical problems. An issue of Chemical Reviews highlighted the progress over the past 25 years and the range of current applications of computer simulations to membrane problems. The group participated in a general review on modelling complex membranes and a more specialized review on lipid-protein interactions, an area that has seen major growth in the past five years. In a more forward-looking project, the group was part of a large collaboration that modelled a chromatophore, an entire bacterial light-harvesting organelle. Published in *Cell*, this paper describes a combination of many techniques used on some of the largest computers in the world to link the fast process of light capture all the way to ATP synthesis efficiency, and provides a glimpse of the scale that will be more routinely accessible in the near future.

The **Noskov** group welcomed three graduate students this year (Mario Valdez Tresanco, Luis Alvarez and Andriy Plakhotnyk) and a new post-doctoral fellow, Dr. Gulru Kayuik. Several of the lab's trainees received prestigious awards including AIHS and Eyes High Doctoral Recruitment Scholarship to Mario Valdez Tresanco, Provost Doctoral and MITACS Globalink awards to Kazi Shudipto Amin, Bettina Bahlsen Memorial Graduate Scholarship to Mary Kudaibergenova, and Eyes High Post-Doctoral Award to Dr. Hanif Khan.

Noskov lab members worked to implement a machine-learning approach to quantify proteomics and metabolomics signalling networks involved in the bacterial antibiotic resistance response. Funded by Genome Canada LSARP, the Noskov and **Ian Lewis** labs launched a public portal to organize and analyze mass-spectrometry data with a rapid-pathogen detection algorithm (<http://proteomics.resistancedb.org/>), with applications including high-throughput analysis of COVID-19 patient samples from the Calgary region.

In collaboration with Colleen Clancy's team from U.C. Davis, the Noskov lab has developed and published a multi-scale model to predict drug-induced arrhythmias from protein to tissues. The two lab papers appeared in *PNAS* and *Circulation Research* and were featured on multiple news outlets including *Science Eureka Alerts* (https://www.eurekaalert.org/pub_releases/2020-04/uoc--cmp041020.php). In 2019, lab activities received a major boost with the R01 NIH grant funded in collaboration with the team of Ira Kurtz from U.C. Los Angeles, and the

group is excited to expand their computational models to the SLC4 family of transporters and transport regulation in the kidney!

In 2019, the **Lewis** Research Group (LRG) made significant advances in its large-scale research programs dedicated to developing precision infection management strategies and building diagnostic devices for treating infectious diseases. The ResistanceDB public web portal went live (see link above), allowing the LRG to disseminate and share these 'omics datasets and related computational data-handling tools with researchers around the world. The LRG continued to partner with clinical end-users, industry-leading instrument manufacturers, and local fabrication facilities to bring its diagnostic tools to market, and it published an additional patent relating to these technologies. As the proteomics and metabolomics hub of the International Microbiome Centre, the LRG partnered with numerous researchers across North America to better understand the metabolomic and proteomics underpinnings of host-microbiome interactions. This resulted in several publications in leading journals and an additional four manuscripts are in preparation.

Elmar Prenner continued his teaching in the Nanoscience minor and the Biochemistry program. One graduate student (Kevin Sule) received a poster award 12/600 at the European Biophysics meeting in Madrid, and also spent 12 weeks supported by a Mitacs grant at the University of Witten/Herdecke in Germany to continue a collaboration on metal-membrane interactions. Other areas of research were lipid-based anticancer drugs and nanoparticle-based drug delivery. His group's applied research dealing with the design of fluorescence instruments resulted in pending PCT patents. Elmar serves on the editorial board of *BBA Biomembranes*.

In March of this year, **Hans Vogel** celebrated 35 years as a faculty member at the University of Calgary. He actively continues with his highly productive research programs in regulatory calcium-binding proteins, host-defence peptides and metabolomics of cancer, autism, and various infectious and inflammatory diseases. While NMR spectroscopy remains the major cornerstone of his experimental work, his group frequently relies on the use of other techniques, such as SPR, calorimetry, optical spectroscopy, GC-MS and ICP-MS, to achieve a deeper insight into biochemical mechanisms and their regulation. He continues to enjoy teaching a two-week summer course in biological NMR spectroscopy in Sapporo, Japan each year. Also, for the last 10 years,

he has had a significant impact in the area of biological membrane biology as Executive Editor of the journal BBA-Biomembranes.

The **Vanina Zaremborg** group focusses on investigating the mechanisms that regulate glycerolipid metabolism and lipid signalling in eukaryotes. Current focus is on diacylglycerol and phosphatidic acid metabolism, anti-tumour lipid drugs and the biochemical characterization of acyltransferases. Suriakarthiga Ganesan (Ph.D.) defended her thesis on the “Role of diacylglycerol in the cellular response to lysophosphatidylcholine analogues”. Part of her work was published this year in *Traffic* and in two chapter books. Suria was the recipient of a Dean’s Doctoral Scholarship and an Eyes High International Doctoral Scholarship awarded by the University of Calgary. Suria was invited to give an oral presentation at the ASBMB annual meeting held in Orlando, U.S.A. The group also published a study in collaboration with Dr. Athenstaedt from Graz University (Austria) in BBA Molecular and Cell Biology of Lipids. During her sabbatical, Vanina Zaremborg was a visiting scientist at the laboratory of Dr. Maya Schuldiner from the Weizmann Institute in Israel.

On the teaching side, the Biochemistry program is in a transition period after the retirements of Drs. **Robert Edwards** and **Elke Lohmeier-Vogel**, who were both Senior Instructors, and **Dr. Raymond J. Turner**, Professor. All three continue to contribute to the program, but no longer as “instructors on record”. Core biochemistry courses are taught every year to second- and third-year students, but the more specialized fourth year courses are not. Our goal is to offer these courses in alternating years, providing the students with choices while adapting to Research and Scholarship Leaves and keeping teaching loads reasonable. A large cohort of close to 40 students progressed to their final year of the B.Sc. in Biochemistry in 2019. In addition to the lecture-based courses, we were able to offer 22 students two-term project courses in our research labs, and nine additional single-term project courses.



Brianne Burkinshaw

This year we welcomed **Brianne Burkinshaw** as a new Biochemistry instructor. During the Fall she was learning about the courses in the program and preparing to teach the Introductory Biochemistry courses (BCEM 393 and BCEM

341) with Dr. **Marie Fraser**. These courses are offered in the upcoming Winter semester. She has enjoyed working with the lab technicians to prepare a new protein purification teaching lab for BCEM 393.

Isabelle Barrette-Ng was promoted to Teaching Professor in July 2019, and was awarded the following team grants: (1) a Department of Biological Sciences grant worth \$6,000 to introduce flipped learning in BIOL 331 with Dr. Carrie Shemanko; (2) a University of Calgary Teaching and Learning grant (\$30,902.50) with Mr. Patrick Kelly to study how flipped learning varies across disciplinary boundaries; and (3) a University of Calgary Teaching and Learning grant with Dr. Amy Burns and Mr. Gareth McVicar to study the role of StrengthsQuest for postsecondary students in teaching roles.

University of Guelph

Department of Molecular and Cellular Biology

Correspondent: Frances Sharom

Faculty comings and goings:

Faculty retirements continued in 2019, with three long-standing members of the department retiring on September 1 after many years of service. **Anthony Clarke** started at the University of Guelph in 1986 as a faculty member first in the Department of Chemistry and Biochemistry, then Microbiology, and finally Molecular and Cellular Biology as a result of internal re-organization. Following his retirement, he joined Wilfrid Laurier University as Dean of Science. During his 34 years at the University of Guelph, Anthony served as Department Chair, College Dean, Associate V.P. (Research), University International Liaison Officer, Director of the Centre for International Programs, Dean of Graduate Studies, and Assistant V.P. (Graduate Studies and Program Quality Assurance). In addition, he managed to find the time to run an internationally-recognized research program focussed on the structure-function relationship of enzymes involved in the biosynthesis and degradation of peptidoglycan, in antibiotic resistance, and in glycogen hydrolysis. We wish Anthony well in his new endeavours!

Manfred Brauer retired after 33 years at the University of Guelph, first in the Department of Chemistry and Biochemistry, and then Molecular and Cellular Biology. Fred’s expertise lay in the field of NMR spectroscopy and imaging applied to metabolic studies of the liver and toxicology. After 29 years at the University of Guelph, first in Molecular Biology and Genetics, then in Molecular

and Cellular Biology, **George Harauz** also retired this year. George, who was a Tier 1 Canada Research Chair, used various types of microscopy and biophysical approaches, including NMR, fluorescence and CD spectroscopy, to investigate the structure, dynamics and biological roles of various proteins in human myelin, and their role in multiple sclerosis. We hope that all our former colleagues enjoy their well-deserved retirement.



Anthony Clarke

Manfred Brauer

George Harauz

Hiring has been continuing apace, and two new Assistant Professors will join the department in 2020, **Shawn Sanders** and **Siavash Vahidi**.

Staff news:

We are pleased to welcome **Catrien Bouwman** in her new capacity as Undergraduate Teaching Coordinator, starting November 2019. Catrien will be covering the Biochemistry undergraduate program course labs, and brings with her a wealth of experience in molecular and biochemical techniques, as well as in training and supporting both students and other lab staff.

Faculty research news:

NSERC Discovery Grants were awarded to **Andrew Bendall**, **Georgina Cox**, **John Dawson**, **Steven Rothstein**, **Ian Tetlow**, **George van der Merwe**, and **Wei Zhang**. **Georgina Cox** was awarded a CIHR New Frontiers in Research Award, and **Nina Jones** received a CIHR Project Grant. Mason Research Fund grants were awarded to **Jennifer Geddes-McAlister** and **Nina Jones**. **Wei Zhang** was awarded a Canadian Cancer Society Innovation Grant, and **Terry Van Raay** received a grant from the Weston Family Microbiome Initiative.

Awards and recognition:

Wei Zhang was among 14 international researchers named as Canadian Institute for Applied Research (CIFAR) Azrieli Global Scholars for 2019-21. This honour will provide Dr. Zhang with \$100,000 in funding over the next two years, which he plans to invest in state-of-the-

art laboratory infrastructure. The CIFAR Azrieli Global Program also connects Dr. Zhang with a network of highly experienced and accomplished senior researchers, who will provide mentorship and guidance. Dr. Zhang's research group develops synthetic biology approaches to manipulate human cell signal transduction cascades, with the goal of identifying new molecular mechanisms and innovative therapeutic strategies.



Wei Zhang

Scott Ryan was awarded an Early Researcher Award (ERA) from the Ontario Ministry of Research, Innovation and Science. Scott's research group investigates how reactive oxygen and nitrogen species impair organelle function in human stem cell and animal-based models of neurodegenerative disease, and his team is developing techniques to re-populate lost tissue in the diseased brain.



Scott Ryan

Emma Allen-Vercoe has been appointed a Tier 1 Canada Research Chair in Human Gut Microbiome Function and Host Interactions. This support will extend Dr. Allen-Vercoe's studies on the gut microbiome and its linkage to human health and disease. She is also part of an international research team receiving a \$25-million award under the world's most ambitious cancer research grant. Dr. Allen-Vercoe is among 14 researchers from five countries looking to study connections between microbes in the body and colorectal cancer. Her expertise in culturing gut microbes developed in her U of G lab, and its custom-designed "robo-gut" mimicking the workings of the large intestine, led the team's principal investigators to invite her to join the project. The team, called OPTIMISTICCC (Opportunity to Investigate the Microbiome's Impact on Science and Treatment in Colorectal Cancer), was chosen to receive funding from Cancer Research U.K. The group was one of three teams supported in the current funding round from 134 submissions involving some 40 countries. Under its Grand Challenge competition launched in 2015, the agency intends to assemble interdisciplinary

teams of scientists in cancer research. OPTIMISTIC is the seventh international team funded under the initiative. Dr. Allen-Vercoe will culture gut microbes from people with and without colorectal cancer and study the influence of those microbes. She and her team hope to develop ways to treat the microbiome, and even replace



Emma Allen-Vercoe

a risky microbiome with a healthy one. Through Nubiyota, a spinoff company she co-founded in 2013, Dr. Allen-Vercoe also plans to conduct a trial of gut microbiome replacement in cancer surgery patients with the goal of preventing disease recurrence.

University of Guelph iGEM team wins gold medal

iGEM (International Genetically Engineered Machine) is an international competition where students are tasked with using synthetic biology to solve a real world problem. The University of Guelph's iGEM (International Genetically Engineered Machine) team won the gold medal at the 2019 iGEM international competition in Boston. The team genetically engineered an *E. coli* strain to express components of the violacein pathway in the presence of tetracycline. The bacteria turn green in the absence of tetracycline but will shift to pink in its presence. With the current crisis due to emergence of antibiotic-resistant bacteria, monitoring of antibiotics, especially in food products is increasingly important. The "VioSensor" made by the Guelph iGEM team is able to respond to tetracycline concentrations of 50 ng/mL and above and may be suitable for detection of this antibiotic in milk and honey.

The Guelph iGEM 2019 team consisted of 33 undergraduate students primarily from the College of Biological Science but with members from different disciplines across campus. As a research group the team designed and executed 3 distinct projects. In addition to development of the VioSensor, they continued with their Beerstone project, which looked at the enzymatic breakdown of oxalate, an undesirable side product of the brewing process. They also started a project where they used CRISPR-Cas9 genome engineering to make *Arabidopsis* more resilient to environmental changes, mimicked by climate change.

Outside of the lab, the team actively engages the public in discussions about synthetic biology. Guelph iGEM hosted a provincial-wide conference (oGEM) in October, where iGEM teams from Ontario and Quebec, together with executive members of Ontario Genomics, meet to discuss the latest research in synthetic biology. They created an iGEM program at STEM Camp Guelph, produce a synthetic biology podcast and blog and partner with Guelph Queer Equality to educate the wider community about synthetic biology.

With the team winning the poster award at Canada SynBio conference and a gold medal at the international competition, there is a huge opportunity for students to become successful and be awarded for their own research. We hope that iGEM Guelph continues representing the University of Guelph on an international stage.



Some members of the University of Guelph iGEM team 2019; MCB members were Layla Alibabai, Catherine Fust, Sahel Gamage, Connor Gianetto-Hill, Larsen Iorgovitis, Nicole LeBlanc, Hannah Parente, Dr. Stephen Seah, (Faculty Advisor), Dr. Rebecca Shapiro (Faculty Advisor), Jehoshua Sharma (iGEM Co-President), Kelli Sokoloff, Vivian Versluis, Nathanael Willms.

Graduate student awards:

CIHR Post-doctoral Awards were received by **Evan Mann** (Whitfield lab) and **David Sychantha** (Clarke lab), while **Rachel Karson** (Perreault lab) was awarded a Vanier Scholarship and **Caitlin Sande** (Whitfield lab) received a CIHR Banting and Best Doctoral Award. **Sean Liston** (Whitfield lab) received the Governor General's Gold Medal, which is awarded to the student at the University of Guelph who achieves the highest academic standing at the graduate level, a tremendous achievement.

Congratulations go out to all our student award winners!

University of Manitoba

Department of Biochemistry and Medical Genetics

Correspondent: Barbara Triggs-Raine

Changing places and new faces:

In 2019 our Department recruited its newest computational biologist, **Dr. Britt Drögemöller**. Dr. Drögemöller will join us as an Assistant Professor in April of 2020. She completed her M.Sc. and Ph.D. in Genetics at Stellenbosch University, South Africa. She is currently a post-doctoral research fellow at the Faculty of Pharmaceutical Sciences, University of British Columbia. Her research, under Dr. Colin Ross, has focussed on using large-scale genomic analyses for precision medicine applications. In this position, she has led studies that incorporate genomic and bioinformatic analyses to identify the genetic predictors of severe adverse drug reactions to treatments. She developed an interest in complex regions of the genome as a graduate student,



Dr. Britt Drögemöller

and has been involved in the identification of structural variants that cause rare and potentially treatable inborn errors of metabolism. Dr. Drögemöller is looking forward to joining the Department, although the COVID19 crisis will mean that her interactions remain remote for the time being.

We also had several changes in office staff over the past year. We said good-bye to **Ms. Lisa Zhang**, who moved to work in an area closely related to the research degree she is pursuing. Although we miss her very much, we have been fortunate to attract great new staff members. **Mr. Annan Sher** joined us in December to assist with the genetic counselling program, as well as departmental equipment and facilities. Two former departmental graduate students, **Mr. Nikho Hizon** and, more recently, **Ms. Chloe Lepage**, have stepped in to assist with our academic portfolio.

In 2019, **Dr. Louise Simard** moved from her administrative role as an Associate Dean, Graduate Studies to Acting Dean, Graduate Studies. This new role is keeping her very busy, but continues to allow her to contribute to her passion for graduate studies.

Dr. Daniel Gietz retired from the Department in December 2019 after 30 years of service. Dr. Gietz is recognized internationally for his contributions to yeast genetics. His laboratory made significant advances in transformation of yeast that were vital to the progress of the field. We wish him well in his retirement!

Celebrating outreach:

Dr. Francis Amara and **Dr. Etienne Leygue** visited Sierra Leone in the spring of 2019 to teach and train future leaders in STEM. While in Sierra Leone, they established teaching and research partnerships with the Department of Biochemistry, College of Medicine and Allied Health Sciences, University of Sierra Leone. Since then, Drs. Amara and Leygue have been appointed as adjunct professors in the Department of Biochemistry. They are planning to return to Sierra Leone in late 2020 to develop courses in Molecular Biology, and offer hands-on activities in gel electrophoresis and protein analysis. During this period, Dr. Amara will oversee progress made so far in construction of the STEM and Biomedical Centre, which will provide training opportunities in professional development for Sierra Leone.



Fourah Bay College of the University of Sierra Leone



STEM and Biomedical Science Building under construction

Dr. Mojgan Rastegar established the new “Human Rett Syndrome Brain Bio-Repository Laboratory” located within the Children’s Hospital Research Institute of Manitoba (CHRM). Establishment of this new lab was supported by private donations from Rett Syndrome parents and the Ontario Rett Syndrome Association (ORSA). Rett Syndrome parents from British Columbia, Ontario, and Manitoba, as well as ORSA President (Kevin Morton) were among the attendees at the grand opening of this new laboratory in September 2019.



Opening of Rett Syndrome Brain Bio-Repository

Our department worked with event coordinator Kristine Macalinao to host “Let’s Talk Science-GeneTalks High School Symposium” on May 14, 2019. More than 50 high school students were introduced in the morning to CRISPR/Cas9 and careers in genetic counselling. After a lunch break, they spent the afternoon rotating in small groups to four different hands-on experiences. With the assistance of our faculty and graduate students, and other departmental staff and trainees, we supported a memorable event that was appreciated by the students!



High school student and mentor loading a gel

Dr. Kirk McManus and his research team also organized and participated in numerous outreach activities aimed at inspiring the next generation of STEM researchers through laboratory demonstrations and tours. These tours included girls and parents involving the WISE-kidnetic Energy Girls club (with help from members of **Dr. Pingzhao Hu** and **Dr. Sabine Mai’s** labs) and the Aboriginal Nursing Cohort Initiative (ANCI). Here, kids, siblings, parents and nursing students were introduced to bioinformatics and microscopy and their applications in cancer research studies.

The Genetic Counselling Program celebrated the accomplishments of the Class of 2019 on September 14, 2019, following the Annual Canadian Association of Genetic Counsellors Conference, where they presented their Masters research. The development and implementation of this program could not have been accomplished without the hard work of all supervisors and instructors who provided teaching, mentorship and support to the students within the University of Manitoba and the Shared Health Genetics and Metabolism Program.



Class of 2019 graduates, left to right: Angela Krutish, Rachelle Dinchong, Ashleigh Hanson

Jim Davie and M.Sc. student **Tasnim Beacon** gave talks at the 41st annual Asilomar Chromatin, Chromosomes & Epigenetics Conference and were recruited to the organization committee for the 42nd meeting.

Faculty awards and recognition:

Dr. Cheryl Rockman-Greenberg, a clinician scientist and metabolic geneticist, is a Distinguished Professor in the Max Rady College of Medicine, Departments of Pediatrics

& Child Health and Biochemistry & Medical Genetics. She has been the recipient of several awards in the last 2 years, recognizing her contributions over the past 40 years to basic and translational research in the area



Dr. Cheryl Rockman-Greenberg

Dr. Jim Davie was designated a Distinguished Professor, which is bestowed on academic staff members who have demonstrated outstanding distinction in research, scholarship, creative endeavours, professional service and teaching. Continuing in his role in professional service, he joined the Board of Canadian Science Publishing this year.

Ms. Shannon Chin received the 2019 AGCPD Supervisor of the Year award. She also received the Canadian Association of Genetic Counsellors Professional Practice, Innovation and Advocacy Leadership Award, which recognizes a member who has worked to promote high standards of practice, encourage professional growth and increase public awareness of the genetic



Shannon Chin (right) and Charity Fan (left) receiving their awards

counselling profession in Canada. **Ms. Charity Fan** received the Canadian Association of Genetic Counsellors New Leader Award, which recognizes a member within five years of graduation who has contributed substantially to the genetic counselling profession and shows great promise to contribute in the future.

Dr. Barbara Triggs-Raine was recognized with the 2018/19 Manitoba Medical Students' Association B.Sc. Med. Supervisor Mentorship Award.

Dr. Tamra Werbowetski-Ogilvie's research in medulloblastoma was featured in *Nature Research* as part of a series on the "Spotlight in Canada", and received funding from the Rally Foundation for Pediatric Cancer. **Dr. Kirk McManus** was successful in obtaining a CIHR Project grant titled, "Exploring and exploiting reduced *USP22* expression in colorectal cancer", and **Dr. Geoff Hicks**, together with investigators Drs. Brenda Elias and Garry Munro, successfully obtained a CIHR project grant entitled "Translating to the Community (T2C): A social epigenetic study of FASD." **Dr. Meaghan Jones** along with co-applicant Dr. Ayesha Saleem (Kinesiology and Recreation Management) received an inaugural New Frontiers in Research Fund for their project titled, "Reversing frailty through transmission of epigenetic age by extracellular vesicles", which was featured on CTV news. **Dr. Mojgan Rastegar** and co-applicants Dr. Marc Del Bigio and Dr. Jiuyong Xie received a Rady Innovation Fund for their project entitled "A multi-omic study of the human brain to uncover the mechanism of Rett Syndrome". **Ms. Jessica Hartley** and **Ms. Angela Krutish** (M.Sc. GCP 2019) were awarded the 2019 Audrey Heimler Special Projects Award from the National Society of Genetic Counsellors for their research "The Impact of the Genetic Assistant Position on Genetic Counsellor Productivity."

Future leaders:

Departmental trainees at all levels demonstrated their commitment to excellence and innovation in research, acquiring many provincial and national awards in 2019. Graduate student recipients included **Selina Casalino** (CIHR CGS-M); **Cassie McDonald** and **Samantha Lee** (UMGF Scholarship), **Yong Won Jin**, **Leo McKay**, **Kazem Nejati Koshki** (Research Manitoba M.Sc. Studentship); **Kailee Rutherford** (2020 Research Manitoba/Rady Faculty of Health Sciences Graduate Entrance Scholarship); **Tasnim Beacon** (M.Sc.), **Lucile Jeusset** (Ph.D.) (CancerCare Manitoba/Research Manitoba Studentship); **Marjorie Buist** (Tri-Council Master's Supplemental Award (TMSA); **Laura Thompson** (2019 Simon and Sarah Israels Award); **Claire Morden** (Women's Health Research Foundation of Canada Graduate Scholarship), and **Khatereh Saei Arezoumand**, **Mehrafarin Ashiri**, **Mohd Wasif Khan**, **Doris Onuzulu**, and **Le Tram** (International Graduate Student Entrance Scholarship).

Undergraduate students were also recognized with many research awards. Recipients included **Morgan Hiebert** and **Sari Glow** (2019 NSERC Undergraduate Student Research Award); **Cindy Atayan** and **Nikolas Furletti** (2020 NSERC Undergraduate Student Research Award); **Emily Barker** (GlycoNet Summer Research Award); **Matthew Genung** (B.Sc.Med. Award Manitoba Neuroscience Network Award for an Excellent Research Project in Neurosciences) and **Steven Cooper** (B.Sc. Med. Award for Molecular Biochemistry with Potential for Commercial Application, ADE & Co. and Dr. James C. Haworth Memorial Award for excellence in research related to hereditary disease); **Trista Xu** and **Ally Farrell** (2020 RIOH Summer Studentship).

Ph.D. student **Berardino Petrelli** was a 3MT finalist for his work entitled “Using vitamin A to mediate FASD”. M.Sc. student **Qian Liu** (Dr. Pingzhao Hu Lab) **won the Best Oral Presentation Award** at the 2019 IEEE 7th International Conference on Bioinformatics and Computational Biology Conference. M.Sc. student **Zahra Sepehri** was the recipient of two travel awards to attend the Keystone Symposia on Epigenetics and Human Disease (X5) conference held at the Fairmont Banff Springs, Banff, Alberta, Canada in March and the 6th Canadian Conference on Epigenetics/IHEC Annual Meeting held in Banff Alberta in November. **Tasnim Beacon** was sponsored by Canadian Science Publishing to attend the Bioinformatics Network Alberta held in Lethbridge. At that conference, Tasnim, as Special Editor for *Biochem. Cell Biol.*, identified potential authors for a special issue on Genome Biology.



Qian Liu receives the 2019 IEEE award

University of Saskatchewan

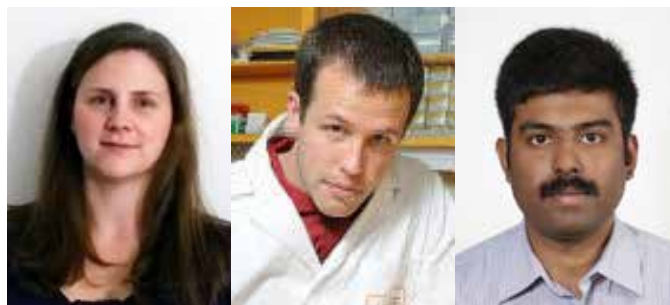
Department of Biochemistry, Microbiology and Immunology

Correspondent: Scot Leary

Another year saw us make tremendous progress with respect to our on-going efforts to harmonize collegial processes as a result of the Departmental merger. The College of Graduate and Post-doctoral Studies approved our new graduate program and, with any luck, most of our current trainees will migrate over from either the Biochemistry or Microbiology & Immunology graduate programs so that these can be mothballed, and all of our trainees will fall under the same organizational umbrella. Kudos to our two graduate co-chairs **Jeremy Lee** and **Sylvia van den Hurk** and the graduate affairs committee for working so hard on this portfolio over the past year to make this happen! Our head **Bill Roesler** and our assistant head **Linda Chelico** also deserve a lot of credit for navigating another year of administrative challenges to ensure minimal turbulence to the research and teaching missions of the Department, now and in the future.

New faculty:

We are excited to welcome three new faculty members to the fold, **Jenny-Lee Thomassin** and **Yannick Tremblay**, who joined us in the spring from the Institut Pasteur in Paris, and **Anil Kumar** who will soon join us from the University of Alberta.



Jenny-Lee Thomassin Yannick Tremblay Anil Kumar

Undergraduate program news:

It has also been a busy year for our undergraduate students and the programs and courses they may enroll in. This past year saw **Harold Bull** officially launch CURE or “course-based undergraduate research experience”, a project near and dear to his heart. Rather than being technique driven, the goal of CURE is to expose students to what it would be like to perform wet bench research.

In teams of 3 to 4, students develop a project proposal which includes a hypothesis, related experiments and associated timelines, and a budget for reagents. The culmination of their efforts results in a scientific article detailing their findings which Harold then handles as an editor. To say the course was a success was an understatement, and we expect enrollment to be high for years to come!

The efforts to restructure biomedical science education, spearheaded by **Scott Napper**, reached a number of key outcomes this year including university approval of new degree majors in Biochemistry, Microbiology & Immunology (BMI), Cellular, Physiological & Pharmacological Sciences (CPPS), Biomedical Neurosciences, and Interdisciplinary Biomedical Science. The education program also includes a new admissions model that allows direct entry from high school, a new Bachelor of Science of Biomedical Sciences (B.Sc., BMSC) degree template, and a new degree model shared by our College with Arts and Science. This newly forged collaborative relationship will be reflected from promotion to parchment, and include dual signatures by each Dean. Collectively these changes enable cutting-edge, multi-disciplinary training that includes experiential learning opportunities, and will position our students for careers in the biomedical sciences as well as health-related professions, and empower branding and promotion opportunities to attract top-tier students from across Canada. This initiative epitomizes the university's strategic plan to prioritize cross-college collaboration.

Finally, it is noteworthy that several of our faculty including Scott, Harold and **Kyle Anderson** were recognized for their teaching excellence. Kyle was named Engage 2018's top scholar, and all three were nominated for University of Saskatchewan Students' Union (USSU) teaching awards, with Scott receiving the fourth such award of his career. Congratulations to all, we are grateful for your commitment to pedagogy, as are our students!

Research news:

We also wish to share several noteworthy developments on the research front. **Troy Harkness** received a CIHR Project grant that investigates the molecular mechanisms and signalling pathways behind aging, to identify targets that can be leveraged to improve health. **Wei Xiao** and **Yuliang Wu** were also recipients of NSERC Discovery grants to study the importance of DD12 to stress resistance in budding yeast, and the role of the KH domain in helicases, respectively. Finally, **Kerry Lavender**

submitted the top-ranked application in the 2019-2020 Saskatchewan Health Research Foundation (SHRF) Establishment grant competition, and will use the grant to investigate how to normalize immune system function in HIV infections in a humanized mouse model. Three of our faculty members were also promoted this year, with **Kerri Kobryn** ascending to the rank of Associate Professor and **Joyce Wilson** and **Eriqie Lukong** becoming full Professors.

We would be remiss not to acknowledge the successes of our undergraduate and graduate students. Convocation awards were presented to **Erin White** as the most outstanding graduate in Biochemistry, and to **Justin Hall** as the J.F. Morgan Memorial awardee in Microbiology and Immunology. **Sumudu Perera** (Dillon lab) was awarded the Irene Grodums Memorial Graduate Scholarship, while **Nikki Forsberg** (Leary lab), **Kristen Mitzel** (Dillon lab), **Sean Lipsit** (Napper lab) and **Michael Palmer** (Wilson lab) all received Canada Graduate Scholarship Master's awards.

University of Toronto

Department of Biochemistry

Correspondent: Alex Palazzo

2019 was a noteworthy year for the Biochemistry Department at the University of Toronto. We celebrated the 80 year anniversary of the discovery of Premarin. In 1939, as a Ph.D. student in the Department of Biochemistry, Dr. Benjamin Schachter developed the first robust purification of the hormone estrogen and carried out the pre-clinical work that ultimately led to the development of Premarin, introduced clinically in Canada by Wyeth Ayerst (Pfizer) in 1941. Since then, Premarin has provided relief from symptoms associated with menopause for tens of millions of women.



Guest and faculty speakers at the Biochemistry Schachter Alumni Symposium



Alumni speakers at the Biochemistry Schachter Alumni Symposium

On May 3, 2019, over 200 faculty, alumni, and students, gathered at Hart House at the University of Toronto to celebrate Dr. Benjamin Schachter's legacy and reunite our department in appreciation for all our alumni. The event featured guest speakers and presentations from numerous alumni. A big thanks goes out to the Schachter Organizing Committee, which included graduate students (Brian Hicks, Esther Shin, Kyla Germain, Natalia Moskal, Jan Falguera), and faculty (Justin Nodwell, Reinhart Reithmeier, Trevor Moraes, Haley Wyatt, Kate Lee, and Nana Lee).

The Proteostasis Researchers in Canada (PRinCE) inaugural meeting was held at the University of Toronto on June 10-11, 2019. The aim of this first symposium was to establish a network of researchers working in the field of protein homeostasis in Canada, and to promote collaborations between labs working on topics relevant to proteostasis. These include (but are not limited to) protein folding, protein trafficking, protein degradation, and neurodegenerative diseases – regardless of the model system. The meeting was organized by **Walid A. Houry**, along with Joerg Gsponer (University of British Columbia), Thibault Mayor (University of British Columbia), Mikko Taipale (Molecular Genetics, University of Toronto) and Jason Young (McGill University).

Andrew Wilde and **Peter Kim**, along with other faculty members from Ryerson University, University of Toronto Scarborough, York University, University of Guelph, McMaster University and the University of Waterloo, helped to co-organize the First Ontario Cell Biology Symposium, which was held at SickKids on August 27th, 2019. The symposium included talks from trainees and keynote lectures from Julie St Pierre (University of Ottawa) and Laurence Pelletier (Lunenfeld Tanenbaum Research Institute).



Karen Maxwell

Biochemistry's own **Karen Maxwell** was featured in the Globe and Mail's feature on women in STEM and made an appearance on the Netflix docuseries "Unnatural Selection" on how the new science of CRISPR technology is affecting culture in North America.

Awards:

Hue Sun Chan was recognized by the Biophysical Society of Canada as the 2019 Fellow. He gave the National Lecturer presentation at the Society's Annual Meeting in May 2019.

Lewis Kay was awarded an honorary Doctor of Science degree from University of British Columbia, Okanagan campus, for his "pioneering research in biochemistry and nuclear magnetic resonance spectroscopy" at the 2019 Spring Convocation.

Alex Palazzo was awarded a 2019-2020 Faculty of Medicine Graduate Teaching Award for Mid-Career Excellence in Graduate Teaching and Mentorship.

Promotions:

We are pleased to announce that **Scott Prosser** has been awarded the title of University of Toronto Distinguished Professor of Biophysical Chemistry. This award recognizes individuals with highly distinguished accomplishments who exhibit and maintain an extraordinary level of activity in their research and scholarly work, and have achieved pre-eminence in their field in line with the university's stated objectives and emerging priorities.

Jean-Philippe Julien was promoted to Associate Professor and **Roula Andreopoulos** was promoted to Professor, Teaching Stream. Congratulations to them both!

Research Highlights:

Palmitoylation of NOD1 and NOD2 is required for bacterial sensing (*Science* (2019) 366:460-467)

An international collaboration which included the **Klip**, **Fairn**, and **Muise** labs from the Biochemistry Department described how the bacterial-sensing proteins, NOD1/2, are recruited to the membranes of our gut cells to allow them to function to initiate a proper immune response. This involves the addition of a lipid moiety, palmitoyl,

to NOD1/2 by the palmitoyl-transferase ZDHHC5. Importantly, variants of NOD2 that are associated with Crohn's disease are unable to be palmitoylated. These findings could help to explain many inflammatory conditions, such as irritable bowel syndrome.

Phagolysosome resolution requires contacts with the endoplasmic reticulum and phosphatidylinositol-4-phosphate signalling (*Nat Cell Biol.* (2019) 21:1234-1247)

New work from the **Grinstein** lab examined how phagolysosomes, structures that mature from phagosomes and help macrophages eat bacteria, are disassembled. They found that this involved the exchange of lipids between the phagolysosomes and the endoplasmic reticulum. This work provides one of the first glimpses at how phagolysosomes are turned over.

Time-resolved crystallography reveals allosteric communication aligned with molecular breathing (*Science* (2019) 365:1167-1170)

In collaboration with the Miller Lab (Departments. of Chemistry and Physics, University of Toronto), the **Pai** lab pieced together a time-lapse movie revealing all the major steps during the catalytic cycle of an enzyme. This study is the most detailed depiction of such a process to date.

The human coronavirus HCoV-229E S-protein structure and receptor binding (*eLife* (2019) 8:e51230)

The **Rini** and **Rubinstein** labs used X-ray crystallography and cryo-EM to determine how the spike proteins of coronaviruses recognize their receptors on the surface of cells. This study provides insights not only into how these spike proteins function, but also how they evolve to evade the host immune system.

Anti-CRISPR AcrIIA5 potently inhibits all Cas9 homologs used for genome editing (*Cell Rep.* 2019 29:1739-1746) and **Inhibition of CRISPR-Cas9 ribonucleoprotein complex assembly by anti-CRISPR AcrIIC2** (*Nat Commun.* 2019 10(1):2806)

In these two papers the **Maxwell** and **Davidson** labs continue to discover new phage-encoded proteins that inhibit a variety of CRISPR systems. These anti-CRISPR proteins not only provide a glimpse into the evolutionary battle between bacteria and phages, but also provide new gene editing tools.

Phospho-dependent phase separation of FMRP and CAPRIN1 recapitulates regulation of translation and deadenylation (*Science* (2019) 365:825-829)

The **Forman-Kay** lab demonstrated that as RNA-binding proteins transition from the bulk solution to a phase-separated condensate in a test tube, this regulates their ability to affect mRNA translation and deadenylation in the same manner observed in the cell. These results provide biophysical insights into the interactions underlying phase separation and the biological processes occurring within them.

Mitochondrial ClpP-mediated proteolysis induces selective cancer cell lethality (*Cancer Cell* (2019) 35(5):721-737)

The labs of **Emile Pai** and **Walid Houry**, along with Aaron Schimmer (Medical Biophysics) and Michael Andreeff (M.D. Anderson Cancer Center, Texas), identified ClpP as the first confirmed molecular target of ONC201, an experimental Phase 2 anti-cancer drug, with functional importance for its cytotoxicity. By combining the expertise of the various laboratories', they showed that ONC201 binds with high affinity to ClpP and induces ClpX-independent activation. These act to destroy and thus recycle proteins in the mitochondria. This study illustrates that mitochondrial dysregulation may be an attractive new strategy in cancer therapy.

The ion transporter NKCC1 links cell volume to cell mass regulation by suppressing mTORC1 (*Cell Reports* (2019) 27: 1886-1896)

The **Rotin** lab found that the ion transporter NKCC1, known to regulate cell volume, forms a complex with the leucine transporter LAT1 and the glutamine transporter ASCT2, to regulate mTORC1, which is a key regulator of cell division. This work provides a long-sought link between cell size and cell mass.

Bim escapes displacement by BH3-mimetic anti-cancer drugs by double-bolt locking both Bcl-XL and Bcl-2 (*eLife* (2019) 8:e37689)

David Andrews' lab demonstrated that Bim, a pro-cell-death protein, binds to anti-cell-death proteins at two sites, rendering it "double-bolt locked." Previously, it was thought there was only one site. This second binding site could explain Bim's role in cancer treatment resistance and why some drugs designed to kill cancer cells fail.

Rad5 recruits error-prone DNA polymerases for mutagenic repair of ssDNA gaps on undamaged templates (*Mol Cell.* (2019) 73(5):900-914)

The **Brown** lab characterized a new mutagenic single stranded DNA gap-filling pathway in budding yeast involving Trans-lesion synthesis (TLS) polymerases. TLS

polymerases have a larger active site to accommodate non-canonical DNA templates. It is possible that, like budding yeast, cancer cells also upregulate TLS polymerases to cope with replication stress, offering a new pathway to target with therapeutics to treat cancer.

Deubiquitinating enzyme USP30 maintains basal peroxisome abundance by regulating pexophagy (*J Cell Biol* (2019) 218 (3): 798–807)

In a collaboration, the **Kim** and **McQuibban** labs described a novel role of the mitochondrial deubiquitinase USP30 in peroxisome homeostasis. They demonstrated that USP30 acts to inhibit the accumulation of ubiquitin on peroxisomes and thus inhibits their destruction by pexophagy. Their findings could lead to a potential therapeutic approach in the treatment of peroxisome storage diseases.

Departmental events:

Department Retreat:

The 2019 Biochemistry Retreat was a huge success. Members of the department spent September 4th to the 6th at Geneva Park (Lake Couchiching), where they heard talks from students, post-doctoral fellows, faculty and invited speakers. For the second year the faculty presented their lab's work to the newly recruited rotation graduate students. In the midst of all this, department members partook in a scavenger hunt, fireside singing and other group activities. The department also distributed awards to its trainees for their accomplishments.



Professor Trevor Moraes presenting his work to the grad students

Here are some highlights:

Sarah Kronheim from the Maxwell lab won for the best publication by a graduate student in 2019 on how bacteria produce chemicals to combat phages. **Brandon Ho** from the Brown lab won the Sela Cheifetz Centennial award for best all around Ph.D. student. **Swetha Raman** from the Julien lab was selected to give a talk on her post-doctoral work. **Chloe Mitchell** from the Deber lab won the David A. Scott Award.

We also heard talks from our two keynote speakers. Dr. Anne S. Meyer, Associate Professor, Department of Biology, University of Rochester, spoke to us about how bacteria survive environmental stress and how to harness bacteria and 3D printing to generate new materials. Dr. Joyce C. Havstad, Assistant Professor, Department of Philosophy, Oakland University spoke to us about the motivations of scientists and whether these align with our ethical standards and ideals.

2019 Biochemistry Golf Day

The forecast rain stayed away for our 2019 Golf Day held in July 2019. Golfers enjoyed a beautiful cloudy day with the sun making an appearance near the end of the round. Twenty-eight students, administrative staff, faculty and more than a few ringers, headed out to the Flemington Park 9-hole Golf Course in mid-town Toronto. Each team had its share of novices and experienced players playing a “best ball” format that allowed everyone to contribute to their team. The competition was fierce but the ERADicals managed to hold onto their title for yet another year. All in all, a great afternoon!



Biochemistry Golf Day

University of Toronto

Department of Cell and Systems Biology

Correspondent: Neil MacPherson

Faculty appointments:

Professor Vincent Tropepe has been appointed Vice Dean, Research, for the Faculty of Arts & Science. As Chair of CSB, he built strength into a young department. He led CSB through major research infrastructure renovations, enhanced undergraduate learning communities and worked on new initiatives to enhance biological data science education. As Vice-Dean, he will deploy his excellent leadership and organization skills to support and enhance the research mission of the faculty.



Vincent Tropepe

We are pleased to welcome **Dr. Heather McFarlane** as Assistant Professor in CSB. Professor McFarlane's research aims to uncover the mechanisms by which plants sense and respond to the status of the cell wall, with the goal of modifying plant cell walls to advance sustainable agriculture, food security, and next-generation biofuels. Her multidisciplinary approach integrates cell biology,



Heather McFarlane

Dr. Jessica Pressey has been recruited to CSB as an Assistant Professor, Teaching Stream. Professor Pressey graduated with a Ph.D. from Dean Melanie Woodin's lab and completed post-doctoral research at INSERM's Institut du Fer à Moulin in Paris, France. Her field of expertise is synaptic transmission, neuroplasticity, and brain development, and



Jessica Pressey

as such she will be a valuable addition to CSB's Animal Physiology Major program, and for CSB research project course students studying electrophysiology.

Research news:

Recent high profile papers from CSB researchers include: Cortical interneuron-mediated inhibition delays the onset of amyotrophic lateral sclerosis. Khademullah CS, Aqrabawi AJ, Place KM, Dargaei Z, Liang X, Pressey JC, Bedard S, Yang JW, Garand D, Keramidis I, Gasecka A, Côté D, De Koninck Y, Keith J, Zinman L, Robertson J, **Kim JC, Woodin MA**, *Brain* 2020; 143(3):800-810. Woodin laboratory delays onset of amyotrophic lateral sclerosis (ALS) in murine model.

The pan-genome effector-triggered immunity landscape of a host-pathogen interaction. Laflamme B, Dillon MM, Martel A, Almeida RND, **Desveaux D, Guttman DS**, *Science*. 2020;367(6479):763-768. Insights into the diverse methods used by *Pseudomonas* to evade host immune response.

Par-1 controls the composition and growth of cortical actin caps during *Drosophila* embryo cleavage. Jiang T, **Harris TJC**, *J Cell Biol.* 2019;218(12):4195-4214.

The sublaterodorsal tegmental nucleus functions to couple brain state and motor activity during REM sleep and wakefulness. Torontali ZA, Fraigne JJ, Sanghera P, Horner R, **Peever J**, *Current Biology*. 2019;29(22):3803-3813.e5. CSB neurobiologists identify switch that turns muscles off and on during sleep.

Apical polarity proteins recruit the RhoGEF Cysts to promote junctional myosin assembly. Silver JT, Wirtz-Peitz F, Simões S, Pellikka M, Yan D, Binari R, Nishimura T, Li Y, **Harris TJC**, Perrimon N, **Tepass U**, *J Cell Biol.* 2019;218(10):3397-3414.

KLF4 protein stability regulated by interaction with pluripotency transcription factors overrides transcriptional control. Dhaliwal NK, Abatti LE, **Mitchell JA**, *Genes & Dev* 2019;33(1):1-14. First steps in embryonic differentiation revealed by the Mitchell laboratory.

Faculty awards:

Our faculty has benefited greatly from major grant funding from NSERC, CIHR, CFI and the Weston Foundation. Some notable awards are given below:



Shelley Lumba

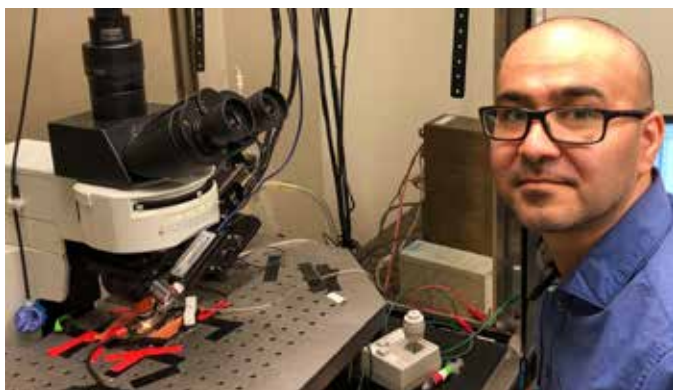
Professor Shelley Lumba is the recipient of an inaugural Exploration Grant from the New Frontiers in Research Fund (NFRF), a new federal fund aimed at providing opportunities for early career researchers to conduct high-risk, high-reward interdisciplinary research. She will be investigating the “Molecular dynamics of strigolactone receptors in parasitic witchweeds.”

Professor Vincent Tropepe has received funding from Fighting Blindness Canada to conduct research using zebrafish to study Usher syndrome, a genetic condition that results in hearing and vision loss. The protocadherin gene is altered in some Usher patients, and mutations in zebrafish that mimic Usher-linked changes can result in reduced hearing and vision. The Tropepe lab will characterize the subcellular defects underlying this photoreceptor degeneration in zebrafish.

Trainee awards:

Our trainees are the recipients of major research awards for excellence, including Vanier, CIHR Doctoral, NSERC CGS, and Banting awards.

Dr. Ebrahim Lari of Professor Leslie Buck’s lab has been awarded a prestigious NSERC Banting Fellowship. He is focussed on discovering the cellular mechanisms that permit cells of the western painted turtle to survive days to months without oxygen. With the help of the Banting award, Dr. Lari will build on studies of excitable brain cells to look at non-excitable cells and how they tolerate low levels of oxygen.



Ebrahim Lari

CSB graduate **Navroop Dhaliwal** received the Graduate Student Research Prize for the best graduate research paper of 2019 from the Canadian Council of University Biology Chairs. Dr. Dhaliwal’s research in Professor Jennifer Mitchell’s laboratory revealed that altering the stability of KLF4 protein is key to initiating differentiation of the embryo into the whole organism. This insight



Navroop Dhaliwal

came from the unexpected observation that deleting a KLF4 transcriptional enhancer in stem cells greatly reduced transcript levels but left protein levels relatively unchanged. Further studies will provide significant new insight into the very first steps taken by stem cells when they exit the pluripotent state in order to become more specialized cells.

CSB Research Day, held on May 2nd, 2019, was a chance for Cell & Systems Biology graduate students to present their ground-breaking discoveries in the wide variety of research at CSB. Awards were presented to **Medha Sharma** (Harris lab) for best Ph.D. talk, **Ernest Iu** (Plotnikov lab) for best Master’s talk, and **Amir Arellano Saab** (McCourt lab) for best graphical abstract. **Francis Hyun Kyung Lee** received a special award for his dedication to organizing CSB Research Day over many years.



CSB Research Day

The academic excellence, research potential and leadership abilities of Cell & Systems Biology graduate students was recognized through internal prizes, scholarships, fellowships and awards: the Valerie

Anderson Award to **Tatiana Ruiz Bedoya** (Guttman lab), Kenneth C. Fisher Fellowship to **Kevin Xue** (Christendat lab), Sheila Freeman Graduate Award in Zoology to **Kamar Nayal** (Levine lab), Dr. Clara Winifred Fritz Memorial Fellowship to **Francis Hyun Kyung Lee**, Duncan L. Gellatly Memorial Fellowships to **Jonathan Burnie** (Guzzo lab) and **Pallavi Pilaka** (Calarco lab), Yoshio Masui Prize to **Gordana Scepanovic** (Fernandez-Gonzalez lab), David F. Mettrick Fellowship to **Mouly Rahman** (McGowan lab), Dr. Klaus Rothfels Memorial Scholarship to **Samantha Lauby** (McGovern lab), Senior Alumni Association Prize to **Deka Mohamed** (Gazzarrini lab), Hilbert and Reta Straus Award to **Michael Kanaris** (Christendat lab), Vietnamese-Canadian Community Graduate Award to **Jee (June) Bang** (Kim lab), Elizabeth Ann Wintercorbyn Awards to **Alexandre Martel** (Guttman lab) and **Gurdeep Singh** (Mitchell lab), Ramsay Wright Scholarship to **Thanh Phung** (Monks lab), Zoology International Scholarships to **Luis Abatti** (Mitchell lab) and **Renan Almeida** (Guttman lab), Zoology Sesquicentennial Graduate Award to **Morley Willoughby** (Bruce lab), Alfred and Florence Aiken and Dorothy Woods Memorial Graduate Scholarship to **Wassim Elkhatib** (Senatore lab), Rustom H. Dastur Graduate Scholarship to **Kathryn McTavish** (Guttman lab), Joan M. Coleman QEII-GSST to **Ian Shen Yen Hsu** (Moses lab), Sherwin S. Desser QEII-GSST to **Justin Jarovi** (Takehara lab)

Staff commendations:

CSB is fortunate to have active and engaged staff whose work keeps the department running smoothly. Two of our staff received special recognition this year from UofT's True Blue Awards. Our Chief Administrative Officer Tamar Mamourian successfully aligns University policies and personnel to get important initiatives accomplished in a timely and cordial manner. She fosters a sense of community in all those around her and happily helps anyone who walks into her office.

Teaching Lab Technician Lisa Matchett ensures the safety of the department through her role as Worker Co-chair of the Joint Health & Safety Committee. Through the many changes in protocols and legislation, she has ensured that safety inspections are completed and deficiencies addressed even under the added duress of constant renovations in the building.

Undergraduate teaching:

In Summer 2019, seventeen CSB undergraduates worked in academic research labs in Asia and Europe as part of the CSB397 Research Abroad course. CSB students Echo

Jing and Stephanie Le agreed to share their experience as research students in Singapore in a video profile. Upon returning to Canada, students presented a final report or poster to the Department describing the results of their experiments. CSB397 is suspended for 2020, but we expect 2021 to provide a great summer research experience.

Professor Melody Neumann is a leader in technology innovation in the classroom. For the past six years, she has been developing Team Up!, an online learning tool that facilitates active learning and group work. Team Up! is now in use in over a dozen courses across different Faculties through the university's online teaching and learning environment Quercus. Students can collaborate in Quercus groups, or spontaneously form their own



Melody Neumann

groups. This provides the opportunity for peer teaching and consensus-building, while allowing misconceptions to be corrected immediately. The development of this project internally will also permit cost savings for students over similar commercial applications.

University of Toronto

Department of Molecular Genetics

Correspondent: Barbara Funnell

2019 marked the 50th anniversary of the Department of Molecular Genetics. We began as the Department of Medical Cell Biology in 1969, led by Dr. Lou Siminovitch. Our name has evolved to the Department of Molecular Genetics, led by our current Chair, Dr. Leah Cowen. We now include over 100 faculty members in several locations, both on and off campus, over 350 Ph.D./M.Sc. students, 12 M.Sc. Genetic Counselling students, 35 M.H.Sc. Medical Genomics students, and over 200 MGY undergraduates!

Molecular Genetics 50th Anniversary Symposium:

In honour of the anniversary, we held a full-day science symposium at the Carlu in downtown Toronto on May 31, 2019. The 50th Anniversary Symposium was a

tremendous success; over 500 current and former members of our MoGen community registered for the event! Our goals were to celebrate our great history, engage with the MoGen community, and inspire the next generation of Molecular Genetics graduates. The symposium highlighted the science and scientists that are, and have been, part of our MoGen community over the last 50 years. Our two keynote speakers, Dr. Lap-Chee Tsui (Hong Kong Academy of Sciences) and Dr. Roderick McInnes (McGill University), both former faculty, reminisced about their time in the department and important events in our history. Eleven Ph.D. alumni speakers illustrated the variety of science pursued by our graduates: Dr. Angela Anderson (Life Science Editors), Dr. Anastasia Baryshnikova (Calico Life Sciences), Dr. Cheryl Birmingham (Sanofi Pasteur), Dr. Joe Bondy-Denomy (U.C.S.F.), Dr. Arvin Dar (Icahn School of Medicine), Dr. Scott Dixon (Stanford University), Dr. Kristin Hope (McMaster University), Dr. Christopher Koth (Genentech), Dr. Tina McDivitt (Spindle), Dr. Pleasantine Mill (University of Edinburgh), and Dr. Liz Patton (University of Edinburgh).



Several of the attendees at the 50th Anniversary Symposium

Education updates:

M.H.Sc. in Medical Genomics: In September 2018, the Department of Molecular Genetics launched a new 2-year course-based M.H.Sc. in Medical Genomics, accepting 15 students into the inaugural cohort. September 2019 marked our 2nd incoming year, with 20 new students. The program teaches practical and theoretical aspects of modern genetics and genomics with a strong focus on clinical applications, and has received overwhelmingly positive responses and much appreciated support from many academic, clinical, and industry partners.

The Amgen Scholars Program: During the summer of 2019, the University of Toronto hosted the inaugural

cohort of the Amgen Scholars Program to great success. Fifteen outstanding undergraduate students from across Canada joined research groups in the Faculties of Medicine and Pharmacy, including several in the Department of Molecular Genetics, to participate in cutting-edge research conducted at the University of Toronto. The Program Director is Dr. Jessica Hill, Assistant Professor, Teaching Stream, in Molecular Genetics. The Amgen Scholars Program is a 10-week summer research program that is fully funded by the Amgen Foundation. The goal is to help students develop the skills necessary for graduate school and for careers in science through a combination of hands-on research, participation in lab and professional development activities, and relationship building.

Career Development for Molecular Genetics Trainees: Five years ago MoGen students and faculty members came together to fill a vacancy in the expansive MoGen programming, to provide initiatives to educate graduate students on the many facets of career development. This sparked the start of the MoGen Career Development Workshop Series, student-led monthly workshops that educate trainees about the multitude of career options available to them and provide opportunities for skill building and networking to help trainees achieve their career goals. The workshops have showcased the plethora of careers that MoGen alumni pursue including academia, industry, consulting, non-profit, government, law, science communication, medical writing and more. These workshops are designed by trainees for trainees, and provide students with the invaluable experience of hosting or planning workshops in career areas. These monthly workshops culminate each year in a faculty-led, MoGen Career Development Symposium. The annual event connects MoGen trainees directly with MoGen alumni, through panel discussions, round table mentoring and networking sessions. Recently, these



MoGen Career Development Symposium

initiatives have been complemented by co-curricular topic courses geared towards career development. “Graduate Professional Development for Scientists” and “The Ins and Outs of Life Sciences Entrepreneurship” are taught by MoGen alumni Dr. Bruce Seet and Dr. Fredrick Sweeney, respectively, and have given MoGen students the chance to build their career skills in a classroom setting, while being guided by professionals.

Welcome to new faculty:

Dr. Sagi Abelson is an Investigator at the Ontario Institute for Cancer Research (OICR), and joined the Department as an Assistant Professor in September 2019. He completed his Ph.D. at the Technion-Israel Institute of Technology, and his post-doctoral training at Princess Margaret



Cancer Centre (UHN), Toronto. His work focusses on the analysis of genomics and other age-related quantitative factors to understand the aetiology of cancer. To improve patient care and outcome, the team seeks to develop and bring advanced sequencing methodologies and bioinformatics tools into clinical use.

Sagi Abelson

Dr. Kieran Campbell is an Investigator at the Lunenfeld-Tanenbaum Research Institute and an Assistant Professor in MoGen, effective January 2020. His research focusses on Bayesian models and machine learning for high dimensional biomedical data, including single-cell



and cancer genomics. Most recently, he was a Banting post-doctoral fellow at the Department of Statistics, University of British Columbia and Department of Molecular Oncology, B.C. Cancer Agency. He obtained his D.Phil. in computational and statistical genomics at the University of

Oxford under the supervision of Christopher Yau.

Kieran Campbell

Faculty highlights and awards:

Dr. Stephen Scherer has been awarded a *2019 Killam Prize* for his significant contributions to Health Science, in recognition of his outstanding work in genomics, genetics, and towards our understanding of autism. The

\$100,000 Prize is one of five awarded annually by the Canada Council for the Arts, the country’s public arts funder, and is the organization’s top annual award.

Dr. Mikko Taipale is the inaugural recipient of the *David Dime and Elisa Nuyten Catalyst Award in Molecular Genetics*. Chemistry alumnus and business founder David Dime has generously established the catalyst fund in Molecular Genetics to support research into novel approaches to combat diseases. The \$50,000 award will allow Taipale’s team to further develop a new technology called PROTACs, for Proteolysis Targeting Chimeras, to reveal therapeutic targets in cancer cells.

Dr. Bruce Seet has been honoured with a *2020 Life Sciences Ontario (LSO) Community Award*, one of five awards awarded annually by LSO to recognize individuals who have made outstanding contributions to the life sciences community in Ontario. Bruce is Director, Medical Affairs at Sanofi Pasteur, and an Adjunct Professor in Molecular Genetics, where he teaches and supports graduate professional development in the department.

Dr. Benjamin Blencowe has been elected a fellow of the Royal Society, the U.K.’s national academy of sciences. He is recognized for his pioneering work in the development and application of high-throughput RNA profiling technologies.

Dr. Alan Bernstein has been awarded an honorary degree, Doctor of Laws, *honoris causa*, from the University of Toronto. Alan has held many leadership positions in science in Canada, including inaugural President of the Canadian Institutes of Health Research. He is currently President and CEO of CIFAR.

Dr. Leah Cowen has been named co-director of the newly launched CIFAR program on the *Fungal Kingdom: Threats and Opportunities*. The CIFAR team includes diverse experts to understand the unique facets of fungal biology and develop new strategies to mitigate the threats posed by fungi and harness their extraordinary potential.

Dr. Ronald Cohn has been appointed President and CEO at the Hospital for Sick Children, effective May 1, 2019. He first joined SickKids in 2012 and is a Professor of Paediatrics and Molecular Genetics at the University of Toronto, a renowned clinician in the area of genetic medicine, and Senior Scientist in the Research Institute at SickKids.

Canada Research Chairs:

Six faculty members from Molecular Genetics were awarded Canada Research Chairs in 2019:

Dr. Sabine Cordes - Tier 1 Canada Research Chair in *Molecular Mechanisms of Mood and Mind*.

Dr. W. Brent Derry - Tier 1 Canada Research Chair in *Genetic Models of Human Disease*.

Dr. Philipp Maass - Tier 2 Canada Research Chair in *Non-Coding Disease Mechanisms*.

Dr. Julien Muffat - Tier 2 Canada Research Chair in *Stem Cell Bioengineering and Synthetic Neuroimmunology*.

Dr. Christopher Pearson - Tier 1 Canada Research Chair in *Disease-associated Genome Instability*.

Dr. Hannes Rost - Tier 2 Canada Research Chair in *Mass Spectrometry-based Personalized Medicine*.

Trainee awards:

Dr. Eric Chapman (Derry lab) was awarded the 2019 Barbara Vivash Award for his Ph.D. thesis, entitled "Elucidating the Mechanism by which KRI-1/CCM1 Regulates Apoptosis Cell Non-Autonomously in *Caenorhabditis elegans*". In humans, aberrant CCM1 function leads to the disease known as Cerebral Cavernous Malformations (CCM), characterized by the formation of anomalies in the cerebral vasculature that can lead to seizures and stroke. Using cell death as a readout, Eric was able to utilize high-throughput screening approaches and hypothesis-driven experimentation to identify that the ERK5 MAPK pathway is over-activated in the absence of CCM1. Eric then demonstrated that the ERK5 pathway alters the function of a KLF transcription factor that is required for the proper expression of a zinc transporter. As a result,



zinc redistribution occurs and inhibits critical processes such as apoptosis. As the search for CCM therapeutics remains an intense focus in the scientific community, Eric and the Derry lab hope that their work will help to identify druggable targets. The Barbara Vivash award is given annually to the graduating student with the best Ph.D. thesis in Molecular

Genetics.

Eric Chapman

Owen Whitley (Bader lab) was awarded the David Stephen Cant Graduate Scholarship in Stem Cell Research. This scholarship is granted annually to a Molecular Genetics



Owen Whitley

graduate student in the M.Sc. or Ph.D. program demonstrating excellence and commitment in the area of stem cell research.



Kaitlin Laverty

Kaitlin Laverty (Hughes and Morris labs) was awarded a 2019 Jennifer Dorrington Award. Kaitlin's Ph.D. work is aimed at understanding the nature of the specificity of RNA binding proteins (RBP) for their target RNA molecules, using computational biology approaches.

Molecular Genetics also has several competitive awards and fellowships, given annually or biannually to our graduate students. Congratulations to all recipients!! They are:

Jaime Yockteng (Frappier lab): L.W. MacPherson Award

Sam Salamun (Frappier lab): Roman Pakula Award

Nicole Revie (Cowen lab): Hannah Farkas-Himsley and Alexander Himsley Memorial Prize

Swathi Jeedigunta (Hurd lab): Norman Bethune Award

Jie Guo (Meneghini lab): Eric Hani Fellowship

University of Toronto Mississauga

Department of Chemical and Physical Sciences

Correspondent: Voula Kanelis

Voula Kanelis:

The Kanelis lab welcomed new lab members (Sarah Quail, Agatha Tymczak, Maria Walker, Jeffrey Youn) who all joined in the 2019-2020 academic year. They join Sarah Bickers and Jonathan Sayewich in investigations of ABC transporters. Sarah and Jonathan presented their research at the Biophysical Society of Canada Meeting (May 2019) held at UTM and joined Voula to present at the NMR Gateway Meeting in Ann Arbor (September

2019).

In addition to her ABC protein research, Voula continues to co-direct the Amgen Biotechnology Experience (ABE) outreach program with her colleagues in the Department of Biology at UTM (Professor Steven Chatfield) and in the ABE@UTM group (co-ordinator Kristina Han). Having just renewed their ABE grant for another three years, the ABE@UTM team is looking forward to expanding the program to other regions of Ontario and incorporating online modules into the program.

David McMillen:

David McMillen received funding through the New Frontiers in Research Fund to support a collaboration with co-PI Dana Philpott (Immunology) on using engineered yeast cells to sense inflammatory conditions in the human intestine and respond by producing anti-inflammatory peptides to fortify the intestinal epithelial barrier.

Scott Prosser:

Scott will soon end his stint as Associate Chair Grad studies and is looking forward to other forms of torture. There is a new generation of students in the lab now (Reizel, Rima, Roopan, Geordi, and Omar) and all share an interest in biophysical chemistry, receptors, and pharmacology through the eyes of chemists. Construction of the new Centre for Medicinal Chemistry has started and the group is very excited about new labelling ideas, spectroscopy experiments, and biology to do at the bench.

Sarah Rauscher:

Sarah Rauscher and colleagues continued their research in the development of accurate and efficient simulation methods to study protein dynamics in all-atom detail. Congratulations to Liam Haas-Neill and Justin Kim who completed their M.Sc. degrees in Physics and are continuing in the group as Ph.D. students. Ethan Lee and Brandon Shew recently joined as graduate students in Chemistry and Physics. Please see <https://rauscher-group.physics.utoronto.ca> for more information and recent papers.

Jumi Shin:

Jumi Shin's lab has made good progress on phage-assisted continuous evolution (PACE) and design of small proteins as potential drugs that inhibit Myc/Max binding the E-box DNA site and potential transcription factor mimics useful in synthetic biology. Serban Popa just completed his M.Sc., and a couple of papers were submitted using rational design and PACE. Jumi is organizing a Directed

Evolution session at the ACS National Meeting in August that is now all online, so come and watch from the comfort of your own home (in your pajamas)!

Andrew Beharry:

Andrew Beharry's research focusses on the development of small molecules for cancer diagnosis and treatment. For more information on the Beharry group, please see: <http://www.beharrylab.com>.

Patrick Gunning:

Patrick Gunning and his group continue their research to develop drugs for fighting cancer and other diseases, create new drug screening platforms, and develop new chemosensors for cell biology. For more information on the Gunning group, please see: <https://www.gunninggroup.ca/home>.



As is now tradition in the Kanelis and Prosser groups, female structural biologists marked the International Day for Women and Girls in Science on social media with a photo in the NMR Centre at UTM. In order from top to bottom, left to right are: Sarah Bickers, Reizel Pejana, Agatha Tymczak, Kristina Han, Maria Walker, Voula Kanelis, Kate Huang. 4th year student Sarah Quail was at a lecture, but was with us in spirit! (photo credit: Dimitry Pichugin, Prosser group)

University of Victoria

Department of Biochemistry and Microbiology

Correspondent: Perry Howard

New faculty:

We welcome to the department **Dr. David Goodlett**. Dr. Goodlett's research focusses on the use of mass spectrometry to study structure- function relationships, especially in lipidomics, bolstered by technology and software development around mass spectrometry, microfluidics and -omic pipelines. In addition to a faculty position, Dr. Goodlett has assumed the position of Director of the Uvic-Genome BC Proteomics Centre.

Faculty news:

Dr. Caren Helbing received funding from the Digital Technology Supercluster this year. The Supercluster funds Canadian research in the development and implementation of digital technologies. Dr. Helbing received funding for her Fresh Water Data Commons project. This project involves developing a platform to collect and integrate data from various sources to create a holistic understanding of the health of water systems allowing better informed decisions on water management and conservation.



Dr. Caren Helbing (photo credit: Uvic Photo Services)

Dr. Martin Boulanger received funding from the Digital Technology Supercluster to fast-track the complex task of developing antibodies required for a vaccine and effective treatments for COVID-19. Working with project partners Variational AI and Zymeworks, a global leader in the design of antibodies, the artificial intelligence-powered platform will help identify new treatments to protect Canadians against COVID-19 and other diseases, saving time and money.



Dr. Martin Boulanger (photo credit: Uvic Photo Services)

Gillian Carleton, a Ph.D. student supervised by Dr. Julian Lum, was named a Vanier Canada Graduate Scholar this year. They are developing novel immune-based therapies using CRISPR-Cas9 gene editing technology to modify CAR-T cells to more successfully attack cancer cells in a solid cancer. Before entering academia, Gillian was a world class track cyclist including a Bronze medal at the London 2012 Olympics.

Rory Hills, Biochemistry Honours student under the supervision of Dr. Boraston, was named a 2020 Rhodes Scholar in recognition of his superior academic achievements and leadership.

University of Waterloo

Department of Biology

Correspondent: Bernie Duncker

New faculty:

2019 was a year of renewal in the University of Waterloo Department of Biology, with the hiring of three new faculty members. Having **Dr. Jozef Nissimov** join us proved timely, as his expertise lies in the area of environmental virology, with a focus on the interplay of hosts and their viruses in the context of aquatic biogeochemistry and energy flow. **Dr. Liam McGuire** is a physiological ecologist who studies how animals cope with energetic challenges driven by environmental conditions and constraints, who joined us after starting his independent career at Texas Tech University. Aquatic ecologist **Dr. Adam Yates** arrived after serving as a faculty member at Western, and is an expert on sustainable management of river and stream ecosystems.



New faculty member Jozef Nissimov



New faculty member Liam McGuire



New faculty member Adam Yates

Faculty news:

Major accomplishments of department members in 2019 include the establishment of a powerful new online tool “AnnoTree” by **Drs. Andrew Doxey** and **Laura Hug** (<http://annotree.uwaterloo.ca>). It allows users to navigate through an interactive microbial tree of life that integrates data from thousands of microbial genomes, published in *Nucleic Acids Research*. **Dr. Marcel Pinheiro** was one of two recipients of this year’s UW Excellence in Science Teaching award (along with Dr. Natalie Hutchings, School of Optometry), for his outstanding and innovative teaching of zoology and parasitology courses. **Dr. Brian Dixon** had his Tier I Canada Research Chair in Fish and Environmental Immunology renewed. Biochemistry student **Stephanie Chan** was named Science co-op student of the year for her work as a Clinical Research Assistant at Sunnybrook Health Sciences Centre. Finally, phycologist (and incoming Department Chair), **Dr. Kirsten Müller**, was one of 99 female leaders from around the world selected for the 2019 cohort of Homeward Bound participants. This is a unique training program set aboard a ship travelling to Antarctica, providing melting glaciers and changing ecosystems as the backdrop for three weeks of learning how science leaders can effectively work towards implementing changes surrounding the climate crisis within their roles back home.



Incoming Department Chair, Kirsten Müller

CSMB-Sponsored Events 2019

Graduate events

The CSMB provides financial support to graduate student societies for a variety of activities related to biochemistry, molecular biology, cell biology or genetics. Examples of supported activities include (but are not restricted to) the following:

Scientific Symposium Days, with invited scientists speaking on subjects in the areas of biochemistry, molecular biology, cell biology or genetics.

Student Research Conferences, where students display their research as posters, or give oral presentations.

Career Fairs or Career Workshops in areas related to biochemistry, molecular biology, cell biology or genetics.

*The society will support **up to six** events each year, to a **maximum of \$500** per event, on a competitive basis. Student organizations seeking financial support under this program should contact the society Secretary with a short description of the planned event, and the amount of funding requested. The request should also include a Regular Member of the Society as a Sponsor/Coordinator, working with the Student Organization. Requests will be accepted twice each year (up to 3 possible awards for each competition), with deadlines of **February 15** and **September 15**.*

McGill University

Annual McGill Biomedical Graduate Conference (AMBGC)

Correspondent: Nida Haider

The AMBGC is one of the largest student-run research symposia in Canada. It offers graduate students engaged in biomedical research across Montreal the opportunity to present their research findings in an encouraging environment. It aims to provide conference participation opportunities for graduate students from all labs, regardless of budgetary restrictions. In this vein, we remain committed to organizing a high-quality scientific event that does not charge a registration fee for presenters. AMBGC promotes direct communication across diverse research backgrounds and universities; thus, contributing to the advancement of biomedical research in Montreal.

The 12 members of the AMBGC 2019 Organizing Committee are Nida Haider (Chair), Alex Cooke, Samantha Bovaird, Juan-Carlos Padilla, Vincent Ta, Rutherford Exius, Sepideh Mikaeeli, Alyssa Francis, Sydney Ross, Heather Duncan, Jenna Giubilaro and Hamehr Sekhon.

Conference themes include:

- Oncology
- Cardiovascular and Respiratory Systems
- Endocrinology and Energy Homeostasis
- Cellular and Molecular Biology
- Genetics and Gene Expression
- Microbiology and Immunology
- Epidemiology, Bioethics and Clinical Research
- Neuroscience

This year's event was held on March 19th 2019 at the Research Institute of McGill University Health Centre, 1001 Decarie Blvd, Montreal, with 160 conference participants. Of these, there were 73 M.Sc., Ph.D. and post-doctoral student oral and poster presentations, judged by a team of 20 participants. In addition, 16 sponsors and 3 industry representatives also attended.

This year, we invited Dr. Gary Kobinger to give the keynote lecture for the 19th AMBGC. Dr. Gary Kobinger is a Professor in the Department of Microbiology and Infectious Diseases and the Director of the Research

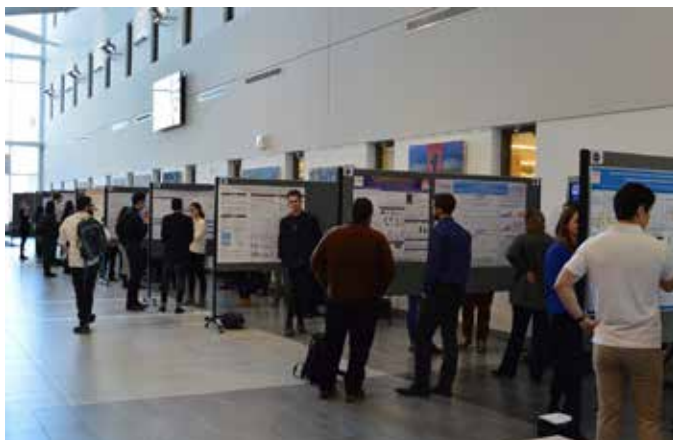
Centre on Infectious Diseases, Faculty of Medicine at Université Laval. His work focusses on developing and testing new vaccine platforms and immune treatments against new emerging viruses of high consequences to public health. His keynote lecture, which was entitled “Innovative vaccines and therapeutics to reinforce trust in infectious disease interventions”, initiated great discussion and questions from the attendees.



Organizing committee AMBGC 2019



Keynote lecture hall AMBGC 2019



Poster presentation session AMBGC 2019



Oral presentation judges AMBGC 2019



Oral and poster presentation winners AMBGC 2019

Western University Ontario Biology Day

Correspondent: Carlie Muir

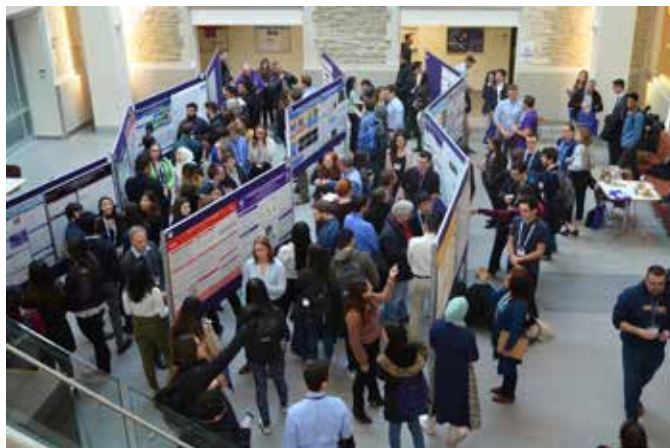
Ontario Biology Day (OBD) is a provincial conference which provides an opportunity for senior undergraduate students to showcase their research and share their passion for science. For most, it is their first conference attendance. As students approach the completion of their undergraduate degrees, Ontario Biology Day serves as a venue to form connections, engage with other scientists, and to be inspired by current research.

The 32nd annual Ontario Biology Day was held at Western University in London, Ontario on March 23rd and 24th, 2019. Over 270 students and faculty from across the province attended the event, with 225 student presentations. Research topics discussed at this year's

conference included genetics, cell biology, neuroscience, physiology, biochemistry, and ecology.

The first keynote speaker was Dr. Brock Fenton, an Emeritus Professor of Biology at Western University and a Fellow of the Royal Society of Canada. In his keynote address, Dr. Fenton detailed his prolific career researching bat ecology, evolution, and behaviour. The second keynote address was given by Dr. Bonnie Schmidt, Western University alumna and founder/president of Let's Talk Science. This is an award-winning, national charitable organization that helps children and youth fulfill their potential and prepare for their future careers by supporting their learning through science, technology, engineering and mathematics (STEM) engagement.

At OBD, awards are given for the best presentation in each research stream to reward students for their scientific excellence. This year, the award for Best Cell & Molecular Talk, presented by CSMB, was awarded to Fatima Nadeem of the University of Windsor. In her senior thesis project, Fatima investigated the mechanisms regulating the tumour microenvironment in glioblastoma multiforme (GBM), and how the microenvironmental landscape affects GBM progression and therapy resistance.



Student poster session at OBD



Dr. Bonnie Schmidt, founder of Let's Talk Science, delivering her keynote address at the OBD banquet



Bat biologist and Emeritus Professor, Dr. Brock Fenton, giving his keynote presentation



A toast to early career researchers at the OBD banquet



Fatima Nadeem, winner of the CSMB Award for Best Cell and Molecular Talk

Toronto RNA Club Seminar Series Jan-June and Sept-Dec 2019

Correspondent: Eliza Lee, Ashley Campbell and Nevraj Kejiou

The Toronto RNA Club was founded by trainees in 2014 to bridge research institutes across the Greater Toronto Area (GTA), with the goal of strengthening the RNA biology research community. Our reach spans over 250 researchers in the extended GTA – including those at the University of Toronto, the University of Guelph, the University of Western Ontario, McMaster University, and York University – who study diverse facets of RNA biology using a wide array of tools and model organisms. The Toronto RNA Club seminar series is a forum where RNA research is disseminated and new collaborations are forged. Our monthly seminar series runs from September to June, showcasing the latest research from trainees and PIs across the GTA and into Southern Ontario. We have a strong turn-out from the RNA community, with approximately 30-50 attendees per seminar.

In the 2019 January to June cycle, we hosted many outstanding talks on RNA biology. We were especially pleased to have hosted external speaker, Dr. Jocelyn Côté, from the University of Ottawa, to share his work on arginine methyltransferases. Our remaining seminars featured trainees and PIs from the University of Toronto, University of Guelph, and York University. In addition to the breadth of research topics, such as endogenous yeast retroviruses, hypoxic translation regulation, and tRNA modifications, all our talks have continued to provide speakers and an audience that reflect the diversity in

ethnic background which represents the vibrant Toronto RNA community.

In the 2019 September to December cycle, we had presenters, both trainees and PIs, representing multiple universities throughout Toronto including the University of Toronto, University of Guelph and York University. We also fostered new collaborations with departments at the University of Toronto and other institutions which increased the diversity of our audience and of our speakers.

Also, during this cycle, we arranged for an exciting guest speaker, Dr. Selena Sagan from McGill University, to share her work in 2020 on miRNAs and how they facilitate hepatitis C virus. Her lecture will discuss a non-canonical function for miRNAs and will supply better insight into their role during viral infections. This talk will expand our range of influential speakers to another highly regarded Canadian university, and increases the diversity in topics covered.

All seminars include a pizza-fuelled networking session where we continue our RNA-centric dialogue. Thus far, our seminars have proven to not only be a wonderful opportunity to connect RNA researchers but also a great means of inducting new trainees into the Toronto RNA community and forging new collaborations.

We thank CSMB-SCBM for supporting the Toronto RNA Club, and as we continue with our remaining 2019-2020 Seminar Series, we will continue to provide exciting RNA biology content to the Greater Toronto Area.



February 8th, 2019: Even in one of the harshest winter storms, everyone attended Dr. Marc Meneghini's talk "RNA binding by the Nab3 RRM domain in yeast: a regulatory role for reversible lysine methylation?"



September 13th 2019: Jeongeun (Lisa) Kim gives her first presentation as a graduate student in Dr. Frappier's lab, Department of Molecular Genetics, University of Toronto. Her talk was one of the first presentations in the Toronto RNA Club to illustrate a role in mRNA regulation during a human viral infection.



October 11th 2019: The "Early Birds" are getting their seats before Dr. Alex Palazzo (Department of Biochemistry, University of Toronto) explains "everything you wanted to know about junk RNA but were afraid to ask".

Université de Sherbrooke La Journée Phare 2019

Correspondante: Camille Francoeur

La Journée Phare est un congrès annuel provincial en sciences de la santé organisé par des étudiants de l'Université de Sherbrooke. L'édition de cette année a eu lieu les 5 et 6 décembre 2019 à l'hôtel Chéribourg d'Orford. Nous avons eu la chance d'accueillir les professeurs John Bell de l'Université d'Ottawa et Philippe Gros de l'Université McGill, qui sont venus nous présenter

leurs travaux. De plus, l'atelier "Bio-éthique 101: Enjeux et perspectives au 21^e siècle", avec entre autres le professeur Yann Joly de l'Université de McGill, a été très apprécié des participants. Finalement, la présentation de Marc-André D'Aoust de Medicago nous a fait découvrir le genre de recherche qui peut être fait en industrie lors de notre traditionnel souper-conférence.

En 2019, la Journée Phare a accueilli plus de 250 participants, dont des étudiants du premier cycle, des étudiants gradués, des stagiaires postdoctoraux, des professeurs et des professionnels de recherche. Plus de 100 présentations orales et par affiche ont été réalisées, mettant ainsi en valeur la qualité des travaux menés en sciences de la santé.

Le comité organisateur remercie la société canadienne pour les biosciences moléculaires pour leur support permettant d'organiser ce congrès annuel rassembleur.



Séance de présentations par affiche



Comité organisateur

University of Guelph, College of Biological Sciences

Graduate Student Symposium 2019

Correspondent: Madison Wright

The annual Graduate Student Symposium is an event that is looked forward to by faculty, staff and graduate students in the College of Biological Science at the University of Guelph. This is a free annual conference, which provides graduate students with the opportunity to showcase their research, as well as learn about the other research taking place within the College of Biological Science. This symposium provides a platform for graduate students to share their research with a broad audience and foster new interactions and collaborations at the University of Guelph that would not otherwise be possible.

On Tuesday April 23rd 2019, the 15th annual Graduate Student Symposium welcomed approximately 200 graduate students, staff and faculty from the Departments of Molecular and Cellular Biology, Integrative Biology and Human Health and Nutritional Sciences. This symposium took place at the University of Guelph, and there were just over 30 oral presentations and 60 poster presentations delivered by graduate students, giving them the opportunity to present their current research.

This year we had the pleasure of welcoming Dr. James Ellis from The Hospital for Sick Children (Sick Kids) and the University of Toronto as our plenary speaker. He discussed his research on induced pluripotent stem cells and disease, in addition to the broader issue of research integrity. This talk was thought-provoking, and challenged graduate students, staff and faculty to think critically about their research and conduct themselves in an ethically responsible manner.

The 2019 Graduate Student Symposium organizing committee consisted of 10 individuals (students and faculty) from the College of Biological Science, including Sarah Bates, Marc Coppolino, Jennifer Gleason, Mara Goodyear, Olena Klahsen, Dennis Larson, Elisa Lau, Glen Van Der Kraak, Karen White and Madison Wright.



Oral presentation at the Graduate Student Symposium



Poster sessions at the Graduate Student Symposium

University of Toronto

Toronto DNA Replication and Repair Symposium 2019

Correspondent: *Tajinder Ubhi*

The Toronto DNA Replication and Repair Symposium is a one-day, trainee-oriented research symposium that was established by a Ph.D. student from the University of Toronto in 2018. It is organized by students, for students in the local genome stability field.

Our second annual symposium took place on April 18, 2019 in the MaRS Discovery District Centre Auditorium in Toronto, and welcomed 120 attendees, 90 of whom were trainees. The symposium assembled researchers from 36 academic labs from the Greater Toronto Area to share their ongoing research, and ultimately promote academic and professional development among its trainees. Despite the sizable number of researchers within the DNA replication and repair community in Toronto, no formal meeting of these researchers had ever taken place until last year, limiting collaboration and career development opportunities for the trainees in this community. The symposium resolved this problem by bringing researchers across institutions together to share their expertise and establish collaborations, thereby promoting sustained growth in the DNA replication and repair community in the Greater Toronto Area.

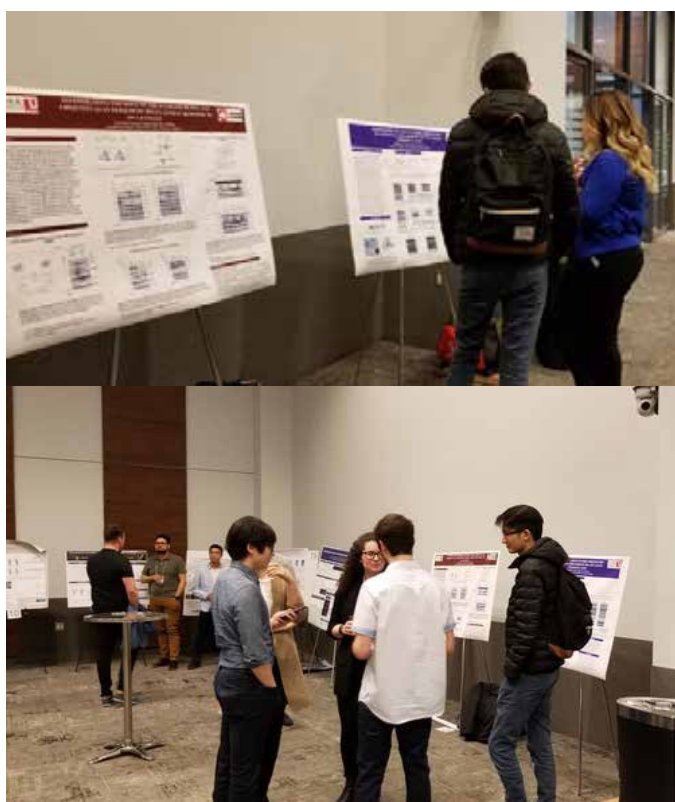


Lunch break at the 2019 Toronto DNA Replication and Repair Symposium

The symposium prioritized professional development opportunities for trainees through oral and poster presentations, and networking opportunities. The day featured ten oral presentations from early career researchers from seven different institutions in the Greater Toronto Area and a keynote presentation by Dr. Johannes Walter from Harvard Medical School, followed by a poster presentation session.



Johannes Walter delivering his keynote presentation



Poster presentation session at the 2019 Toronto DNA Replication and Repair Symposium

The symposium was a great success again this year - thanks to the hard work of the organizing committee, which consisted of nine graduate students from the Greater Toronto Area (Tajinder Ubhi, Brandon Ho, Michele Olivieri, Tiffany Cho, Parasvi Patel, David Miller, Roxanne Oshidari, Liza Calhoun, and Zohreh Kianfard). We look forward to seeing the growth of our local DNA replication and repair community in next year's symposium!

Western University, Department of Biology

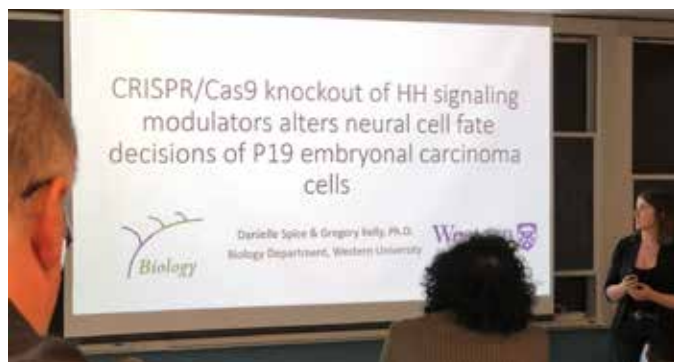
Biology Graduate Research Forum 2019

Correspondent: Mohamed Gatie

The Biology Graduate Research Forum (BGRF) at Western University is organized by the graduate students in the Department of Biology. The goal of the conference is to showcase work being conducted by graduate students in Biology. At BGRF, graduate students, undergraduate students, faculty and staff engage in meaningful discussion about their projects, which allows students and faculty the opportunity to explore potential collaborations within the department. As the Department of Biology has a diverse blanket of disciplines, BGRF is an incredible opportunity for networking and idea-sharing across ecology, physiology, biochemistry and molecular biology.

This year's event, the 10th BGRF, took place on **October 18th, 2019** in the Physics & Astronomy Building at Western University, London, ON. The forum consisted of morning and afternoon concurrent Ph.D. and M.Sc. student talks, both in a standard talk and "lightning" talk format, a poster session, and a keynote address. BGRF 2019 showcased the work of 34 students and had 150 attendees. This year's BGRF also included a graduate student-keynote speaker networking and socializing event, where students were able to meet with the keynote speaker, Dr. Roman Krawetz, in a more relaxed setting to discuss biology and career options. Dr. Roman Krawetz is a Tier II Canada Research Chair in Bone and Joint Stem Cell Biology, and also holds the Grace Glaum Professorship in Arthritis Research at the McCaig Institute at the University of Calgary.

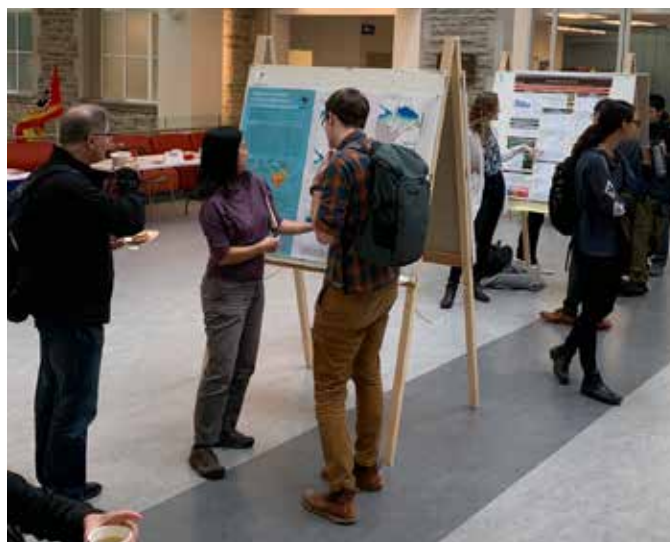
BGRF 2019 was a resounding success, and an event that would not have been made possible without the help of the Canadian Society for Molecular Biosciences.



BGRF 2019 Chair Danielle Spice presenting her Ph.D. talk in a concurrent session



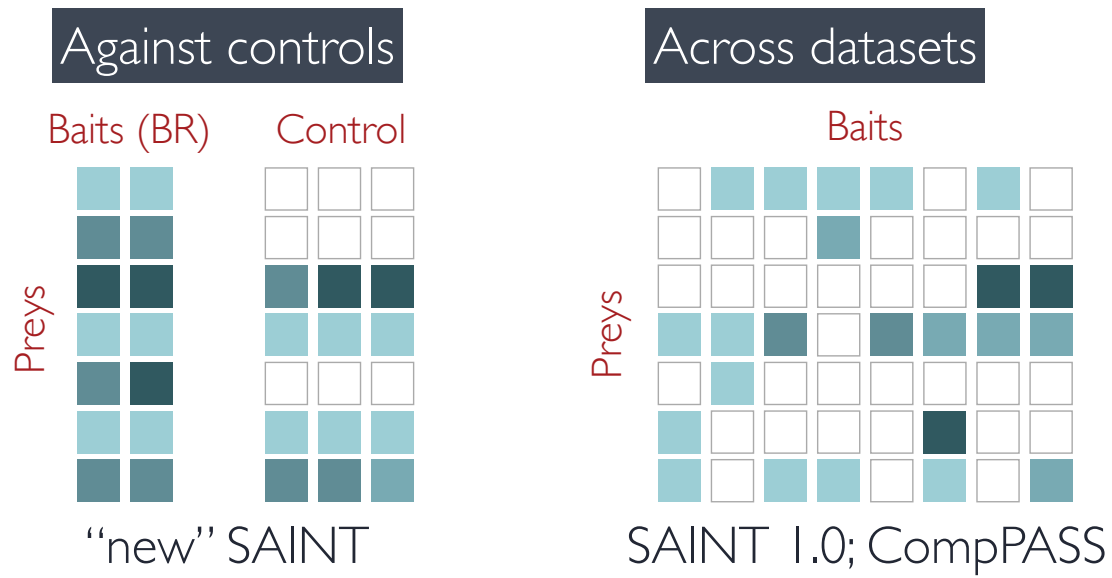
Winner for Best Poster Presentation, Brendon Samuels



Students presenting their posters during the poster session



Dr. Roman Krawetz presenting his talk



Robust bioinformatics platform

