

MOGEN NEWS

SUMMER 2024 | ISSUE 22

Welcome to the Summer 2024 edition of MoGeNews!

Dear MoGen Community,

Welcome to the summer edition of MoGen News! We are looking back on a couple of productive months, as you will see from the research and event recaps and the induction of four new faculty members.

Per July 1 there have also been changes in leadership of the Department that we are excited to share with you. Dr. Julie Claycomb is taking over as Vice Chair from Dr. William Navarre, who now fills a new role as mentorship coordinator. Dr. Erin Styles is the new undergraduate coordinator, while former undergraduate coordinator Dr. Rick Collins is now workload coordinator, and Dr. Johanna Carroll will be filling Dr. Styles' former role as the Director of the MHSc Medical Genomics program. We thank Drs. Navarre, Collins and Styles, for their years of service in their former roles, and I wish everyone success in their new roles!

We are excited to welcome three new members to our communications team. Liliana Trajceska will focus on content related to the medical genomics program. Saya Sedighi will handle website content and EDI mission statements and manage social media. Xuefei (Jasmine) Ma will redesign the MoGen webpage for better accessibility.

Special thanks to Liliana Trajceska, Saya Sedighi, Anika Hazra, Marcia Iglesias, and Martina Steiner for contributing to this newsletter.

Share your stories by contacting mogen.news@utoronto.ca.

The Editorial Team

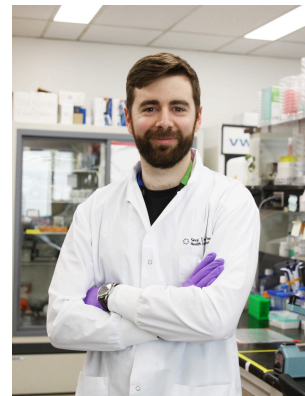


From left to right: Liliana Trajceska, Saya Sedighi, and Jasmine Ma

Featured Story

Interview with MoGen postdoc Dr. Ugo Dionne

Dr. Ugo Dionne, a postdoctoral research fellow in Dr. Anne-Claude Gingras's lab at Lunenfeld Tanenbaum Research Institute (LTRI), discusses his journey through academia, his cancer research on kinase fusions, and the importance of mentorship. [Learn more about his inspiring story.](#)



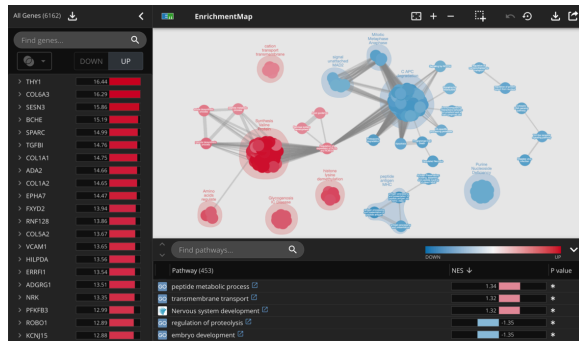
Molecular Genetics Research Highlights

EnrichmentMap:RNA-Seq: The Bader Lab Releases New Pathway Analysis App

The Bader Lab at the University of Toronto releases

[EnrichmentMap:RNA-Seq – a new web-based app](#) that

provides a platform for pathway enrichment analysis for RNA sequencing. As a part of the Cytoscape open-source bioinformatics software platform, the app offers fast and efficient enrichment analysis and visualization. The tool allows users to create visual networks representing their RNA-Seq pathway enrichment analysis results, providing users with easy-to-navigate and informative data figures.



Website screen for EnrichmentMap:RNA-Seq



Soil-dwelling nematodes, such as Meloidogyne Incognita, can cause big trouble for farmers when they parasitize crops. William Wergin And Richard Sayre; colourized by Stephen Ausmus/Wikimedia Commons

MoGen Researchers Introduce Cyprocide: A Novel Bioactivated Nematicide

MoGen researchers led by Professor Peter Roy alongside Professor Leah Cowen, Professor James Dowling, and Professor Igor Stagljar present research in [Nature Communications](#). The study describes the discovery of a bioactivated molecule named Cyprocide, which selectively kills nematodes through bioactivation by nematode enzymes. The newly

discovered nematicide does not kill other organisms, showing that its targeted lethality is selectively due to the enzymes found in a diverse array of nematodes. Considering the over 4000 species of plant-parasitic nematodes existing, this research finding has the potential to protect global food supplies and improve food security.

Smaug Discovered to Play Regulatory Role in Drosophila Embryos

Researchers from the Department of Molecular Genetics at the University of Toronto, led by Drs. Howard Lipshitz, Najeeb Siddiqui, and Angelo Karaiskakis, showcase new research findings about Drosophila embryo regulatory mechanisms in Science Advances. [In the study](#), they observed the post-fertilization role of Smaug RNA binding protein in the early Drosophila embryo. They reveal that Smaug triggers a post-transcriptional regulatory pathway to modulate the number of primordial germ cells by reducing the amount of germplasm in embryos.

Event Recaps

Recap: MoGen's 8th Annual Career Development Alumni Symposium

On June 25, 2024, the Department of Molecular Genetics hosted its 8th Annual Career Development Alumni Symposium at Hart House. The event featured keynote addresses from Dr. Amanda Veri and Dr. Nathan Schachter, engaging roundtables with 26 mentors, and new interactive career activities. [Read more about the event here](#). Thanks to all our volunteers, speakers, and sponsors for making this event a success!



Pictured: Dr. Amanda Veri (left) and Dr. Nathan Schachter (right)



Mentors and Participants engaging in their roundtable discussion.

MoGen Launches NextGen to Boost Science Education

The Department of Molecular Genetics has launched nextGen, an outreach program to engage younger and underrepresented audiences. The program debuted on April 29th at the Division of Teaching Lab (DTL), featuring workshops by graduate students and a lecture from Dr. Martina Steiner.



The logo for MoGen's outreach program.

The Department, in collaboration with Temerty Medicine's STEAM-D program for high school students, hosted program sessions. Grad students from the Research program and MSc Genetic Counselling program also hosted various outreach events showcasing genetics-related activities such as simulated genetic counselling sessions, charting pedigree, and a hands-on experiment to extract DNA from strawberries.

These activities and partnerships with other educational initiatives highlight MoGen's dedication to promoting science in diverse communities.



STEAM-D student cohort with the genetic counselling team volunteers



PhD candidate, Jhenielle Campbell speaking to STEAM-D students about her grad journey.



PhD candidate Ashley Campbell speaks to middle school students in NextGen's program.

In case you missed it

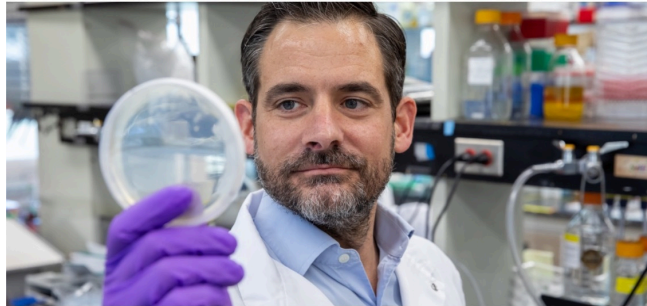


Photo taken from Sinai Health Communications

Novel Identification of Pancreatic Cancer Drivers

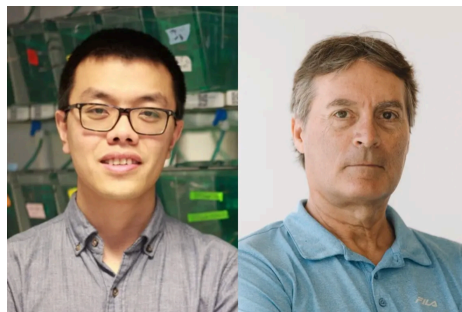
A team of Sinai Health researchers led by MoGen professor Dr. Daniel Schramek, identified two genes that play a role in

pancreatic tumour growth. Using an in vivo CRISPR/Cas9 mutagenesis screening strategy for 125 genes often mutated in pancreatic cancer, USP15 and SCAF1 were determined to be pancreatic tumour suppressors. This study, published in [Nature Communications](#), reveals mutations in these genes increase the likelihood of fast-growing tumour development yet also increase tumour sensitivity toward chemotherapy. Identification of these critical genes has the potential contribute to developing treatment options and improving prognosis for pancreatic cancer patients.

Professor Henry Krause and Research Associate Jiabao Liu discover compounds produced by gut bacteria that can treat inflammation

MoGen researcher associate Jiabao Liu, alongside Professor Henry Krause, presented their [discovery of compounds produced by the gut microbiome in the journal Nature Communications](#).

In this study, the researchers describe the identification of compounds produced by human gut bacteria capable of binding to the constitutive androstane receptor (CAR). CAR is a nuclear receptor which is critical for proper regulatory function, liver metabolism, and intestinal



Pictured: Jiabao Liu (left) and Professor Henry Krause (right)

inflammation. By characterizing a series of compounds that can act as agonists for CAR, the researchers contribute fascinating insights into the roles of CAR in relation to the gut microbiome and the potential for developing disease treatments.



Pictured: Osama Abdin (left) and Professor Philip M. Kim (right)

New PepFlow Peptide Predictor Surpasses Google AI's Predicting Capacity

Researcher Osama Abdin and Professor Philip M. Kim from the Department of Molecular Genetics developed PepFlow - a new deep-learning model which can predict peptide shapes and structures. The AI model uses machine learning in combination with physics to show

the variety of conformations a peptide can show depending on their energy landscape. [The study was published in Nature Machine Intelligence](#) and highlights PepFlow's predicting power, surpassing that of Google AI's protein predictor, AlphaFold. The ability of this new tool to accurately and precisely peptide conformations holds promise for drug development with specifically designed peptides.

Faculty Updates

We are happy to introduce new faculty members to the department. Please find below their names and information on their research:

[Dr. Shu Wang](#) has joined as an Assistant Professor at the Donnelly Centre. Their lab focuses on mathematically understanding biological networks to treat diseases like cancer.

[Dr. John Morris](#) began his role as an Assistant Professor at the Donnelly Centre. His research includes bioinformatics, CRISPR-Cas9, and functional genomics, aiming to solve the variant-to-function (V2F) problem using CRISPR genome editing.

[Dr. Aleksandrina Goeva](#) had assumed the position of Assistant Professor at the Donnelly Centre. Her research interests include machine learning, neuroscience, single-cell transcriptomics, and spatial transcriptomics.

[Dr. Brett Trost](#) had become an Assistant Professor with status-only at the Hospital for Sick Children. His research focuses on computational biology

methods for detecting genetic variation in neurodevelopmental and mental health conditions.

We send our best wishes to **Emeritus Professor Dr. Andrew Spence** as he steps into retirement. We are sincerely grateful for his valuable contributions during his tenure.



Awards

2024 Graduate Faculty Teaching Award for Early Career Excellence in Teaching and Mentorship

Dr. Martina Steiner is the recipient of the 2024 Graduate Faculty Teaching Award for Early Career Excellence in Teaching and Mentorship. She is an Assistant Professor, Teaching Stream in the Department of Molecular Genetics. She co-developed the MHSc in Medical Genomics and led various initiatives in teaching and mentorship. [Read more about the award.](#)

2024 Vanier Canada Graduate Scholarship

Graduate student Esra Erkut is the recipient of the 2024 Vanier Canada Graduate Scholarship. Esra is recognized for her outstanding achievements in the Molecular Genetics program, supported by the Canadian Institutes of Health Research (CIHR).

2024 Connaught Innovation Award

Fourteen researchers at the University of Toronto have been selected to receive the 2023-2024 Connaught Innovation Awards. Among the recipients is MoGen professor Dr. Andrew Fraser. He will be focusing on establishing methods for single-cell metabolomics using hydrogel-embedded barcode aptamers. [These awards](#) aim to recognize the impactful research carried out by each scholar and to facilitate the advancement and commercialization of technologies that have the potential to significantly help society.

GSA Updates

The GSA and MoGen learning strategist Kyle Turner have collaborated to support students through reclassification and qualification exams. They organized a Q&A panel and mock exams for second-year research stream

students pursuing a PhD. The post-exam survey showed positive feedback, with most students feeling well-prepared for the oral exam. Additionally, the June recruitment event, partially organized by the GSA, was successful, with prospective students engaging in Q&A sessions and networking with current MoGen students. [Read more here.](#)

Announcements

MedGen is celebrating 5 cohorts of graduates with a Fireside Chat Video

This firechat video highlights students from each cohort and Program Director Dr. Erin Styles as they explore the professional journeys of MedGen graduates and how the Medical Genomics program has impacted their careers.



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Temerty Faculty of Medicine at University of Toronto

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