



Molecular Genetics
UNIVERSITY OF TORONTO

MoGeNews

Issue 8 - November 2016

Editor's message

Welcome to fall 2016! This is a season of transitions for many of us in Molecular Genetics. Our new Chair, Leah Cowen, has transitioned into her role, and the previous Chair, Howard Lipshitz, has transitioned out. I have assumed editorial duties for this newsletter from Leah, and the transition is represented in this issue. A large cohort of colleagues in the Medical Sciences Building are preparing for a move to new research space in the MaRS2 tower, with the first moves happening in late November. Planning is underway for renovations to improve the research space in the Medical Sciences Building. Arguably the biggest transition is occurring for the new graduate students, as they participate in rotations and transition from undergraduate to graduate studies.

As always, we encourage all members of our community to keep us posted on discoveries, awards and achievements. Your input is crucial as we continue to build an engaged community.

Barbara Funnell

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Message from the Chair



Although these are certainly turbulent times on many fronts, it is exquisitely clear that Molecular Genetics is thriving. This year we have welcomed our largest graduate class ever with 80 bright young minds, we have witnessed phenomenal growth in our undergraduate program with two new online courses that are engaging well over 1,000 students, we had record breaking participation at our Departmental retreat with over 250 attendees, we are recruiting three new faculty members, and we are expanding into state-of-the-art new research space. We continue to foster interdisciplinary learning and innovation, as with our new graduate programs in Quantitative Biology in Molecular Genetics (QBMG) and Computational Biology in Molecular Genetics (CBMG). This is all made possible by our incredible community of current faculty, staff and trainees as well as with our colleagues, alumni and friends.

We hope that you will enjoy the highlights of community events, alumni spotlights, research highlights, and coverage of exciting faculty and student achievements.

Sincerely,

Leah Cowen

Community Events



Farewell to the Chief

On July 7, MoGen faculty met at the Faculty Club for a reception in honour of Dr. Howard Lipshitz's term as Chair of the Department. Howard was first appointed Chair in 2005, and his term ended on June 30, 2016. In that time, there have been many changes to MoGen, not the least of which is changing and consolidating our name to Molecular Genetics. In addition, there are now over 100 faculty in MoGen, the size of our undergraduate and graduate programs have increased dramatically, and the visibility of Molecular Genetics has increased internationally with several partnerships with universities in China. Howard now has a year of well-deserved administrative leave. At the reception, Howard was presented with a quail and a flask, implements for enjoying Scotch, of which we hope that Howard takes full advantage during the next year!



2nd Annual MoGen Career Development Symposium

Empowering trainees. Engaging alumni. The 2nd Annual MoGen Career Development Symposium was held on June 10th at the historic Chestnut

Residence and Conference Centre. Dr. Leah Cowen and Dr. Julie Claycomb spear-headed the event and organized a day in which trainees could interact and seek mentorship from the breadth of extraordinary alumni in the Department of Molecular Genetics.

A highlight of the day was a panel discussion consisting of some of MoGen's most distinguished graduates. Dr. Kristin Baetz (University of Ottawa) and Dr. Scott Dixon (Stanford University) discussed their paths to academic research careers. Dr. Andrew Keeping (ATCO Power Canada Ltd), Dr. Ainslie Parsons (Bereskin & Parr LLP), Dr. Michael Szego (Centre for Clinical Ethics, University of Toronto), and Dr. Luc Marengere (TVM Life Science Management Inc.) presented their experiences in the pursuit of fulfilling careers outside of academia. Finally, the symposium provided a lot of time for trainees to network with alumni and seek advice. Overall, the day ended with trainees excited and inspired about what the future holds for them. Click [here](#) to read more.



Science Rendezvous

On Saturday, May 7th, the University of Toronto (St. George Campus) opened its door to the general public to showcase the important discoveries and innovations in science, engineering and medicine. The event, Science Rendezvous, allows visitors of all ages the opportunity to interact with world-class

researchers, gain hands-on experience in conducting experiments and experience science in new and creative ways.

The Department of Molecular Genetics came out in full force this year and had one of the largest displays of the day, spanning multiple tables and rooms. Led by GSA vice-president Elizabeth Polvi, over 30 volunteer students and professors gathered bright and early to show members of the public (both young and young-at-heart) how to extract DNA from a banana, analyze unique genetic traits, craft superhero bacteria and introduce various model organisms, such as flies, worms, yeast, and much more!

Early morning coffee and donuts generously provided by Dr. Julie Claycomb and Dr. Alex Ensminger kept the energy high, and an EVOS cell imaging microscope lent by the Taipale lab had everyone flocking to view cool cells and planaria dissections. The day ran smoothly and without a single hitch, a testament to the professionalism and amazing team work of our volunteers. With perfect timing, everything was packed up just as the rain started to fall.

A fantastic day was had by all, leaving everyone excited by cool science! If you are interested in participating in a large-scale science outreach program that is full of energy and creativity, please keep an eye out for next year's recruitment session! The GSA always welcomes more volunteers!



Summer BBQ and MoGen Camping Trip

With the onset of a new school year, we say goodbye to the fond memories that were formed during the warm Summer months. Capitalizing on the beautiful weather, the annual

GSA BBQ was held on July 28th on the front lawn of the Centre for International Experience. Students, staff and faculty gathered in the shade, sat on a patch of grass and enjoyed some perfectly grilled hotdogs, hamburgers, watermelon and freezies. The weather could not have been more perfect and the food kept on flowing, thanks to vice-president Eric Chapman who diligently manned the grill. After everyone's stomachs were stuffed, the day concluded with a Pub Night at the Maddy.



A new event held this Summer and also organized by the GSA was a MoGen Camping Trip! Held on the weekend of August 26-28th and, thanks to the immense hard work of the GSA Event Coordinators Lauren Tracey and Samantha Esteves, the trip was a

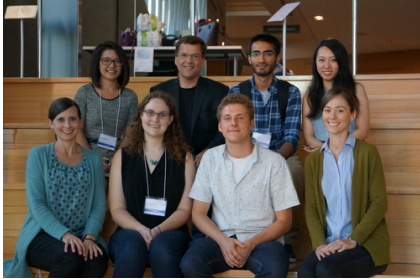
huge success! Over 13 graduate students made the trek up to Mile Lake Provincial Park, and for some of them, it was their very first camping trip! There was much hiking, swimming and roasting s'mores by the campfire. Samantha Esteves commented, "the MoGen Camping Trip went very well! Everyone did their part to keep the camp running and I think these simple activities really bring people together". There really is nothing like roughing it out in the great out-doors to bring people together and help form lifelong friendships.



66th Annual Canadian Society of Microbiologists Meeting

On June 12-15, the University of Toronto hosted the 66th Annual Canadian Society of Microbiologists Meeting for the first time in 30 years, co-chaired by Dr. Alex Ensminger & Dr. Trevor Moraes (Department of Biochemistry).

With 525 registrants, the conference was a huge success. Faculty and trainees from the Department of Molecular Genetics were among the speakers and presenters at the conference. Click [here](#) to read more.



Toronto RNA Enthusiasts' Day

On August 2nd, the very first annual Toronto RNA Enthusiasts' Day (TRENd) was held at the Peter Gilgan Centre for Research and Learning, Hospital for Sick Children. The Symposium was a student-led and trainee-focused event and was spear-headed by five graduate students in the Department of

Molecular Genetics: Amanda Charlesworth, Ashrut Narula, Christopher Wedeles, Miranda Wang and Monica Wu. With guidance from their faculty advisors, Dr. Julie Claycomb and Dr. Olivia Rissland, the organizing group aimed to take advantage of the vibrant and diverse RNA biology community in the Greater Toronto Area and create a platform that will bring together researchers of every level for a day of RNA-related discussions.

The event was very well received, with over 170 RNA enthusiasts in attendance with some travelling from as far as New York and Montreal. Click [here](#) to read more.



MoGen Retreat 2016

We gathered for our 2016 Molecular Genetics Retreat at Geneva Park YMCA, on September 21st-23rd. The retreat was

organized by Julie Lefebvre, Jim Rini and Leah Cowen, with the assistance of Amanda Veri, Sabrina Stanley and their GSA team. Our new Department Chair, Leah Cowen, organized an excellent scientific program of 15 faculty talks that captured the diversity and excellence of the research ongoing in MoGen.

The retreat kicked off on Wednesday evening for first-year students and faculty members with a faculty-student mixer dinner and the always entertaining Power Hour. Each faculty member was held to a strict 3-minute/1 slide presentation during which they could pitch their research to the students. On Thursday, the remaining attendees arrived for our largest turn-out yet: 42 PIs, 74 rotation students, 114 graduate students, 12 post-docs/staff, and 17 undergraduate MoGen specialists. The day began with opening remarks from Leah Cowen followed by 2 sessions of talks, a soggy faculty-student soccer showdown, and a poster session boasting a record 110 presentations. The rooms were buzzing with MoGen members presenting their work or learning about their peers' research. The quality of the poster session was impressive and illustrated the superb research being performed by our trainees. Poster judging turned out to be a tough task and 8 posters were selected for cash awards. We capped a great day off with an entertaining evening of Lies, Fires, and Dancing. Click [here](#) to read more.



MoGen Halloween Pub Night

On Wednesday, October 26th, the GSA held its annual Halloween Pub Night at Prenup Pub. An incredible number of students attended the event and filled the entire upstairs, demonstrating that no matter how young or old, everyone loves celebrating Halloween and getting free candy. As always, awards were given for best individual and group

costumes. Competition was fierce this year as there were many amazing and creative costumes. However, best individual costume was awarded to a first year rotation student, Boyang Qiu, whose costume appealed to all Toronto Jays fans. Runner-up for best group costume went to a pair of first year students, Dustin Ammendolia and Krista Schleicher, who showed off their scientific knowledge through their very accurate depictions of DMEM and FBS bottles. Finally, first place for best group costume was awarded to members of the Claycomb lab (Amanda Charlesworth, Amy Nabih, Monica Wu, Melissa Wong and Allison Jandura) who dressed up as “spice” girls. If you missed the event, please check out the [GSA Facebook page](#) for pictures of all the crazy costumes.

Alumni Spotlights



Ramona Sequeira, President, United States Business Unit and a member of the executive team at Takeda Pharmaceutical Company Ltd, shares her memories starting as an undergraduate student in Molecular Genetics and how it inspired her to pursue a career on the business and management side in the pharmaceutical industry. Ramona reflects on the different stages in her career journey, both complex and rewarding. Click [here](#) to read the full spotlight.



Melanie Szweras is a partner, lawyer and registered Canadian and United States Patent Agent with the intellectual property law firm Bereskin & Parr LLP. Her practice focuses on biotechnology and pharmaceutical patents. Melanie attended the University of Toronto for both her undergraduate and Ph.D. degrees. Click [here](#) to read the full spotlight.



Jordana Lowe is a recent graduate of the Molecular Genetics & Microbiology (MGY) Major undergraduate program. Her undergraduate research career was recently highlighted in U of T News. Click [here](#) to read the full story.

Research Highlights



Toronto scientists, led by **Dr. Stephen Scherer**, have launched a massive project to sequence the whole genomes of 10,000 people per year. These genome sequences will provide an extraordinary opportunity to study the genetic basis behind complex human diseases and to effectively treat (and even someday cure) them.

Read Dr. Scherer's article in the [Toronto Star](#).

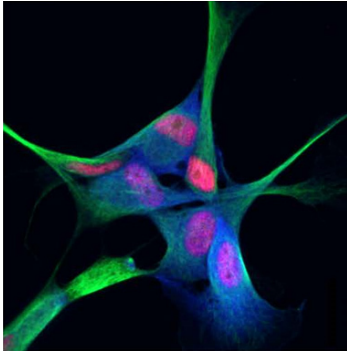
Read the article in [U of T News](#).

Dr. Scherer spoke on CBC's The National recently about the study and how it may help to "crack the autism code". Click [here](#) for more.



Dr. John Dick led the Canadian team of international stem cell scientists that have discovered the switch to harness the power of cord blood and potentially increase the supply of stem cells for cancer patients needing transplantation therapy to fight their disease.

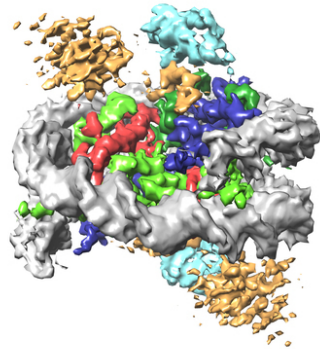
See Dr. Dick discuss the science [here](#).



How do tissues regenerate after injury? In humans, and in mammals in general, limbs cannot regenerate except for the tips of our fingers. By examining how the tips of digits regenerate after injury in mice, a research team led by **Dr. Freda Miller** has discovered that nerve-derived cells may play a key role in regulating tissue repair and regeneration in the distal tip and throughout the body. Click [here](#) to

[read more.](#)

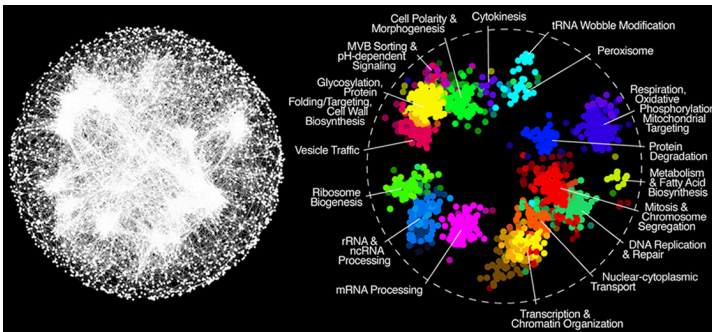
([Cell Stem Cell 2016, 19:433-448](#))



The repair of DNA damage is essential to prevent accumulation of harmful mutations that affect cell survival and genetic integrity. **Dr. Dan Durocher** and colleagues have examined how double-stranded breaks in DNA alter a histone modification cascade that controls DNA repair. Using electron cryomicroscopy, they have uncovered the structural basis of the interactions between a repair protein, 53BP1, with

nucleosome cores modified by ubiquitinylation or methylation. These studies illustrate how histone marks on nucleosomes can produce highly specific responses to DNA damage such as chromosome breaks.

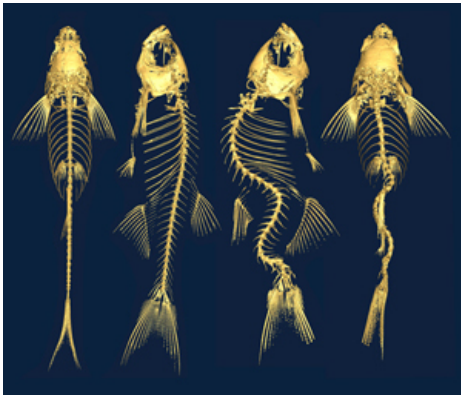
([Nature 2016, 536:100-103](#))



A landmark study led by **Drs. Brenda Andrews and Charlie Boone** has revealed a global genetic wiring diagram of a eukaryotic cell. It maps how genes

interact and coordinate with each other in functional pathways, using the model yeast *Saccharomyces cerevisiae*. Click [here](#) to read more.

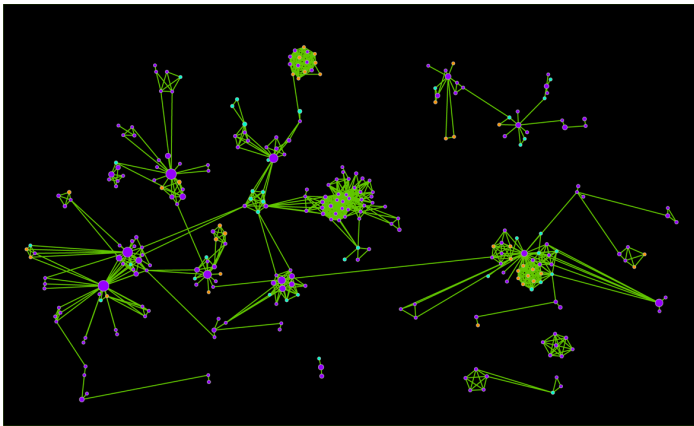
([Science 2016, 253: doi: 10.1126/science.aaf1420](#))



A study led by **Dr. Brian Ciruna** suggests that idiopathic scoliosis, a debilitating disease characterized by a three-dimensional curvature of the spine, could be caused by irregularities in the flow of fluid in the spinal column. Dr. Ciruna and colleagues identified a mutation in the Ptk7 gene of zebrafish that affected how cilia, the tiny hair-like projections that line the spinal canal, beat

to move fluid. These mutations led to spinal curvatures in fish that resembled those in humans with idiopathic scoliosis. Click [here](#) to read more.

(*Science* 2016, 352:1341-1344)



Dilated cardiomyopathy (DCM), whose hallmark is an enlarged heart, is one of the most common inherited disease of the heart muscle. **Dr. Andrew Emili** and colleagues mapped changes in protein

signalling pathways in heart cells that lead to DCM, which begins to shed light on the molecular mechanisms behind this disease. Click [here](#) to read more.

(*Proc. Natl. Acad. Sci. USA* 2016, doi: 10.1073/pnas.1606444113)



Dr. Philip Kim has developed a new method for identifying the raw ingredients necessary to build 'biologics', a powerful class of drugs based on manipulation of cellular proteins rather than synthetic chemicals. The method combines sophisticated computer simulations with high-throughput experimental approaches to identify candidates.

Click [here](#) to read more.

(*Science Advances* 2016; 2 (7) e1600692)



A study led by **Dr. Peter Dirks** explores new links between glioblastoma, the most common and aggressive brain tumour in adults, and Parkinson's disease, which is characterized by interruptions in the supply of dopamine, a chemical signal of the brain's reward system. In the new study, the research team identified chemicals that block dopamine function in glioblastoma tumours, which caused glioblastoma stem cells (the cells that drive tumour formation) to undergo a rapid neurodegenerative process. The discovery leads to

the potential for clinically treating these cancers by subtle alterations of brain chemistry. Click [here](#) to read more.

(*Cancer Cell* 2016, 29:859-873)

Faculty Highlights and Awards



Dr. Brenda Andrews, a Companion of the Order of Canada, receiving her award from Governor General David Johnston.

The Governor General's office cited her “globally significant research in systems biology and for developing and nurturing prominent

scientific communities in molecular genetics”. Click [here](#) to read more.

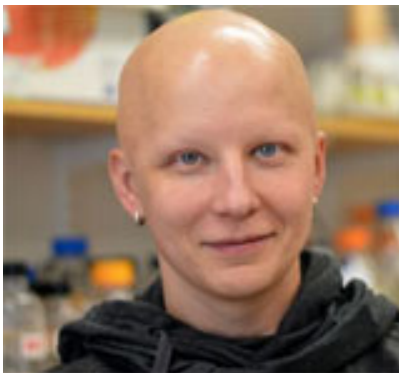


Dr. Laurence Pelletier is the 2016 recipient of the Robert H. Haynes Young Scientist Award in Genetics, awarded by the Canadian Society for Molecular Biosciences (CSMB).



Dr. Sabine Cordes, has recently been named the recipient of the Lloyd S.D. Fogler, QC, Award of Excellence for her work on mood disorders.

Established in 1997 in recognition of Mr. Lloyd Fogler's outstanding tenure as Chairman of the Board (1992-1997), this award is presented annually to an investigator or group of investigators within Sinai Health System whose recent research contributions have had a significant impact at the highest level of international excellence.



Dr. Mikko Taipale has won an inaugural \$100,000 CIFAR-Azrieli Fellowship. He is one of 18 recipients worldwide, awarded by the Canadian Institute for Advanced Research (CIFAR) to scientists who are less than five years into their first academic appointments. Click [here](#) to read more.

Trainee Highlights and Awards



Graduate Student Awards 2016

Molecular Genetics has a number of competitive awards and fellowships given annually (and announced at the retreat) to our graduate students.

Congratulations to all students!!

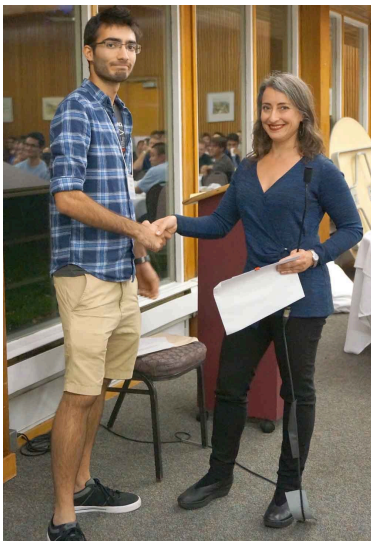
This year the awardees are:

L. W. Macpherson Microbiology Award

Elizabeth Polvi (Cowen Lab)

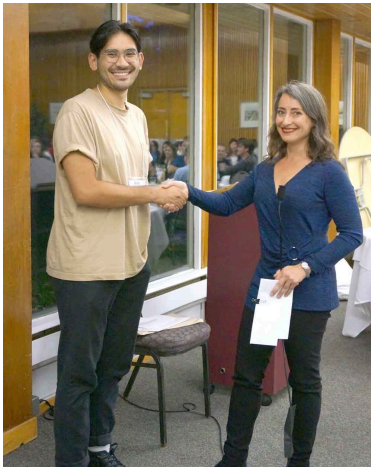
Roman Pakula Award

Ashrut Narula (Rissland Lab)



Norman Bethune Award

Boris Dyakov (Gingras Lab)



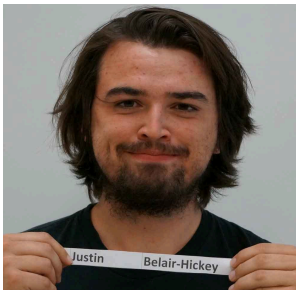


Eric Hani Fellowship

Tavia Kaplan (Cowen lab)

Hannah Farkas-Himsley and Alexander Himsley Memorial Prize

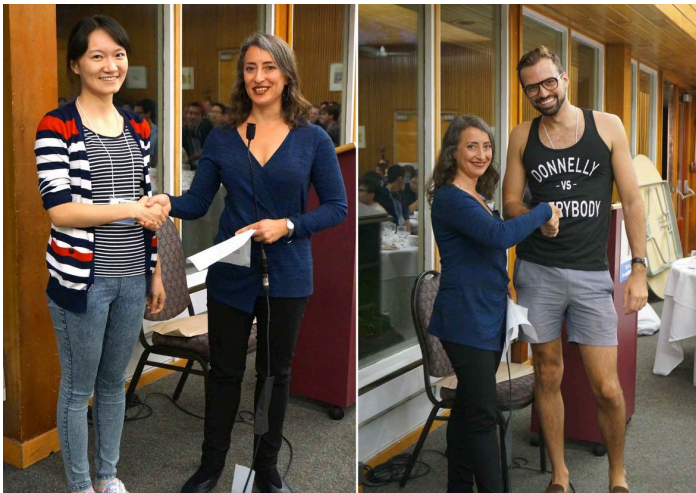
Cassandra Wong (Gingras Lab)



Awarded after the retreat:

David Stephen Cant Graduate Scholarship in Stem Cell Research

Justin Belair-Hickey (1st year rotation student)



MoGen Retreat Poster Awards 2016

Eight students received awards for their posters at the MoGen retreat this year, including a tie for first place!

Winners:

Xuefei Yuan (left; Scott & Wilson labs)
Ben Grys (right;

Andrews & Boone labs)

**Honourable mention:**

Tyler Luyben (Okamoto lab)

Alyssa Molinaro (B. Pearson lab)

Fiona Bergin (Okamoto lab)

Minggao Liang (Wilson lab)

Azad Alizada (Wilson lab)

Ernest Radovani (Greenblatt & Hughes labs)

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