

LAY ABSTRACTS

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Presenting Author	
<p>Jennifer Adams (University of Calgary)</p> <p>Co-authors: Juliet Daniel, Loydie A. Jerome-Majewska, Maydianne Andrade, Evelyn Asiedu, Shams Quader, Anais Ouedraogo, Drew Burchell and Tamara A. Franz-Oodendaal</p>	<p>The experiences of Black Canadian trainees in STEMM (science, technology, engineering, math and medicine)</p> <p>Diversity is important for scientific creativity and innovation. However, research has also revealed that Black students pursuing STEMM face systemic challenges, including microaggressions, cultures of whiteness and lack of mentorship. Through survey and semi-structured interviews, this national study seeks to understand the barriers – perceived and direct – that Black-identifying trainees face in their STEMM education curriculum and training in Canada.</p>
<p>Paul Adamu (Concordia University)</p> <p>Co-authors: Chunyan Lai</p>	<p>Intelligent motor drive for improved electric vehicle performance</p> <p>Electric motors operate better with motor drives. Over time, numerous types of motor drives have controlled different electric motors. Recent technological advances and the increased use of electric motors require smarter motor drives. For motors to perform as efficiently as possible, drives must include control algorithms that adjust torque and speed. Artificial Intelligence (AI) could design a controller that senses optimal motor settings. This study aims to increase EV traction motor dependability and performance (Electric Vehicles). Considered electric motor drive system uses AI for condition monitoring and vector control. Permanent magnet synchronous motor (PMSM) and brushless DC (BLDC) motors are being explored as case studies for EV traction. The discovery could be used to improve EV traction motors, fix electric train difficulties, and industrial automation systems that utilize comparable motors.</p>
<p>Hanad Adan (McMaster University)</p> <p>Co-authors: Lindyann Lessey, Blessing Basse-Archibong, Juliet M. Daniel</p>	<p>Elucidating the Role of Kaiso and TGF-Beta Signaling in Triple Negative Breast Cancer (TNBC) Progression and Metastasis</p> <p>Triple-negative breast cancer (TNBC) is a highly aggressive breast cancer subtype that is difficult to treat. Although it only accounts for 13% of all breast cancer cases, TNBC is responsible for 40% of all breast cancer-related deaths. This is partially due to the lack of effective therapies, limiting treatment options for patients. Over the years, a protein named Kaiso has been increasingly linked to the aggressive nature and poor survival outcomes of various cancers, including TNBC. However, the process by which Kaiso contributes to TNBC development is not well understood. We have data showing that Kaiso interacts</p>

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	with another protein implicated in breast cancer, and that they Kalso work together to promote TNBC progression and metastasis.
<p>Jeanette Adjei (Western University)</p> <p>Co-authors: Paul J. Ragogna, Michael A. Kerr</p>	<p>Finding Radical Ways to Synthesize Phosphorus Containing Molecules</p> <p>The field of catalysis is a growing and thriving field. Catalysts are relied upon to perform powerful and energy efficient chemical reactions, and as a result these compounds are regularly used in academia and the chemical industries. Organophosphorus ligands can be incorporated in catalysts and currently many chemists are investigating efficient ways to synthesize these ligands. An atom economical method to generate organophosphines is through the hydrophosphination reaction (P-H bond addition). A P-H bond addition is a reaction in which a phosphorus-hydrogen bond is formally added to an unsaturated hydrocarbon (alkene/olefin or alkyne) to give a phosphorus-carbon bond. This reaction is performed using radical initiators with either heat or light and little to no by-products are formed. This lightening talk will focus on my PhD work which incorporates the hydrophosphination reaction, the potential applications of the organophosphines I have/will synthesize and the importance of my work.</p>
<p>Marishia Agard (York University)</p> <p>Co-authors: Jean-Paul Paluzzi</p>	<p>Examining the physiological role of tachykinins on the drosophila melanogaster malpighian 'renal' tubules</p> <p>The excretory organs in insects are often studied because they are functionally analogous to the vertebrate kidney. The excretory organs in the fruit fly, <i>Drosophila melanogaster</i>, are regulated by hormones that modulate excretion. In the present study, we utilized molecular, genetic, and physiological methods to examine the role of the neuropeptides, <i>Drosophila</i> tachykinins (DTKs), and their receptor (DTKR) in the adult fruit fly renal organs. Notably, this study establishes that DTK is a diuretic hormone that interacts with DTKR in the renal organs to promote excretion by increasing ion and fluid transport. This research uncovers DTKs as a novel class of diuretic hormones that act on the insect renal organs to trigger primary urine formation that is essential for the organism to maintain hydromineral balance.</p>
<p>Hammed Akande (Concordia University)</p>	<p>Climate change impacts on the distribution of endangered grey parrot (<i>Psittacus erithacus</i>); a modeling approach</p> <p>Africa is an important hotspot for tropical biodiversity and contains diverse fauna and flora species. With the emerging threats from climate change, understanding how African biodiversity will respond to changing environmental conditions is vital to facilitate proactive measures in mitigating adverse environmental hazards. While efforts have been made across many regions to model species distribution across varying spatial and temporal scales, few studies have assessed the potential distribution of climate change on African biodiversity. In addition, few studies have assessed the impacts of this stressor on the distribution of some vulnerable species across continental Africa. Using predictive models, this research assessed the current distribution of the grey parrot (<i>Psittacus erithacus</i>) and predict the potential effects of climate on this endangered species in Africa. Specifically, this study assessed how climate change drives species range shifts and the impact of abiotic factors on species community composition.</p>

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<p>Ayomide Akande (University of British Columbia, Vancouver)</p> <p>Co-authors: Nadine Borduas-Dedekind</p>	<p>Ozonolysis of cashmeran: kinetics, products, and particle formation</p> <p>The widespread use of fragrance compounds in personal care products makes their presence ubiquitous in the environment. They have been found in aquatic systems, air, and humans. Most personal products are used indoors where humans spend ~90% of their lives hence understanding the chemical behaviour of these compounds indoors would improve our understanding of human's total chemical exposure.</p> <p>We investigate the behaviour of cashmeran, a semi-volatile musk-smelling fragrance used mostly in perfumes. We found that cashmeran has a relatively long lifetime and is likely to linger long in the atmosphere in the presence of ozone. We also found that the reaction of cashmeran with ozone leads to uncharacterized products and particle formation. There are multiple human exposure routes: dermal exposure and inhalation because perfumes are applied close to the skin, dietary ingestion since it is found in aquatic organisms, and dust ingestion as it can partition into the particle phase.</p>
<p>Catalina Albury (Statistics Canada)</p> <p>Co-authors: Brittany Vongdara, Shamir Kanji, Martin Nicholas</p>	<p>Exploring career stagnation in employment equity groups amongst Canadian public servants</p> <p>Public service sectors aim to represent the interests of a country's population in policy and decision making and should therefore act as leaders in racial equity in employment. However, historically, the Canadian federal government has analyzed racial employment equity through the lens of the "visible minority" classification, meaning that all self-identified non-caucasian employees' data is analyzed as a whole, with no distinction amongst subgroups. The Treasury Board of Canada recently released disaggregated salary data for public servants, which we analyzed to investigate inequities in salary distribution. We found that while non-visible minority employees were typically equally distributed among salary categories, Black employees were over-represented at the lowest and underrepresented at the highest salary ranges. The clear disadvantage in career progression amongst Black public servants must be resolved with a strategic plan to identify structural and systemic barriers and improve retention and success to levels achieved by their non-racialized peers.</p>
<p>Emmanuel Alimo (University of Alberta)</p>	<p>Antibody affinity modification in the gut of zebrafish</p> <p>For a long time, the process of Antibody Affinity Maturation (AAM) has been poorly understood in humans with autoimmune diseases. However, recent studies indicate that sites of affinity maturation in autoimmune individuals occurs in sites outside of the known germinal centers and these areas where the autoantibodies produced by B-cells affinity mature may be analogous to Melanomacrophage Clusters (MMCs) in early vertebrates. This study will provide more insight into where these MMCs may be located in the gut of early vertebrates, like Zebrafish and this will not only have implications on vaccine use in aquaculture, but also help us better understand antibody affinity maturation processes in autoimmune disorders.</p>
<p>Isaac Antwi (Yale University)</p>	<p>Chiral phosphoric acid mediated site-selective functionalization of glycopeptides</p> <p>Chemical strategies for scaffold diversification are gaining momentum as a means to generate library synthesis of bioactive molecules with optimized properties. Under the banners of "semi-synthesis," "scaffold remodeling," "late-stage</p>

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<p>Co-authors: Scott J. Miller</p>	<p>functionalization,” or “scaffold editing,” this activity is challenging for scientists wishing to develop efficient reactions in structurally complicated molecular environments. Daunting challenges exist that involve numerous unwanted reactions, often in the context of poor site, regio- or chemo-selectivity, and stereoselectivity in its many forms. When catalysis is applied to scaffold diversification, most often a singular catalyst platform is developed to achieve a singular type of chemical transformation and catalyst-defined loci within a molecule with many candidate reactive sites.</p>
<p>Tracy Alice Apienti Co-authors: Tamara Franz-Odenaal</p>	<p>Understanding early skeletal development in the embryonic eye of precocial birds</p> <p>The skeleton provides an essential scaffold to the vertebrate body. Birds, for example, depend heavily on their skeleton for support during locomotion (flight and walking). The skeleton in the eyes of birds may play a role in vision. In order to assess this, we analysed the development of this skeleton in birds that can feed and walk on hatching (i.e. in precocial birds). We analysed the timing of the formation of ocular skeleton in three different precocial bird species (chicken (<i>Gallus gallus</i>), quail (<i>Coturnix japonica</i>), and duck (<i>Anas platyrhynchos</i>). To perform this experiment, we used wholemount skeletal preparations, histology, and microscopy. We found that the structures of the ocular skeleton develop prior to hatching in all three birds. More research work needs to be performed to examine the ocular skeleton in birds that are less independent on hatching (altricial birds).</p>
<p>Olayinka Arimoro (University of Calgary) Co-authors: Colin Josephson, Samuel Wiebe, Scott Patten, Lisa Lix, Tolulope Sajobi</p>	<p>Depression in epilepsy: Same questions, but different meanings to different people</p> <p>Patient-reported outcome measures (PROMs) are multi-item instruments used to elicit patients' appraisal of their health status, disease symptoms, and quality of life. PROMs can enhance effective communication between care providers and patients. The validity of PROMs can be threatened by heterogeneity in how patients with the same underlying health status interpret questions about their health, a phenomenon widely known as differential item functioning (DIF). Failure to account for DIF may lead to making inaccurate interpretations and conclusions of PROM scores, leading to inappropriate treatment decisions and disparity of access to health services. This research aims to identify subgroups of people with epilepsy responding differently to depression PROMs using a tree-based item response theory model. This research will help understand variations in how patients self-report their health status and quality of life and its implications for selecting optimal treatment strategies and delivering personalized care to people with epilepsy living with depression.</p>
<p>Ifeoluwa O. Awogbindin (University of Victoria; University of Ibadan, Nigeria) Co-authors:</p>	<p>Neurotoxicity of furan in juvenile wistar rats involves behavioural defects, microgliosis, astrogliosis and oxidative stress</p> <p>Furan is a widespread contaminant of health concern found in coffee, infant's ready-to-eat meals and gasoline/diesel engine exhaust. There is a small margin between exposure and experimental doses which cause hepatocarcinoma in rats, but outcomes of exposure are ill-defined in the brain. We investigated behaviour, reactivity of first responders (microglia and astrocyte) protecting the brain, and protective biochemical antioxidant response across striatum, cerebellum, hippocampus, pre-frontal cortex and hypothalamus of juvenile rats treated with furan for 4 weeks. Furan administration resulted in</p>

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<p>Cynthia Nwamaka Ikeji, Isaac A. Adedara, Ebenezer O. Farombi</p>	<p>hyperactivity at low doses together with lack of coordination at high doses in rats. These rats also have impaired working memory. Microglia over-reacted and aggregated in what appeared like ingestion of yet-to-be determined materials. Cellular apparatuses that metabolize furan and protect the brain from associated damage were depleted most in the striatum. Our findings suggest that furan poses a risk to brain health and calls for comprehensive investigation.</p>
<p>Olakunle Betiku (University of Waterloo)</p> <p>Co-authors: Elliot Biro</p>	<p>Metallurgical pathways to improve mechanical performance and vehicle crashworthiness</p> <p>The need to safely reduce the weight of vehicles as well as improve passengers' safety has been of interest in the automotive industry. Weight reduction will make cars more fuel efficient and reduce the emission of CO2 to the environment. Hence, car manufacturers have adopted the use of advanced high-strength steels (AHSS) in a vehicle body structure. These AHSS are lighter and provide higher strength compared to conventional steels. However, welds of AHSS are brittle and show poor resistance to impact during crash events. This research employs various techniques to improve the performance of AHSS welds in-service. The improved performance of the weld will result in enhanced vehicle crashworthiness-that is the capability of a car structure to provide adequate protection to its passengers against injuries in the event of a crash.</p>
<p>Ayooluwa Bolaji (Public Health Agency of Canada, National Microbiology Laboratory)</p>	<p>In silico analysis identifies sequence contamination threshold for nanopore generated SARS-CoV-2 whole genome sequences</p> <p>The current pandemic has increased public awareness of genomic sequencing as diagnostic and surveillance decisions have been aided by the quick turnaround of genomic data. Large-scale genomic comparisons provide a wealth of knowledge, including modes of transmission, rates of evolution, and the impact of mutations on infection, disease severity, and treatment effectiveness. As a result, the public release of genomic data has proven to be crucial. The pandemic's scope has prevented many sequencing runs from being repeated, resulting in some imperfect runs being uploaded to public repositories. When genomic data is contaminated, both scientific decisions/studies and public health measures may be compromised. To identify a genome contamination threshold for SARS-CoV-2 sequences generated by Nanopore sequencing, computational biology techniques were utilized. Together, these novel results will make it possible for some flawed runs to be considered reliable for reporting findings to stakeholders, thereby minimizing the need for repeat runs.</p>
<p>Craige Boyd (Ontario Tech University)</p>	<p>"Hot particle" dosimetry using a wall-less tissue equivalent proportional counter</p> <p>Understanding the impact of "hot particles" likely released into the environment by a severe accident from a nuclear power plant requires the measurement of absorbed doses as well as other appropriate radiation factors. In this work, an apparatus was built to explore the impact of these particles and to examine whether biological changes will occur at various depths at the dimension of a few cells in tissue. Hot particles typically emit beta particle radiation that have limited ranges in tissue depending on the energy of the radionuclide. Dose gradients are likely to be steep making measurements difficult with conventional measuring devices. In contamination scenarios to workers, dose measurements are considered a difficult</p>

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	<p>undertaking. Through experimental measurements and computer modelling several values for dose at various source to target distances were determined.</p>
<p>Jonathan Burnie (University of Toronto Scarborough) Co-authors: Christina Guzzo</p>	<p>Screening the surface of HIV for cellular proteins using novel methods in flow virometry</p> <p>Characterizing proteins on the surface of virus particles is critical since they can dictate where the virus spreads in the body and how infectious it is. While the virus, HIV, is known to contain a wide range of cellular proteins on its surface, many of them remain uncharacterized. Previous attempts to screen HIV for cellular proteins have relied on techniques which assess the average of virus preparations (i.e., western blot). While informative, these techniques lack the ability to provide detail about single virus particles. Herein, we discuss the adaptation of a novel flow cytometry-based method (flow virometry) for screening the surface of viruses in a high throughput manner which can provide reliable single particle analysis. We show this technique can identify new proteins on the viral surface and reliably detect proteins at low levels, highlighting its potential for diagnostic use.</p>
<p>Lucy Campbell (Carleton University)</p>	<p>Mathematical studies of vortex Rossby waves in tropical cyclones</p> <p>Vortex Rossby waves occur in the atmosphere in the form of outward-propagating disturbances within cyclonic vortices such as hurricanes. They result from the force due to the radial gradient of the vorticity of the cyclone. In this presentation I will describe a mathematical formulation for vortex Rossby waves based on the conservation laws of physics. Mathematical analyses and numerical solutions of the wave equations give some insight into the development and structure of vortex Rossby waves; this is important for accurate models and forecasts of tropical cyclones.</p>
<p>Taylor Cargill</p>	<p>The coordination of COVID-19 decisions across Canadian post-secondary schools</p>

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<p>(York University)</p> <p>Co-authors: Haleema Ahmed, Nicola Bragazzi, Jude Kong</p>	<p>During the initial year of the COVID-19 pandemic in 2020, Canadian post-secondary schools were tasked with making important decisions to help mitigate disease spread while supporting their campus communities. Investigating the coordination of COVID-19 responses across the Canadian post-secondary sector can open the door to a better understanding of how sociodemographic contexts influenced schools' COVID-19 decision-making. This study provides the first dataset with timing information for characterizing the Canadian post-secondary response to COVID-19. It captures the status and timing of 17 key non-pharmaceutical interventions and community support measures for 122 Canadian institutions. Insights from such data can serve as a useful tool to inform policymakers, and can lead to more effective responses in the face of future pandemic scenarios.</p>
<p>Trevor Charles (University of Waterloo / Metagenome Bio Life Science Inc.)</p> <p>Co-authors: Patricia Quadros, Rebecca Co, JiuJun Cheng, Michael Lynch</p>	<p>Improving the microbiome in hydroponic vegetable production</p> <p>In Canada, about half of the vegetables grown are produced without soil, in greenhouses, indoor or vertical farms. This type of farming, using hydroponic methods to distribute nutrients to the plants, is called Controlled Environment Agriculture (CEA). Microbiome surveillance and improvement in CEA has the potential to increase crop yield and quality. We have performed a genomic characterization of microbial communities in commercial hydroponic systems. This information can be used by the grower to identify the presence of disease-causing microbes before they cause a problem. We also isolate and characterize beneficial microbes from hydroponic systems, and use them to develop inoculant products.</p>
<p>Emily Choy (McGill University)</p> <p>Co-authors: Louise Blight, John Elliott, Keith Hobson, Michelle Zanuttig, Kyle Elliott</p>	<p>Stable mercury trends in salish sea glaucous-wing gulls support a long-term prey shift over the last century</p> <p>The Salish Sea is one of the most disturbed ecosystems in the world, and its seabirds are monitored as indicators of pollution and marine ecosystem health. Glaucous-winged gulls (<i>Larus glaucescens</i>) have experienced a dietary shift over the past century, from mainly marine to more terrestrial food sources, with unknown impacts on trends in contaminants. Methylmercury (MeHg) is the most toxic form of mercury (Hg), a global pollutant. We examined an over 100-year trend in total mercury (THg) and MeHg concentrations in glaucous-winged gull feathers from the Salish Sea. Overall, we found no evidence of a trend in MeHg or THg concentration in several types of gull feathers from 1887 to 1996, despite increases in Hg concentrations in the Pacific Ocean. Overall, our results support that a long term change in diet affected trends in Hg in gulls over time.</p>
<p>Eugenia Dadzie (University of Waterloo)</p>	<p>Microbes and enzymes: sustainable plastic degradation</p> <p>Since their introduction, plastics have grown to become indispensable in modern society. Ironically, the very traits which make them advantageous for daily use also threaten the planet's sustainability: they are chemically unreactive and recalcitrant to degradation. The result of this is an accumulation of plastic waste, which contaminates terrestrial and aquatic</p>

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	<p>ecosystems. Current methods for plastic waste elimination (landfill, incineration, and recycling) also pose threats to the environment, thus recent research efforts have focused on the potential of biological systems to degrade plastics. In this regard, certain microbes have been identified to produce enzymes capable of breaking apart the long carbon chains of plastics into shorter ones. This process, however, is slow and currently not practical for real-time industrial applications. In this project, we will identify and characterize novel microbes and enzymes involved in the degradation of plastics, and alter them for more efficient activity.</p>
<p>Cherif Ibrahima Khalil Diop (University of Burgos)</p> <p>Co-authors: Sagrario Beltran, Maria-Teresa Sanz</p>	<p>Subcritical water, a cleaner nanosizing technique to simultaneously enhance sustainability and circularity of nanocellulose manufacturing</p> <p>More sustainable cellulose nanocrystal (CNC) manufacturing strategies using dilute acid hydrolysis and solid acid-assisted ultrasound and pressurized hydrothermal process have been proposed. Diluting sulfuric acid catalyst at a rate of 3% was sufficient to extract more thermostable CNC from cellulose at a yield of $18 \pm 3\%$ using the self-ionization potential of water in subcritical conditions. On the other hand, when subjected to ultrasound cavitation followed by pressurized hydrothermal hydrolysis, maleic acid (50%) hydrolysis resulted in higher CNC yield ($30 \pm 2\%$). The isolated CNC displayed rod-like particles in the range of 50 to 500 nm. This study aims to demonstrate greener processes as an alternative to the conventional high sulfuric acid route (nearly 90–100 kg of sulfuric acid consumed per kg of CNC), which engender environmental and technical drawbacks. The recovery, recycling, and reuse of the solid maleic acid significantly increased the circularity of the manufacturing processes.</p>
<p>Kafi Ealey (The Hospital for Sick Children Research Institute)</p> <p>Co-authors: Jacques Togo, Hoon-Ki Sung</p>	<p>Rejuvenation of immunosenescent phenotypes in aged adipose tissue by intermittent fasting</p> <p>The process of aging is a major risk factor for a number of chronic diseases. Cellular senescence (biological aging) within fat tissues, particularly in progenitor stem cells, which are important for healthy expansion of fat tissue, is associated with whole-body inflammation and insulin resistance. Intermittent fasting (IF), a dietary intervention incorporating periodic cycles of fasting, has gained popularity recently as it has been reported to promote weight loss and improve glucose intolerance and insulin resistance in both mice and humans. However, few studies have assessed the role of IF on metabolic dysfunction and cellular senescence in aged populations. We found that in aged mice, IF rejuvenated fat stem cells, and reduced senescence, aging-induced fibrosis and inflammation. These findings suggest that IF may be a feasible lifestyle regimen to reverse cellular senescence which could result in attenuation of downstream aging-induced pathologies.</p>
<p>Yasmine Elmi (McGill University)</p> <p>Co-authors: Anne Cockcroft</p>	<p>The transformative impact on adolescents in bauchi state nigeria of making cellphilm about their sexual and reproductive health</p> <p>The reproductive and sexual health of youth is vulnerable in sub-Saharan Africa. Many programs aimed to improve their health implemented in low- and middle-income countries are ineffective. They rarely include adolescents themselves in designing and implementing interventions. A 5-year participatory research project in Bauchi State, northern Nigeria, tests the impact of a dialogic intervention engaging adolescents in discussing locally identified threats to ASRH and seeking solutions. The project uses the cellphilm method where adolescents use a smartphone to create a 1–5-minute video on a certain topic.</p>

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	<p>My specific research project focuses on the transformative impact that creating the cellphilms has on adolescents. I will measure the impact of creating cellphilms on the self-esteem and social capital of adolescents, explore the perceived experience of adolescents who make cellphilms and explore the themes emerging in cellphilms. My project will make an important contribution to this cutting-edge research into participatory methods.</p>
<p>Meea Fogal (University of Guelph)</p> <p>Co-authors: Nicholas C Gervais, Lauren Wensing, Rebecca S Shapiro</p>	<p>Optimizing crispr-based transcriptional gene regulation tools for <i>c. albicans</i></p> <p>Fungi are a diverse group of organisms with profound impacts on human life. Many fungal species are normally harmless to humans. However, under certain circumstances some fungal species, such as <i>Candida albicans</i>, can cause severe infections. Treating <i>C. albicans</i> infections is challenging due to a limited repertoire of antifungal drugs available with low human toxicity and a recent increase in antifungal drug resistance. Thus, it is important that we study <i>C. albicans</i> to better understand the fundamental mechanisms by which they can survive in the presence of antifungal drugs. We propose using a genetic engineering tool, called CRISPR interference (CRISPRi) to do this. CRISPRi physically interferes with genes to repress their expression to low levels. This tool has yet to be optimized for use in <i>C. albicans</i>. We aimed to optimize experimental conditions to achieve maximum and regulatable repression tool to study all genes in the <i>C. albicans</i> genome.</p>
<p>Akeem Gardner (Canurta Inc)</p> <p>Co-authors: Jennifer Holborn, Colby Perrin, Begüm Alural, Cara Aitchison, Adina Borenstein, Tariq A. Akhtar, Jasmin Lalonde</p>	<p>Targeting glioblastoma invasion and survival with cannabis-derived flavonoids</p> <p>The cannabis plant contains novel molecules that aren't CBD and THC that can have therapeutic effect. Canurta Inc, a Black-lead biotechnology company, is leveraging unique intellectual property to develop these rare molecules and create a platform of novel and safe therapeutics important for human and animal health.</p>
<p>Kimberley D. Gauthier (Cell Biology Program, The Hospital for Sick Children)</p> <p>Co-authors: Julie A. Brill</p>	<p>Sac1, a PI4P phosphatase, maintains epithelial integrity during <i>Drosophila</i> dorsal closure</p> <p>During development, epithelial tissues need to fuse and seal together to form a single seamless layer of cells. This process drives wound healing, and dysregulation can lead to developmental anomalies such as cleft palates and neural tube defects, often with no known cause. Epithelial sealing occurs during embryonic development of a fruit fly model organism in a process called dorsal closure, in which the epidermis wraps around the developing embryo, covering the underlying tissue and zippering shut along the dorsal midline. Here, I present the role of Sac1, an enzyme that changes the chemical properties of lipid molecules in cell membranes, during dorsal closure. I found that Sac1 is needed for the integrity of embryonic tissues to facilitate normal epithelial sealing. My research reveals a novel role for Sac1 and lipid homeostasis during embryogenesis and tissue development.</p>

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<p>Maya George (McMaster University)</p> <p>Co-authors: Gerry Wright</p>	<p>Using a prefractionation approach to unveil the true biosynthetic potential of soil bacteria for antimycobacterial drug discovery</p> <p>Tuberculosis is a highly infectious disease caused by the bacterium <i>Mycobacterium tuberculosis</i>. Tuberculosis affects 1.7 billion people, ~23% of the world's population. Currently, treatment options for tuberculosis are limited due to the increase in antibiotic resistance, resulting in a dire need for new antibiotics targeting this disease. Bacteria naturally produce antibiotics as a source of protection; therefore, in this project, we tested 138 bacterial soil samples retrieved worldwide to find new compounds to treat tuberculosis infection. We used a prefractionation method, separating bacterial and fungal extracts into less condensed samples before testing for antibiotic activity. This approach ensures that known compounds do not conceal the activities of unique compounds, which can occur in crude samples. This project identifies a way to find new compounds in bacteria that scientists have already examined. After discovering these compounds, more studies can be conducted to determine their suitability as a drug for clinical use.</p>
<p>Linda Gorim (University of Alberta)</p> <p>Co-authors: Maryse Bourgault and Yvonne Lawley</p>	<p>Making cover crops work with grain cropping in the Canadian Prairies</p> <p>Trials are conducted at three sites, one in each prairie province to assess the impact of different cover crop establishment timing on wheat and canola yields. First year results show that successful cover crop establishment is dependent on location, cover crop species and may or may not have an impact on grain yield.</p>
<p>Alannah Grant (University of Guelph)</p>	<p>City living: the influence of urban stress on early rates of neurogenesis in eastern grey squirrels</p> <p>Currently, the urban landscape is the fastest growing habitat type on the planet, meaning more often than ever wildlife in these areas are faced with the challenges and stressors that come with a city life. One common city slicker is the Eastern Grey Squirrel (<i>Sciurus carolinensis</i>), a species that has been widely successful in both urban and natural landscapes; making them an excellent model to study the effects of urban landscapes and the physiological trade-offs urban wildlife may face. Grey squirrels are characteristically known for their ability to hide food and find it later, a skill especially dependent on spatial memory. If urban areas represent a source of stress, this may hold consequences for the development, memory and inevitably, survival of urban populations. Our current study aims to uncover the effects of urban stress on grey squirrel development and physiology to better understand the impact of anthropogenic landscapes.</p>
<p>Jeffrey Hyacinthe (McGill University)</p>	<p>Transposable elements regulate cell function through cell type specific epigenome associations</p> <p>"Transposable elements (TEs) are DNA elements that have long been elusive due to the complexity of their analysis. Indeed, transposable elements can copy themselves within the genome which make them harder to assess. Furthermore, they are</p>

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<p>Co-authors: Guillaume Bourque</p>	<p>mostly silenced so that they do not spread within our genome. Yet, they still have a noticeable impact on host genome in numerous contexts. Clearly, something is missing. In order to better understand these troublesome elements, a comprehensive analysis of TEs with histone marks across cell types proved necessary. We analysed the TEs found in a large epigenomic dataset and show that TEs have drastically different enrichments levels in different histone marks and that the TE enrichments can be cell type specific. These results further support the importance of TEs in genome regulation while providing a comprehensive profile of TEs across cell types and histone marks."</p>
<p>Adisa Julien (Toronto Metropolitan University)</p> <p>Co-authors: Dr. Stephanie Melles</p>	<p>Headwaters to outlets: bird species accrual curves are faster downstream with different implications for varying landcovers and ecoregion</p> <p>Land based and freshwater ecological studies are usually conducted separately, thereby potentially omitting a large amount of ecological information. Although some studies investigate the effect of terrestrial systems on neighboring aquatic species, additional work is required to explore the effect of flowing freshwater systems on terrestrial species. Using Species Accumulation Curves (SACs) created by comparing the number of species observed with the number of sites sampled, we evaluated the variation in species accrual and richness with changing watershed position and underlying landcover. Using data from the Ontario Breeding Bird Atlas (2001-2005), we created bird SACs to explore how species diversity varied with watershed position on the Canadian side of the Great Lakes Basin (GLB). This work shows that rates of species accrual and potential maximum species richness vary as a function of watershed position, underlying land cover, and the Ecoregion in which sampling was performed.</p>
<p>Sandra Klemet-N'Guessan (Trent University)</p> <p>Co-authors: Kevin O. Obiero, Ajode Z. Migenic Alfred O. Achieng</p>	<p>Bridging Indigenous and non-Indigenous knowledge systems and practices for sustainable management of aquatic resources from East to West Africa</p> <p>In Africa, where most people would be considered Indigenous, at least to the region, the supposed superiority of inherited colonial system continues to be perpetuated. Yet, most African populations still rely heavily on Indigenous knowledge systems (IKS) for spirituality, resources, and natural disaster prediction, mitigation, and adaptation strategies. Aquatic ecosystems are ripe for such knowledge. Here, we show that IKS in aquatic resource use and management from East to West Africa is rooted in deep cultural and spiritual relationships with their environment that can inform activities such as fishing, plant harvesting, or early warning weather signals. Today, these knowledge systems are threatened by erosion and little to no consideration in aquatic resource research, education, management, and policy. We argue that a knowledge co-production approach, with African Indigenous and non-Indigenous knowledge systems paired, may help in providing more meaningful and effective solutions to the challenges faced by our aquatic ecosystems.</p>
<p>Sundiata Kly (University of Victoria)</p> <p>Co-authors:</p>	<p>Packaging gold nanoparticles in polymeric nanocarriers for increased cellular uptake.</p> <p>To maximize the effectiveness of gold nanoparticle (GNP) formulations, the following considerations should be addressed. GNPs must remain stable in plasma and the extracellular environment while travelling to their destination insofar as, for example, interactions with fibrinogen and thrombin in the blood can cause coagulation of human blood. This means that</p>

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<p>Yuhang Huang, Matthew Moffitt</p>	<p>proper GNP dimensions and stabilizing ligands should be selected to avoid coagulation with blood proteins, salt induced aggregation of GNPs, or toxicity from accumulation in undesired locations. In this work, we combine a two-step assembly strategy with flow-variable microfluidic mixing to produce polymer nanoparticles (PNPs) containing multiple GNPs encapsulated within them. The step-wise process generates structural hierarchy using commercially available polymer materials, without the need for complex synthetic methodologies and is applicable to GNPs of different shapes. Our polymer-gold nanoparticle assemblies provide several benefits beyond what is achievable with functionalizing GNPs directly with polymers or small molecules.</p>
<p>Angela Kross (Concordia University)</p> <p>Co-authors: Gurpreet Kaur, Jochen A. G. Jaeger</p>	<p>A geospatial framework for the assessment and monitoring of environmental impacts of agriculture</p> <p>The agriculture sector plays a critical role in global food security and economy, but it is also among the greatest contributors to environmental degradation and global warming through practices such as clearing of forests and wetlands, water management, and use of fertilizers and pesticides. This study proposes a geospatial framework for the systematic assessment and monitoring of environmental impacts of agriculture practices using agri-environmental impact indicators and the environmental impact assessment (EIA) method. Geospatial approaches are identified and synthesized for four key phases of the EIA method: (1) screening; (2) scoping; (3) impact prediction & assessment; and (4) impact management, monitoring & follow up. The study shows the potential of remote sensing and geospatial methods such as mapping, geostatistical interpolation, spectral indices, image classification, multi-criteria decision analysis, and GIS watershed analysis for the different EIA phases.</p>
<p>Ramona Kyabaggu (University of Regina)</p>	<p>The CHIA Project: Extended Reality, Intercultural Communication, and the Future of Healthcare in the Metaverse</p> <p>The agriculture sector plays a critical role in global food security and economy, but it is also among the greatest contributors to environmental degradation and global warming through practices such as clearing of forests and wetlands, water management, and use of fertilizers and pesticides. This study proposes a geospatial framework for the systematic assessment and monitoring of environmental impacts of agriculture practices using agri-environmental impact indicators and the environmental impact assessment (EIA) method. Geospatial approaches are identified and synthesized for four key phases of the EIA method: (1) screening; (2) scoping; (3) impact prediction & assessment; and (4) impact management, monitoring & follow up. The study shows the potential of remote sensing and geospatial methods such as mapping, geostatistical interpolation, spectral indices, image classification, multi-criteria decision analysis, and GIS watershed analysis for the different EIA phases.</p>
<p>Gym Clerc Lentsolo Yalli (Université de Laval)</p> <p>Co-authors: Veronic Landry, Anna Ritcey</p>	<p>Synthèse de nanolatex pénétrants pour le développement des teintures durables pour le bois exposé aux intempéries</p> <p>Le bois utilisé à l'extérieur est sensible aux intempéries. Il doit donc être protégé avec un revêtement adéquat. Les revêtements utilisés présentement ont une durée de vie limitée et des propriétés insatisfaisantes. Une perte d'adhésion du revêtement au bois est constatée, et liée au manque de flexibilité et de pénétration de l'agent liant qui le compose. Il est bien connu que les propriétés de cet agent liant (sa taille, son poids, etc.) ont une incidence sur sa capacité de pénétration et donc</p>

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	<p>sur l'adhérence durable. Au cours de nos travaux nous avons procédé à la préparation d'agent liants de petites tailles afin d'évaluer leur capacité de pénétration ainsi que leur incidence sur l'adhérence durable.</p>
<p>Lindyann R. Lessey (McMaster University)</p> <p>Co-authors: Roopali Chaudhary, Robert Cowan, Juliet M. Daniel</p>	<p>The opposing roles of Kaiso and p120^{ctn} in intestinal diseases</p> <p>Inflammatory bowel disease (IBD) is characterized by chronic inflammation of the intestinal tract. Patients with IBD have an ~2 times greater chance of developing a colon cancer subtype that is associated with intestinal inflammation. The protein Kaiso has been implicated in the development of intestinal inflammation and cancer through its regulation of other proteins that function within these processes. Kaiso's inhibitor, the p120^{ctn} protein, has been shown to protect against intestinal inflammation and carcinogenesis. This study aims to examine the opposing roles of Kaiso and p120^{ctn} in intestinal tissues to determine their roles in inflammatory bowel disease and the progression to colon cancer. Findings from this study would help shed light on the complex roles of both Kaiso and p120^{ctn} in intestinal diseases.</p>
<p>Ainsely Lewis (Trent University)</p>	<p>Using metabolomics approaches to tackle the issue of Canadian food security</p> <p>Humans need a steady, stable food supply for a healthy population. The reality is, environmental stressors such as drought, and floods, all impacted by climate change wreak havoc on the agricultural industry, and reduce output. We also need to double our food production by 2050. We also need to understand how plant adapt to environmental stress in order to produce resilient crops. Metabolomics is an area looking on plant compounds and give cues on plant adaptation.</p>
<p>Delano Lewis (Burman University)</p>	<p>Counting Butterflies! Are you serious?</p> <p>Butterfly counts create a simple way to monitor biodiversity trends. Citizens can participate in butterfly counts, positively contributing to worldwide model citizen science.</p>
<p>Tyra Lewis (Trent University)</p> <p>Co-authors: Erin Giroux, Sanela Martic</p>	<p>Optical aptasensor for rapid detection of COVID-19 antigens</p> <p>During the COVID-19 pandemic, nucleic acid and antibody-based testing methods were heavily relied upon, but can be costly, time-consuming and exhibit high false -negative and -positive rates. Thus, alternative strategies are needed. Viral antigens are critical in the function of the virus and useful for identification of viral infections. Aptamers are suitable high-affinity and cost-effective binding partners for targets such as antigens. Using localized surface plasmon resonance (LSPR), real-time, rapid acquisition of results can be achieved, which is essential for improving the efficacy of testing. Herein, an LSPR aptamer-based test was fabricated for the detection of SARS-CoV-2 antigens. The S1 aptamer bound the S1 antigen with high binding affinity. Excellent shelf-life stability, reusability, and high recovery in complex matrices was also maintained. Overall, LSPR has been</p>

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	demonstrated as a viable tool for measuring SARS-CoV-2 related aptamer-protein and this strategy may be applied to other viral or non-viral antigen targets.
<p>Sabelo Lukhele (Princess Margaret Cancer Center, University Health Network)</p> <p>Co-authors: Diala Abd Rabboa, Mengdi Guo, David G. Brooks</p>	<p>Interferon regulatory factor 2 drives interferon-mediated immune suppression to restrict anti-tumor immunity</p> <p>Understanding how the immune system eliminates cancer is rapidly emerging as one of the most exciting new areas in cancer biology. The ability of immunotherapies to restore immune function has indeed revolutionized cancer treatment. However, for unknown reasons, many patients still do not respond to these therapies. Thus, it is critical to understand what is required of the immune system to control tumour growth and identify the factors that prevent immune function. We have discovered that the molecule IRF2 drives immune (CD8 T) cell dysfunction in the tumour, thus preventing control of various cancer types. Deletion of IRF2 prevents this functional attenuation (exhaustion) of immune cells thereby enabling long-term tumour control, and increased responsiveness to various cancer immunotherapies including immune checkpoint blockade and adoptive cell therapies. Thus, IRF2 is a potential target to engineer T cells for immunotherapies aimed at enhancing cancer control.</p>
<p>Sheri McDowell (McGill University)</p> <p>Co-authors: Daniela F. Quail</p>	<p>Obesity-associated inflammation and cancer progression</p> <p>Obesity affects ~30% of adults in North America and is estimated to be responsible for up to 20% of cancer related deaths, including breast cancer. Obesity increases breast cancer mortality by promoting the spread of cancer (a process called metastasis). Therefore, insight into how obesity regulates metastasis is essential to establish therapeutic strategies. Cancer cells can spread from the breast to other organs via the blood, by moving in and out of blood vessels. My research has shown that obesity promotes breast cancer metastasis by altering the characteristics of blood vessels, making it easier for tumor cells to spread to vital organs such as the lung. This observation is dependent on a specialized immune cell called a “neutrophil”, which can regulate the way blood vessels are structured. Given that obesity is an escalating challenge worldwide, this research contributes to advancing therapeutic options available for a rapidly growing obese patient population.</p>
<p>Sasha McDowell (University of British Columbia)</p> <p>Co-authors: Michael. D Gordon</p>	<p>A molecular mechanism for high salt taste in Drosophila</p> <p>Too much salt in your food can ruin the meal. Low concentrations of salt are encoded in the brain as “attractive” and high concentrations of salt are encoded as “aversive”. This is important since salt is vital for various physiological processes, but excess can cause ill effects. The taste receptors responsible for the aversive portion of this salt taste code remain largely unknown. Since insects generally share a similar bimodal coding, we can use the fruit fly and its genetic toolkit, to look for and understand salt taste receptors. My research identified such a receptor called IR7c, which when removed, flies lacked the normal physiological response to salt and the normal feeding aversion towards it. Therefore, this receptor is crucial for high salt taste aversion. Although it’s not conserved in mammals, understanding its biomechanism could provide insight into how high salt taste receptors work and prompt their discovery.</p>

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<p>Erick McNair (University of Saskatchewan)</p> <p>Co-authors: George Katselis</p>	<p>Assessment of proteome changes in the development of acute kidney injury following cardiopulmonary bypass-supported cardiac surgery</p> <p>Acute Kidney Injury (AKI) affects many patients undergoing heart surgery. It is identified by a rapid loss in kidney function which can lead to increased hospital stay, dialysis or death. The levels of a protein in the blood called creatinine is currently used to diagnose AKI. The problem with creatinine is its slow rise in the circulation and its low accuracy for diagnosis. This research was an attempt to identify new proteins found in the urine which may detect AKI earlier than blood creatinine following heart surgery. An earlier rising more accurate marker in the urine may help doctors to treat patients sooner and avoid complications following heart surgery. Our research identified 8 proteins that have the potential to be earlier rising more accurate identifiers of AKI following heart surgery.</p>
<p>Benilde Mizero (McGill University)</p> <p>Co-authors: Saba Naderi, Rodrigo Rangel-Alvardo</p>	<p>Development of sustainable snow remediation processes using clay-based materials</p> <p>In earth cold regions such as Canada, snowfall seasons can last about 5 months a year and are characterized by large quantities of snow that can accumulate up to several meters per year. Through the ice nucleation phenomenon, falling snow can uptake different types of airborne particles (aerosols) suspended in the atmosphere, ranging from microbial organisms, inorganic and organic compounds, including micro/nano plastic particles. Most of these aerosols that are emitted by anthropogenic activities, have been largely reported to be harmful to human health and identified as some of the factors that are responsible for climate change. Repeated cycles of snow precipitation and melting increase our exposure to those harmful particles. Therefore, there is an urgent need to adopt necessary measures to recycle and remediate using sustainable techniques. Thus, the objective of our study is to create inexpensive, zero-net energy and sustainable processes for snow remediation using clay-based materials.</p>
<p>Adam Mohamed (The University of Toronto)</p> <p>Co-authors: Aylin Reid</p>	<p>The effect of neurofibromin on neurocognition and anxiety in experimental traumatic brain injury</p> <p>Traumatic brain injury (TBI) is a major public health issue worldwide due to the associated long-term effects on cognition and behaviour. TBI related cognitive deficits include memory retention and recollection issues, impairment of motor skills, and difficulties regulating emotions. Neurofibromin is a specific type of protein encoded by chromosome 17; it regulates several signalling pathways involved in cell growth and proliferation. Those with a mutation to the gene that encodes this protein may develop neurofibromatosis type 1 (NF1), which has been shown to cause neurocognitive deficits. Whether dysfunctional neurofibromin can alter TBI outcomes has yet to be determined, and so the goal of this project is to investigate this particular question using visuospatial memory and anxiety tests. This could project could lead to future studies to further identify the mechanism at play and determine whether treatments targeted at this protein could improve TBI outcomes.</p>

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<p>Laure Carole Momo Djonjue (Université d'Ottawa)</p>	<p>Une étude de la covid-19 et des lignes directrices de santé publique basées sur les connaissances, attitudes, comportements.</p> <p>Cette étude est d'une importance primordial car elle servira de preuve scientifique et peut aider les scientifiques à trouver des solutions et a mieux se préparer pour les pandémies qui risques frapper la planète sans prévenir. Néanmoins, beaucoup de pays africain doute du vaccin donc mener cet étude nous permettra d'évaluer leurs connaissances, attitudes et comportements ainsi trouver des solutions relatif.</p>
<p>Nancy Mugisha (McGill University)</p> <p>Co-authors: Helen Carlson, Guillaume Gilbert, Marie Brossard-Racine, Adam Kirton, Maryam Oskoui</p>	<p>Altered functional connectivity of the motor network in children with spinal muscular atrophy: a pilot study</p> <p>Spinal Muscular Atrophy (SMA) is a devastating disease that severely affects motor function. The effects of SMA on brain development remain largely unknown and discovering new pathways to improve motor outcomes has great potential for future impact as cointervention. Communication between motor regions is essential for normal motor development. As such, we aimed to explore whether functional connections between motor regions in the brain were differentially affected in SMA as potential contributing factors to the experienced difficulties in motor learning. We compared 8 children with SMA and 8 healthy controls to primarily look at how well motor regions in the brain were functionally connected or communicating. Preliminary results suggest alterations in motor region connections in children with SMA. This study represents the first step to understand maladaptive motor brain regions interactions with implications that open new pathways for therapeutic approaches to optimize motor learning and function.</p>
<p>Wilson Nartey (University of Calgary)</p> <p>Co-authors: Daniel Ziemianowicz, David Schriemer, Aaron Goodarzi, Gareth Williams</p>	<p>Structure and regulation of the oncogenic chromatin remodeler HELLS</p> <p>Chromatin remodelers are the gatekeepers of our genes. They harness the energy from ATP to reorganize the chromatin structure to enable or disable the expression of important genes. By hijacking and changing the way these remodellers work, cancer cells can control a wide swath of genes that leads to their rapid growth and spread in the organism. Using techniques that allow us to see how an oncogenic remodeler known as HELLS associates with the chromatin, we now have an understanding of the various ways changes in certain parts of the interactions affect the outcome of cancer cells thereby allowing us to leverage this to design better interventions for the treatment of these cancers.</p>
<p>Stéphane Nemours (Molecular Oncology Group, Biodonostia Health Research Institute)</p> <p>Co-authors: María Armesto, María Arestín, Michal Michal,</p>	<p>Transcriptomic analyses of rare kidney tumour "papillary renal neoplasm with reverse polarity"</p> <p>Papillary renal neoplasm with reversed polarity (PRNRP) is a recently described rare renal malignancy that displays differences from other renal tumour types at the tissue, cellular and molecular levels. Pathologists have found PRNRP not to be an aggressive type of cancer. In addition, patients have shown no recurrence, metastasis, or tumour-related death. To learn more about this neoplasm, we studied the expression levels of genes and small RNA molecules involved in the regulation of gene expression in PRNRP cases. We then compared our results with other renal neoplasms. Among other things, we found tumour suppressors, which are usually downregulated in cancer, to be highly expressed in PRNRP tumours.</p>

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<p>Ondrej Hes, Delia Pérez-Montiel, Claudia Manini, Dorian Giustetto, Kristyna Pivovarcikova, Maris Sperga, José I. López, Charles H. Lawrie</p>	<p>In summary, this study is the first to investigate on a great scale the genes and non-coding RNA expression in PRNRP cases. These results add molecular evidence that PRNRP is indeed a distinct entity from the other renal neoplasms.</p>
<p>Fabrice Ngoh Njotu (University of Saskatchewan)</p> <p>Co-authors: Anand Krishnan Nambisan, Jessica Pougoue Ketchemen, Florence Tikum, Hanan Babeker, Koon Y Pak, Maruti Uppalapati, Humphrey Fonge</p>	<p>Evaluation of the effectiveness of Cu67-EB-TATE theranostic as an alternative to Lu177-DOTATE in pancreatic neuroendocrine tumour models</p> <p>Current epidemiological data show that 2 in 5 Canadians will develop cancer in their lifetime. Neuroendocrine tumours (NET) are slow-growing and poorly managed cancers that mostly develop within the gut and respiratory systems. If not diagnosed early, they spread and become lethal within 5 years in 67% of cases. Currently, a lutetium-177 radiolabelled peptide complex called Lutathera, which binds to somatostatin receptor-2 on NET tumours and kills them by breaking down their DNA has been approved by FDA and Health Canada for the treatment of NETs that have spread. However, Lutathera clears off from blood fast, thereby requiring several doses and the properties of its' lutetium-177 component make it less optimal for diagnosis We have therefore developed an alternate and improved version of Lutathera using copper-67 in complex with the prolonged blood-circulating peptide (EB-TATE) and showed that it has both diagnostic and therapeutic potential against NET.</p>
<p>Kennedy Nmecha (McMaster University, Hamilton Centre for Kidney Research)</p> <p>Co-authors: Jackie Trink, Melissa McDonald, Dan Zhang, Bo Gao, Joan Krepinsky</p>	<p>Assessing the influence of sex on the Cd1 nephrectomized streptozotocin-induced diabetic kidney disease model</p> <p>Diabetic kidney disease (DKD) is the leading cause of kidney failure in North America and presents as a progressive increase in albuminuria and declining kidney function. Recent studies have shown that sex is an important factor to consider in the progression of DKD. Presently, the hallmarks of this disease have primarily been studied in male rodent models. Here we explored the influence of sex in a mouse model of DKD. The right kidney of CD1 mice were partially removed and injected with 200mg/kg streptozotocin to induce type 1 diabetes. Outcomes measured included urinary albumin-to-creatinine ratio (ACR), blood pressure (BP), other clinical markers of kidney health. Both sexes developed similar increase in blood sugar, kidney size, kidney scarring and inflammation. While some differences were observed, overall, both sexes developed clinical and pathologic characteristics of early DKD. Future studies evaluating therapeutic interventions can be assessed in both sexes of this DKD model.</p>
<p>Chinyere Nwafor-Okoli (University of Calgary)</p>	<p>One health surveillance: a systematic review</p> <p>Implementation of the One Health approach to the surveillance of disease and health hazards that involve humans, animals, and the environment is a call from the international community and governmental organizations. This study focuses on the</p>

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	<p>systematic review of published and grey literature to assess the frequency of incorporation of the One Health approach in health/disease surveillance systems.</p>
<p>Blessing Ogbuokiri (York University)</p> <p>Co-authors: Ali Ahmadi, Bruce Mellado, Jiahong Wu, James Orbinski, Ali Asgary, Jude Kong</p>	<p>Identifying COVID-19 vaccine hesitancy hotspots in Nigeria: analysis of social media posts</p> <p>In this research, we collected 10,000 vaccine-related geotagged Twitter posts in Nigeria from December 2020 to February 2022 to identify hotspots by clustering tweet sentiments. The tweets were first labelled according to sentiments (positive, negative, and neutral) using the Natural Language Processing pre-trained model known as VADER. The sentiments were visualised on the map using ArcGIS Online. The point-based location technique was used to calculate the hotspots on the map. Green, red, and grey were used to identify the dominance of positive, negative, and neutral sentiments. The outcome of this research shows that social media data can be used to complement existing data in identifying hotspots during future outbreaks. It can also be used to inform health policy in managing vaccine hesitancy.</p>
<p>Ibrahim Ogunsanya (University of Toronto)</p>	<p>Ensuring durability and sustainability of reinforced concrete structures: what to consider</p> <p>North American concrete infrastructures are plagued with chloride-induced deterioration challenges resulting from the switch from de-icing rock salts to a more aggressive anti-icing brine solution used during the winter periods. Therefore, there is a need to erect durable reinforced concrete structures across the continent, particularly in regions experiencing harsh winter seasons. At the same time, there is a need to design concrete structures to meet global sustainability plans aimed to reduce ~25 Mtonnes of greenhouse gas by 2050, including Canada’s “Roadmap to Net-Zero-Carbon Concrete” plans. Adopting durable materials for use in new infrastructures is critical to designing for sustainability across Canada. However, this requires developing both new durable materials and durability database for them. Our research is creating novel solutions to address durability and sustainability challenges affected by three major engineering structures: concrete structures, nuclear reactors, and automobiles. This presentation will focus on recent research findings on reinforced concrete structures.</p>
<p>Toyib Olaniyan (Statistics Canada)</p> <p>Co-authors: Michael Tjepkema, Tanya Christidis, Jeremiah Hwee</p>	<p>Mortality inequalities of Black adults in Canada</p> <p>Mortality rates in Canada have been shown to vary by population groups (e.g., Indigenous peoples, immigrants) and social economic status (e.g., income levels). Mortality patterns for population groups such as Black individuals, are not as well known. The objective of this study was to assess cause-specific mortality for Black adults living in Canada using administrative data. This presentation will highlight the key findings and consultations with various stakeholders, including the Health Analytical working group of the Canadian Black Scientists Network (CBSN).</p>

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<p>Ijeoma Omodu (Black Engineers Canada)</p>	<p>The Promise and Potentials of Carbon Capture, Utilization and Storage</p> <p>Politics, science and technology make an interesting trio to discuss in any and every setting. We will leave the politics out of this one. Believe it or not, our climate is changing because we can see and/or feel the changes. Our extreme natural disasters driven by weather pattern changes; food and energy supply challenges, social and political unrests driven by resource scarcity, increased competition & self-preservation are all indicative and resultant of the changes in status quo. Our Carbon cycle is off balance. Human activities are the major driver of the climatic changes we are witnessing. How do we get back to balance? A combination of solution sets exist but without Carbon Capture Utilization and Storage, CCUS, an artificial method of creating more carbon sinks in our planet we would not achieve our goals of slowing and stopping global warming.</p>
<p>Amanda Ottley and Sara Taghavi Motlagh (The Pamoja Institute for Community Engagement and Action)</p> <p>Co-authors: Michele Ashem</p>	<p>Leveraging technology for equity: using an AI powered chatbot to support Black parents in shared decision-making about COVID-19 vaccination</p> <p>As the world evolves around us, it's inspiring to see technology being leveraged in empowering and equitable ways - which is precisely what Auntie Betty 2.0 does for Black families in Toronto. Her cutting-edge AI utilizes machine learning that recognizes over 500 topics of conversation related to vaccinating children during COVID-19. She provides these communities with an accessible source of information so parents can make informed decisions about their child's well-being without sacrificing cultural sensitivity or accessibility. Early findings suggest that culturally safe AI-powered chatbots can lay a foundation for greater equity across racialized groups by making sure no one gets left behind as we move forward together into our collective future.</p>
<p>Natoya Peart (University of Pennsylvania)</p> <p>Co-authors: Matthew Sears, Jae Yeon Hwang, Mathieu Quesnel-Vallieres, Kristen Lynch, Juw Won Park, Russ Carstens</p>	<p>Mechanisms of RNA processing in modulating cell identity</p> <p>How genes are expressed is a critical component of cell identity. RNA binding proteins, RBPs regulate gene expression through controlling processes such as alternative splicing, mRNA stability and mRNA translation. Here, we investigate the ways in which RBP, ESRP1 contribute to defining cell identity. To do so, we identify the RNAs that ESRP1 binds and determine the consequences of ESRP1 binding on the fate of the RNA. We observed that many of the RNAs bound by ESRP1 had roles critical for maintaining epithelial cell identity. Additionally, we confirmed that ESRP1 binding to the RNAs regulated alternative splicing, but also observed that ESRP1 appears to also affect mRNA translation.</p>
<p>Kim Borden Penney</p>	<p>The absence of Black women engineers in leadership positions</p>

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<p>(University of Toronto)</p>	<p>This qualitative research study examines Black women engineers experiences in Canadian engineering firms and their perceptions about opportunities to management positions. The study's data are collected through in-depth interviews and focus groups with Black women engineers. Further, this study seeks to examine: (1) lived experience of Black women's experiences in engineering firms; (2) perceived incongruity between Black women as leaders and those who are seen as possessing characteristics, qualities, and social capital for management roles; and (3) how the discourse of employment policies and corporate climate has impacted Black women engineers' advancement to management positions. This study utilizes theoretical frameworks of Critical Race Theory, Black Canadian Feminist Thought, and Intersectionality Theory to explore and examine Black women engineers' experiences in their workplaces. Participants were recruited through Black professional organizations, social media, and snowballing. This study is one of the few Canadian examinations of Black women's experience in the engineering sector.</p>
<p>Wasiu Raji (Carleton University)</p>	<p>Aquifer storage assessment using thematic hydro lithologic parameters and machine learning models</p> <p>Efficient computation protocols for predicting volumes of groundwater storable in hard rock aquifers have been built and tested in the Moonset and Sunset regions of Nigeria. The protocol is based on extracting the aquifer's hydrogeological parameters from geo-electric data acquired during geophysical surveys. Evaluation results showed that the two machine learning protocols are computationally efficient and geologically appropriate for predicting aquifer storage in hard rock aquifers. The protocols can be applied to similar geological terrains. This study addressed a critical knowledge gap in groundwater budgeting and management in hard rock terrains with a cascading consequence to achieving water and food security.</p>
<p>Wasiu Raji (Carleton University)</p> <p>Co-authors: Manny Addamah and Mustapha Sulaiman</p>	<p>Subsurface characterization in an ancient graveyard with potential applications to forensic investigations</p> <p>This study presents the results of a geophysical study in an ancient graveyard in Nigeria where multiple-electrodes-resistivity-surveys were undertaken to characterize the near-surface soil and rocks in the graveyard for potential forensic applications. The data were processed to invert 2D resistivity models used to interpret subsurface features. The section dominated by old graves dated between 1994 and 2012 showed features of disturbed stratigraphy and geo-resistivity patterns associated with digging, excavation, and soil in-fills, while the area dominated by recent graves showed low resistivity anomalies associated with bodily fluids produced by decomposing human bodies in the graves in addition to the signatures of digging, excavation, and soil in-fills within four metres depth. The low resistivity anomalies and disturbed stratigraphic features were absent in the model of a location outside the graveyard. This study is critical to the creation of a geo-forensic database in a country with the highest missing-persons in Africa.</p>
<p>Zakee Sabree (Ohio State University)</p> <p>Co-authors:</p>	<p>Modeling microbial influences on animal growth and development</p> <p>Insects as model animals for host-microbiome research can reveal how microbes are critical in the growth, health and evolution of both insects and all animals on Earth.</p>

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<p>Arturo Vera Ponce de Leon, Benjamin Jahnes, Kayla Cross, Mathias Schneider</p>	
<p>Jehoshua Sharma (University of Guelph)</p> <p>Co-authors: Rebecca Shapiro</p>	<p>Investigating gut commensals for antivirulence compounds that attenuates morphogenesis in the fungal pathogen candida albicans</p> <p>With globally increasing rates of antimicrobial resistance, there is a pressing need for therapeutic alternatives that can treat the infection without inducing drug resistance. A promising alternative are compounds that specifically inhibit virulence factors, which by disarming the pathogen, ultimately protect the host. This topic is explored through the lens of the fungal pathogen <i>Candida albicans</i> and its ability to change its shape from a commensal to a pathogen through a process known as morphogenesis.</p>
<p>Kanah Smith (University of Toronto)</p> <p>Co-authors: Arthur Le Saux, Lisa Bugnet</p>	<p>Asteroseismology: unveiling stellar nature through oscillation pattern recognition</p> <p>Solar-like stars oscillate as a result of sound and gravity waves that propagate through the sphere; the waves allow us to then probe the stellar interior for information on its physical properties. Asteroseismology allows us to organize the classifications of stellar evolutionary stages, and with the amount of currently available data, it is necessary to automate the classification process. Using a machine learning-based method, I worked to automate this organization by using seismic data from stellar oscillations, since oscillatory patterns are characteristic of stellar age, to further sort these stars according to their evolutionary history. In this research, I have performed the classification of about 18,000 evolved stars, observed during the Kepler mission, based on their oscillation patterns; this is the largest sample of red giants that has been classified automatically and will allow for better studying of the interior dynamics of evolving solar-like stars.</p>
<p>Tyanna Supreme (University of Toronto)</p>	<p>Defining innate immune cell mechanisms upon <i>Helicobacter pylori</i> mediated tumorigenesis</p> <p>Gastric cancer is one of the most common and deadliest cancers in the world. <i>Helicobacter pylori</i> is a pathogenic bacterium that colonizes the stomach mucosa and is the strongest known risk factor for gastric cancer. <i>H. pylori</i> is classified as a type I carcinogen, is known to cause inflammation and increase the risk of disease. The mechanisms of <i>H. pylori</i> mediated gastric cancer tumorigenesis are poorly understood. Immune cells are known to contribute to tumor inhibition during the progression of cancer, but unresolved immune responses can trigger chronic inflammation and promote cancer growth. Recently, activated eosinophils were found to accumulate in the gastric mucosa upon <i>H. pylori</i> infection, and the number of infiltrating eosinophils increases as disease progresses. Therefore, I hypothesize that eosinophils play a crucial role in gastric epithelial stem cell tumorigenesis.</p>
<p>Shane Taylor (McMaster University)</p> <p>Co-authors: Bhagwati P. Gupta</p>	<p>Manf: a protector of neuronal health and longevity</p> <p>The inability to activate the stress response declines with age and can lead to neurodegenerative diseases, such as Parkinson's Disease (PD). Recent research has focused on understanding the regulation of the stress response to promote neuronal health and longevity for PD. My research on MANF (mesencephalic astrocyte derived neurotrophic factor) aims to investigate how it can regulate the stress response to confer health benefits.</p>

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<p>Diane Watson Ottawa</p>	<p>Securing mobile connectivity and closing the digital divide</p> <p>The COVID-19 pandemic accelerated connecting people across industries and geographies. Every online interaction and site visited leaves a footprint of who you are, where you are and what you are interested in. There are several solutions that are being developed for securing one's digital identity and one technology that is being considered is the trusted SIM (Subscriber Identity Module). Over the years removable SIMs have evolved to be a part of a mobile device. This ubiquitous technology is already everywhere and could replace paper documents and user/passwords for identify verification. The World Bank estimates that there are over 1 billion people still without official proof of identity, however most people have access to mobile devices and this secure technology could be used as a way for the economically or geographically excluded to join the digital world. It will take global collaboration to ensure that this technology is considered trustworthy.</p>
<p>Junior West (Johns Hopkins School of Medicine)</p> <p>Co-authors: Rosela Golloshi, Kate Cho, Isaiah Roberts, Andrew Ewald</p>	<p>The tight junction inhibits cancer invasion and metastasis</p> <p>The most dangerous aspect of cancer is when aggressive cancer cells gain the ability to travel throughout the body. This process requires modulation of molecules that maintain adhesion between cells. My project is focused on studying a family of molecules that are frequently lost during breast cancer progression. We model this process using organoid technology that allows us to miniaturize the process of cancer cells escaping the primary tumor. Use these approaches we have found that experimental depletion of these cell adhesion molecules promotes the ability of cells to escape the primary tumor and travel to distant organs. We have characterized the cell and molecular events that underpin these effects, and believe that this will lead us to unveil novel mechanisms of cancer metastasis.</p>
<p>D'Andre Wilson-Ihejirika (University of Toronto)</p>	<p>Career pathways for Black engineering graduates of the University of Toronto</p> <p>Engineering is a field that has had a lack of representation from specific demographic groups for many decades. One such under-represented group is Black engineers. For other underrepresented groups in engineering, like women, research has been done to look at career paths. The objective of this research was to look at the career pathways for Black engineering graduates from the University of Toronto and compare to general pathways of engineering graduates. This was done by reviewing LinkedIn profiles of engineering graduates. A list of alumni was collected from the University of Toronto registrar and data collected from their publicly available LinkedIn profiles. Data was then anonymized and analyzed using fields of study, job titles, company and industry. Preliminary results showed that Black engineering graduates showed a preference for specific industries (i.e. Oil and Energy).</p>

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<p>Woldegebriel Assefa Woldegerima (York University)</p>	<p>Why do we learn this all math: the use of mathematical modelling in real-life problems</p> <p>In this talk, I briefly show how math is used to write the languages of nature and physical and engineering problems inspired by nature. Particularly, I show some of our research works at York University related to modelling and predicting infectious diseases including the use of Machine learning approaches inspired by mathematical concepts. I will also briefly mention the principles of creating mathematical models, and the different methods or approaches used to analyze and make a prediction. This talk is suitable for general audiences since I will not talk about a single publication or specific work.</p>
<p>Fardowsa Yusuf (University of British Columbia)</p> <p>Co-authors: Tricia Tang, Mohammad Ehsanul Karim</p>	<p>The association between diabetes and excessive daytime sleepiness among American adults</p> <p>Daytime sleepiness is common among people with diabetes, but it is commonly attributed to sleep disorders. We determined whether daytime sleepiness is directly related to diabetes. We accessed data from the National Health and Nutrition Examination Survey, a nationally representative survey of US adults. We found that daytime sleepiness was more prevalent among people with diabetes (31%) than people without diabetes (26%). After accounting for differences between people with diabetes and their counterparts without diabetes (e.g., age, sex, race etc.), we still found that people with diabetes were more likely to have daytime sleepiness. We did not find that this relationship varied by age, sex or race. Among people with diabetes, we also did not find that daytime sleepiness was associated with diabetes care factors (e.g., whether patients are being treated for their diabetes). Our findings support further exploration of the role of diabetes in daytime sleepiness.</p>