Queens

DEPARTMENT OF Queens Medicine 2020

Translational Institute of Medicine (TIME)





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MESSAGE FROM THE DIRECTOR



Dr. Stephen Vanner Director — Translation Institute of Medicine - TIME

In early 2020, COVID-19 and the rapidly escalating public health situation brought Canada to a halt; students, staff, and faculty were all affected in many ways that impacted both professionally and personally. We were all required to adapt to the new normal. TIME, representing both clinical and basic research at Queen's University, was unique in responding to the crisis. Our members rallied to pivot their research towards this end. Throughout this period, we maintained our research capacity, ensuring that research platforms and the scientists who operate them were maintained at levels similar to those pre-COVID. We are grateful and proud of the commitment shown by our researchers, their outstanding staff and our excellent students through this very challenging time. We also used this time to finalize our Strategic Plan, successfully published following consultation with our Executive Committee and our members. In this <u>Strategic Plan</u>, we place Research and Teaching Excellence at the heart of our mandate for the next 5-years, ensuring our Growth and Sustainability through a carefully crafted strategy that includes

building an interdisciplinary research community within Queen's University.

We are excited for the next 5 years and how we can capitalize on our strategic plan to place Translational Medicine at the heart of Queen's research success.

Dr. Stephen Vanner

Director - TIME





ABOUT TIME — SECTION I



TIME LAUNCHED THE FIRST STRATEGIC PLAN 2020-2025

TIME STRATEGIC PLAN

TIME brings together the multi-disciplinary expertise of over 250 scientists and scholars across the university, and reflects the rapidly growing need for interdisciplinary and translational research as a means to accelerate health care for Canadians and patients world-wide. TIME's state-of-the-art research platforms and <u>virtual network</u> are a first for Queen's and enable collaboration at the highest level. Embedded in this rich environment is the new Translational Medicine (TMED) graduate program, which provides novel training opportunities for translational medicine students. This novel program will ensure that the next generation of investigators has the unique mix of skills to meet Canadian's future health care needs. Our strategic plan sets out a clear vision for the Institute, a roadmap of how to achieve this vision, and is accompanied by the aspirational metrics by which our accomplishments and investments can be judged.

TIME is committed to the following core guiding principles:

VISION AND IMPACT - TIME will forge a cohesive and inclusive, interdisciplinary research community

RESEARCH EXCELLENCE - TIME will prioritize 'research excellence' in its decision making

EDUCATION EXCELLENCE - TMED will train highly qualified people (HQP) who will act as ambassadors.

GROWTH AND SUSTAINABILITY - TIME will develop a sustainable financial plan to meet its goals.

TIME Strategic Plan was developed in consultation with the TIME membership and was approved by the TIME Executive Committee.

BY THE NUMBERS



TIME Research Platform; TIME Network Members across different faculties and departments at the Queen's University



Groups on TIME Network



Members from Faculty of Health Sciences



Members from Faculty of Arts & Science

Faculty of Arts & Science Department of Biology: 1 Department of Chemistry: 4 School of Computing: 5

Faculty of Health Sciences

Department of Anesthesiology: 1 Department of Biomedical and Molecular Sciences: 69 Cancer Research Institute: 4 Department of Critical Care Medicine: 1 Department of Medicine: 144 Department of Pediatrics:1 Department of Nursing: 1 Department of Oncology: 3 Department Pathology and Molecular Medicine: 11 Department of Public Health Sciences: 3 Department of Surgery: 2



Member from Faculty of Engineering & Applied Science

TIME Team

Program Involvement Legend

- TIME Team
- TIME Management Committee
- TIME Executive Committee



Dr. Stephen Vanner TIME Director



Dr. Stephen Archer Head, Department of Medicine (DOM)



Dr. Paula James Translational Medicine Graduate Program Director



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Dr. Charlie Hindmarch

Scientific Operations Director for TIME



Dr. Salwa Nihal TIME Manager





Dr. Mark Ormiston Non-DOM Representative



Ms. Brooke Ring QCPU Manager



Dr. David Taylor DOM Educational Lead



Dr. Mala Joneja Equity and Diversity



Ms. Krista Knight DOM Communications Officer



Ms. Carly Hudson DOM Finance Officer



Mr. Matthew James TMED Student



Training & Education

Joseph Nashed — MD/PhD Candidate - Translational Medicine, Study:Investigating recovery mechanism in the gyrencephalic brain following middle cerebral artery occlussion

MESSAGE FROM PAULA JAMES & MARK ORMISTON



Dr. Paula James Graduate Program Director



Dr. Mark Ormiston Graduate Program Co-Director



Charmi Shah and Dr. Annette Hay at a clinical observership

The TMED Program leaders are very proud of the accomplishments of our students in 2020. Their programs of study underwent enormous change because of the COVID-19 pandemic. Students had to immediately pivot to cope with lab closures, the loss of in-person research and remote learning in addition to personal and professional fear and uncertainty.

Despite these challenges, our students continued to shine with multiple successful defenses, publications, presentations, and awards. Our strong partnership within the Kingston Health Sciences Centre enabled our students to have the unique opportunities to attend clinical observerships throughout the pandemic. Through the establishment of the vibrant and active TMED Student Society, the group has managed to create a sense of community and provide peer support to one another.

Additionally, our program staff, Julie Heagle and Wei Yan have seamlessly risen to the challenge of working from home and navigating the evershifting landscape of public health guidelines, while maintaining an excellent level of organization and management of program activities.

The TMED program was one of the first graduate programs on campus to start in-person classes at the beginning of Fall 2020. Our first-year students truly appreciated the in-person learning experiences and started their research journey with passion and excitement.

Our students are indeed becoming the researchers of the future, able to translate new knowledge efficiently and effectively into improvements in health. We look forward to their ongoing success.

Dr. Paula James, *Graduate Program Director* **Dr. Mark Ormiston**, *Graduate Program Co-Director* " I joined the laboratory of Dr. Stephen Archer in September 2018 as a Master's degree student in the Translational Medicine (TMED) Graduate program.

My research focuses on the right ventricular (RV) failure as the primary cause of death in patients with Pulmonary Arterial Hypertension (PAH). I am interested in investigating RV inflammation and its role in promoting RV failure, particularly the activation of



Ruaa Al-Qazazi TMED Graduate 2020

the NLRP3 inflammasome pathway in macrophages. It is an exciting project with translational potential, including therapy development.

The unique design of the TMED program offered me excellent research skills combined with clinical experiences through clinical observerships and medical rounds.

In the Archer lab, I learned several techniques relevant to my project, such as high-frequency rodent echocardiography, cardiac catheterization, confocal microscopy, flow cytometry, western blot, and transcriptomics. In September 2020, I successfully defended my thesis and became the first student to graduate from the TMED program!

Currently, I am finalizing my Master's thesis research submission to one of the most prestigious scientific journals in the field – Circulation. While still working in the Archer's Lab, I have been invited this semester to co-instruct Biomedical Respiratory Physiology PHGY 355/ BMED 855 course to the third-year undergraduate students at Queen's University. At this stage of my career, I am looking forward to pursuing medicine while advancing my knowledge in cardiovascular research."

DR. RUAA AL-QAZAZI, MSc'20 (TMED)

BY THE NUMBERS

Number of MSc Students: 20 Number of PhD Students: 5



Ruaa Al-Qazazi, MSc'20 Graduated in – Fall 2020



(above) Ruaa with all the members of Archer's laboratory



Number of MSc Students

Two students have defended their thesis and will formally graduate in Spring 2021



George Philip, MSc'21 Supervisor: Dr. Jennifer Flemming



Supervisors: Dr. Annette Hay & Dr. Joe Pater

Number of PhD Students

5

EXTERNAL/INTERNAL AWARDS AND SCHOLARSHIPS

Franklin Bracken Award, Mitacs Research Training Award Thalia Hua Supervisor: Dr. Damian Redfearn

Queen Elizabeth II Graduate Scholarship in Sciences and Technology

CIHR Poster Presentation Gold Award - Canadian Student Health Research Forum Matthew James Supervisor: Dr. Denis O'Donnell

Mitacs Research Training Award Sophia Linton Supervisor: Dr. Anne Ellis

Graduate Entrance Tuition Award Max Moloney Supervisor: Dr. Diane Lougheed

Ontario Graduate Scholarship Bethany Monteith *Co-Supervisors: Dr. Annette Hay and Dr. Joe Pater* Robert Wilson Award, Dean's Doctoral Award Edwin Ocran Supervisor: Dr. Paula James

Young Investigator's Award from sfRBM, Paroian Family PH Research Scholarship from the Pulmonary Hypertension Association of Canada (PHAC) Austin Read Supervisor: Dr. Stephen Archer

R. Samuel McLaughlin Award Charmi Shah Supervisor: Dr. Don Maurice

Canadian Graduate Scholarship Master's Award Marty VandenBroek Supervisor: Dr. Mark Ormiston

Canadian Graduate Scholarship Doctoral Award, PSI Research Trainee Fellowship Caitlyn Vlasschaert Supervisor: Dr. Michael Rauh



Mark Ormiston and Marty VandenBroek

PUBLICATIONS

- **Hua, T.**, Vlahos, A., Shariat, M.H., Payne, D., Redfearn, D. (2020). Predicting Adverse Cardiovascular Outcomes in Post-Coronary Artery Bypass Grafting Patients Using Novel ECG Frequency Analysis of the QRS Complex. Annals of Noninvasive Electrocardiology.
- Hossenbaccus L, Linton S., Garvey S, Ellis AK. Towards definitive management of allergic rhinitis: Best use of new and established therapies. Allergy, Asthma Clin Immunol. 2020. doi:10.1186/ s13223-020-00436-y
- Standage D., Areshenkoff C.N., Nashed J.Y., Hutchinson R.M., Hutchinson M, Heinke D, Menon R.S., Everling S., Gallivan J.P. (2020) Dynamic reconfiguration, fragmentation and integration of whole-brain modular structure across depths of unconsciousness. *Cerebral Cortex (In Press*)
- Mackinnon, M., To, T., Ramsey, C., Lemière, C., & Lougheed, M. D. (2020). Improving detection of work-related asthma: A review of gaps in awareness, reporting and knowledge translation. *Allergy, Asthma & Clinical Immunology,16*(1). doi:10.1186/s13223-020-00470-w
- Prisco, S. Z., Rose, L. L., Potus, F. W., Tian, L., Wu, D., Hartweck, L.,
 Al-Qazazi R., ... Prins, K. (2020). Excess Protein O-GlcNAcylation Links Metabolic Derangements to Right Ventricular Dysfunction in Pulmonary Arterial Hypertension. *International Journal of Molecular Sciences*, 21(19), 7278. doi:10.3390/ijms21197278



(Above) TMED student Sophia Linton in her lab

TMED Graduate Program Faculty

We would like to thank all faculty members who have participated in the training of the next generation of translational scientists. The success of our highly qualified graduates is the product of the diligence and commitment of our faculty.



Paula James



Mark Ormiston

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Stephen Archer

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Anne Ellis



Stephen Vanner

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Gord Boyd

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Annette Hay

•••



Rachel Holden



Don Maurice



Charlie Hindmarch

••



Amer Johri

• •



Diane Lougheed



Prameet Sheth



Karen Yeates

• •



Marie Clements-Baker



Ramana Appireddy





• •

Genevieve Digby



Lawrence Hookey

•



DJ Cook



Jennifer Flemming



Program Involvement Legend

- Course Chair
- Graduate Committee Member
- Graduate Program Director / Co-Director
- Observerships
- Supervisor
- TMED 800 Lecturer

- TMED 801 Speaker
- TMED 802 Speaker
- TMED Research Project



Denis O'Donnell

•







Michael Rauh

•



Damian Redfearn

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100 COVID-



David Reed



Yuka Asai



•



Hugh Guan



Jenna Healey



David Lillicrap



Thomas Herzinger



Lysa Lomax









Mala Joneja



David Lee

•



•



Santiago Perez





Guillaume Richard-Carpentier C



Garima Shukla



David Taylor

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Tara Baetz



TMED Program Inclusive and Collaborative Student Experience

The Translational Medicine (TMED) graduate program was guided by education theories throughout the development and approval process, and has strived to achieve educational excellence since it was launched. Dr. Paula James, Graduate Program Director and Wei Yan, Educational Lead, conducted a SEAMO-funded Program Evaluation project on the health sciences graduate program curriculum development and innovation, which allowed both questionnaire and interview data to be collected in a formal research capacity. Moreover, both Program Directors Dr. Paula James and Dr. Mark Ormiston had one-on-one meetings with every student during the month of March 2021, which gave students an opportunity to speak freely with the program leadership. It was a challenging year due to the impact of COVID-19. However, we are very pleased to find that our students were still able to achieve positive and rich learning experiences. Some of the key highlights of our findings were:

Tremendous supervisor support: Students reported that they received tremendous support from their supervisors and lab mates. They felt that the expectations from supervisors were appropriate and they were comfortable reaching out to them whenever they had questions. Supervisors were very responsive to the changes that COVID-19 brought to research and research labs. Whether it was new protocols in lab research or virtual learning and defenses, students felt that their supervisors were engaged in every step of the changes and made every effort to minimize the impact of COVID-19 on their experience. Because of such effort and support, our students largely stayed on track in



(Left) Picture of TMED student Madison Mackinnon in her lab during Covid

terms of their program of study. Some students even built up their research program around COVID-19 because of the shift of focus in their labs.

Unique curriculum design: Students appreciated the unique curriculum design of the TMED program. They enjoyed how our curriculum allowed them to self-direct their learning through various experiential component. An average of 94% of students reported that they learned a great deal from our core courses and 89% students' interests in translational medicine have been stimulated by the core courses. Under the circumstances of COVID-19, peer interactions were limited. However, students recognized the effort our program made: a) we were one of the first graduate programs on campus to start in-person classes at the beginning of Fall 2020; and b) we had in-person classes whenever possible.

Leadership and staff availability: Students valued the openness and availability of the program leadership and staff. They felt safe and comfortable to reach out whenever they had a question or feedback. The program leadership and staff held weekly virtual meetings with all students at the beginning of the COVID-19 pandemic and students stayed informed and well-supported by the program and their peers as a community. Students were very grateful for the dedication of program leadership and staff. They were impressed by our Graduate Program Assistant Julie Heagle's effective and efficient communications on COVID-19 related policies and program regulations, in addition to her extensive involvement with students' initiatives.

We have been practicing principles of EDI since the development of our program. In consultation with Equity and Human Rights Office, we mandated EDI in our terms of reference for the GPC, including all decision-making activities such as admission and hiring. All of our GPC members and staff received EDI training. We were very glad to see the outcome of such practices – a diverse group of students and faculty members. In fact, the majority of our students are from equity-seeking groups. A curriculum review indicated several EDI related components as ongoing efforts to promote education about EDI to our students.

We will continue to make efforts on the promotion and practice of EDI. After the survey, the student society prepared a wellness package and followed up with resources for health and wellness to all students. They also worked with the GPC to establish a protocol for conflict resolution as a preventative measure, and all students were informed of the protocol. We are planning to incorporate more EDI components in our we had in-person classes whenever possible the program are under discussion.



2020 TMED Milestones & Events

AUGUST 18, 2020: ESTABLISHMENT OF TMED STUDENT SOCIETY CONSTITUTION SEPTEMBER 16, 2020: FIRST EXECUTIVE COUNCIL OF TMED STUDENT SOCIETY ELECTED



From top left, Madison MacKinnon, Secretary, Thalia Hua, President, Sophia Linton, PhD Rep, second row Katie Monteith, VP Finance and Administration, Melinda Chelva, VP Student Services, Kassandra Coyle, MSc Rep, Charmi Shah, EDI Officer and SGPS Rep

NOVEMBER 2020 THE OFFICIAL TMED LOGO IS APPROVED!



NOVEMBER 19, 2020: TMED STUDENT SOCIETY GAME NIGHT



NOVEMBER 27, 2020: TMED STUDENT SOCIETY WELLNESS PACKAGES WERE CREATED AND GIVEN TO ALL TMED STUDENTS

DECEMBER 16, 2020: TMED STUDENT SOCIETY COOKIE DECORATING CONTEST





Rachel Bentley (TMED Candidate) Study: "The molecular mechanisms of oxygen sensing in the human ductus arteriosus: a comprehensive transcriptome profile of hDASMC".

Research

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Research Funding

TIME is prioritizing Research Excellence in its decision making over the next 5-years. Since its conception, TIME has offered incubator grants to ensure that our members have access to seed money in order to generate pilot data that will facilitate future major bids. Through our Speed Dating sessions, TIME has also ensured that members have the opportunity to cross-cut between disciplines in order to achieve genuinely novel funding bids. Lastly, TIME has participated in the FHS CIHR review process to ensure that applications from the Faculty to CIHR have the best chance of success; this is starting to bear fruit.

TIME communicates with members through our webpage, via email and through our Twitter account @QueensuTIME

\$15M

External Research funding received in the year 2020 by all TIME members in the Department of Medicine, DBMS & Pathology (It includes funding received from Government CFI, Tri-council, Clinical Trials, Associations/ Societies & Foundations)



Themes



TIME Incubator Grant Competition 2020

Iscover research interests and connections

Platforms

Image: Construction of the construction of t

Members



Internal DOM Award Competitions

DOM RESEARCH FUNDING

TIME Incubator Grant Competition 2020

With \$150,000 in funds provided by the members of the Department of Medicine (DOM), PI's from DOM assembled teams spanning different departments. Seven applications went forward for external review by experts from McMaster University and the University of Alberta. Based on their recommendations, the following four teams were awarded funding:

TIMEKEEPER: A COMPREHENSIVE CARDIOVASCULAR BIOBANK LINKED TO CLINICAL DATA TO SUPPORT IMPLEMENTATION OF PERSONALIZED MEDICINE THROUGH TRANSLATIONAL RESEARCH



Dr. McLellan

Dr. Hindmarch



Dr. Archer

PI: Dr. Stephen Archer (DOM)

Co-Pls: Dr. Charlie Hindmarch (DOM), Dr. Cathy McLellan (DOM)

Collaborator: Dr. Gian Bisleri, Dr. Al Jin, Dr. Amer Johri, Dr. Paula James, Dr. David Lillicrap, Dr. Michael Rauh, Dr. Pati Lima, Dr. Stephen Vanner, Dr. D Payne, Dr. P Malik, Dr. V Sniekus, Dr. Chris McPhee, Dr. Francois Potus, Dr. Dianne Lougheed, Dr. Strivastava, Dr. Andres Enriquez, Dr. Brian Amsden, Dr. Christine D'Arsigny, Dr. Mark Ormiston, Dr. Donald Maurice, Mrs. Brooke Ring

There is currently a major unmet need for a prospective, characterized, standardized and integrated repository of tissues from consented patients with cardiovascular disease (CVD) and controls. CVDs account for 31% of global deaths and in Canada, CVD is the second leading cause of death, taking 33,600 lives a year, with increased risk of death for females, or First Nation persons. Canada spends more than \$20.9 billion a year on the treatment of CVD. Kingston Health Science Center (KHSC) and its 24 satellite facilities serve 500,000 residents in the South Eastern Ontario region. KHSC operates 440 inpatient beds and on an annual basis admits more than 22,000 patients, performing approximately 9,000 surgical procedures. Queen's University is home to a rich environment of translational research and a bench-to-bedside-and-back philosophy. In this proposal our research team includes both clinicians and clinician-scientists, as well as basic research collaborators across the Faculty of Health Sciences.

Currently, many CVD researchers at Queen's rely upon samples collected as part of limited local studies, samples obtained through public databases, or external collaborations, focusing nationally and/or internationally rather than locally. As we expand our team of clinician-scientists in the department of medicine, this dependency on external samples and an ad hoc approach is proving to be a major bottleneck to discovery-based translational research at Queen's University, particularly as we have the opportunity to study the patients who come to us as south eastern Ontario's only tertiary care centre. Beginning with patients admitted for cardiac services and then expanding to all patients at KHSC, we will begin a biobanking program with patients who are competent to provide informed consent. They will be approached to have their blood, plasma and DNA/RNA biobanked using a simple consent form in a consistent and organized manner that is compatible with downstream 'omic' technologies like genomics, transcriptomics metabolomics and proteomics. Equally important to the TIMEKeeper vision is that patients will simultaneously be consented to have their clinical data, resident in the patient care system (PCS; our current electronic health record system), accessed to determine their clinical phenotype. Moreover, individual researchers can link their OMIC data to patient health care utilization and outcomes (pursuant to approval from ICES and adequate funding).The simultaneous consent for sample acquisition, local healthcare data access and linkage to the ICES registry is unique in Canada.



(left, L-R) Dr. Michael Adams, Dr. Martin Petkovich, Dr. Elahe Alizadeh, Dr. Charlie Hindmarch, Dr. Marosh Manduch, Dr. Ross Walker

PARATHYROID GLAND CELL PHENOTYPE AND PATHOLOGICAL ALTERNATIONS IN BONES AND BLOOD VESSELS; THE IMPACT OF DIETARY PHOSPHATE



Dr. Holden

PI: Dr. Rachel Holden (DOM)

Co-PIs: Dr. Michael Adams (DOM, DBMS) **Collaborator:** Dr. Martin Petkovich, Dr. Charlie Hindmarch, Dr. Elahe Alizadeh, Dr. Marosh Manduch, Dr. Ross Walker

Abnormalities in the metabolism of dietary phosphate are linked to cardiovascular disease in humans. The amount and type of dietary phosphate, and its ratio with calcium in our food supply, has changed substantially over the past 20 years with the widespread use of inorganic phosphate food additives. A diet enriched in phosphate, but with relatively low calcium, triggers the release of hormones, including parathyroid hormone, that lead to osteoporosis and vascular disease. For this reason, some people require the removal of their parathyroid gland to prevent further damage. We believe that this altered dietary ratio drives long-term cellular changes in the parathyroid gland that are central to the maladaptive changes in structure and function of bones and blood vessels.

In this research, using our pre-clinical rat model, we will determine the mechanisms by which parathyroid gland adaptations to dietary phosphate are altered by the ratio between phosphate and calcium in the diet. In addition, in humans undergoing surgical removal of a parathyroid gland, we will characterize the cell populations present as a result of the typical diet. Current regulations do not require that food labels include the amount of phosphate that is added to the food supply. The evidence from these studies may be important to exposing an important, but insidious, public health problem.



(left, L-R) Dr. Appireddy, Dr. Albert Jin, Dr. Jaff, Dr. Tampieri, Dr. Dhillon, Dr. DaBreo

PREVALENCE OF ATRIAL CARDIOPATHY IN TRANSIENT ISCHEMIC ATTACK/ MINOR STROKE



Dr. Jalini

PI: Dr. Shirin Jalini (DOM) Co-PIs: Dr. Ramana Appireddy (DOM), Dr. Albert Jin (DOM), Dr. Zardasht Jaff (DOM), Dr. Donatel-

la Tampieri (Radiology), Dr. Rob Dhillon (Radiology), Dr. Dominique DaBreo (Radiology)

Transient Ischemic Attack (TIA) and minor stroke are more prevalent than previously thought. These patients are at risk of stroke recurrence and the most effective prevention strategy depends on determining the cause of the inciting event. Despite advancements in technology, the cause of stroke is not found in approximately one third of patients (cryptogenic stroke). It has long been suspected that the blood clot causing the stroke in these patients originates from the heart.

Atrial cardiopathy is a broad term which implies dysfunctional atria within the heart. It is hypothesized that structural and/or electrophysiological changes within chambers of the heart can predispose it to form blood clots, which can travel to the brain. This can happen independent of known thrombogenic arrythmias such as atrial fibrillation.

Our research focuses on identifying known imaging, electrophysiological and serum markers of atrial cardiopathy in cryptogenic TIA/ minor stroke patients. We hypothesize that atrial cardiopathy is more prevalent in this patient population compared to patient whose cause of strokeis known. This will potentially provide these patients with better and more targeted stroke prevention strategies.



(left, L-R) Dr. Jason Gallivan, Dr. Lysa Boisse Lomax, Dr. Garima Shukla, Dr. Michelle Keiski, Dr. Stephen Scott

COMBINING NEUROIMAGING AND ROBOT-BASED BEHAVIORAL ASSESSMENT TO IDENTIFY BIOMARKERS OF COGNITIVE DYSFUNCTION IN PEOPLE WITH EPILEPSY



Dr. Winston

PI: Dr. Gavin Winston (DOM)
Co-PIs: Dr. Jason Gallivan (DBMS, Psychology)
Collaborator: Dr. Lysa Boisse Lomax (DOM), Dr. Garima Shukla (DOM), Dr. Michelle Keiski (DOM), Dr. Stephen Scott (DBMS)

Epilepsy is a common neurological disorder affecting around 300,000 Canadians. Aside from seizures, many patients also suffer with cognitive problems, including memory, processing speed and planning. These affect day-to-day life and are a key factor in impaired quality of life. Patients are usually assessed by neuropsychological evaluation, which is lengthy, expensive and fatiguing for the patient.

In a collaboration between the Department of Medicine (Neurology), DBMS and Psychology, we will evaluate cognitive problems in people with epilepsy using both conventional neuropsychology and robotic assessment with the Kinarm robot developed at Queen's. We will also acquire detailed brain scans looking at the structure and function of the brain.

We aim to develop robotic-based evaluation of cognition as a valuable clinical tool to more easily identify the cognitive deficits and to understand the changes in brain networks that underlie these problems. In particular, we wish to understand why both focal epilepsies, such as temporal lobe epilepsy, and generalised epilepsies share some of the same impairments. Improved understanding of the underlying causes may help provide better treatments in future.

DOM Research Awards

In addition to the TIME Incubator grants, the Department of Medicine held its annual grant competitions for DOM Research Award and John Alexander Stewart (JAS) Fellowship to support research opportunities within the Department. A new category for "Medical Education Research" was added in the DOM research awards competition 2020. A total of \$135,000 was awarded across the four categories for the 2020 competition.

RECIPIENTS OF THE DOM RESEARCH AWARDS 2020

Category: CIHR Pillars





Dr. Anne K Ellis

Dr. Stephen Vanner

Project title: COVID-19 testing of health professional students: informing testing and public policy for Universities and Society.



Dr. Jennifer Flemming

Project title: Pregnancy in women with hepatitis C: A population-based cohort study.



Dr. Sarah Moran

Project title: The role of complement in membranous nephropathy study.

Category: Clinical Innovation



Dr. Robert Bechara

Project title: Tranexamic Acid to prevent bleeding after endoscopic resection of large colorectal polyps: A pilot project.

Category: Clinical Improvement



Dr. Amer Johri

Project title: POCUS education and training of GIM physicians for pandemic preparedness.



Dr. Kristen Marosi

Project title: Post discharge after surgery Virtual care with remote automated monitoring technology (PVC-RAM) trial at KHSC.

Category: Medical Education



Dr. Lysa Lomax

Project title: Implementing Resident Telemedicine Clinics: Virtual Medicine Assessment Tools in the era of Competence by Design (CBD).



Dr. Sara Awad

Project title: Barriers and enablers of implementation of personal learning plans in an Internal Medicine Residency Program: An exploratory study.

The John Alexander Fellowship Award

Dr. Mandip Rai (supervised by of Dr. Lawrence Hookey and Dr. Robert Bechara) won a JAS award for his project entitled "Tranexamic Acid to Prevent Bleeding After Endoscopic Resection of Large Colorectal Polyps." Post-polypectomy delayed bleeding has a significant impact on the life of the patient and is a major cost to the healthcare system. Currently, there are no clear guideline recommendations from the major Canadian, American or European gastroenterology societies on the prevention of it. If effective, tranexamic acid could then become the standard of care to prevent post-polypectomy delayed bleeding.



Dr. Mandip Rai

SEAMO COVID-19 Innovation Fund Winners 2020

To help fight the global pandemic the Southeastern Ontario Academic Medical Organization funded projects in June 2020, following five TIME members' projects got funded:



Dr. Victor Snieckus



Dr. Stephen Archer

Synthesis and preclinical testing of novel small molecule therapies for COVID-19

Currently no drugs have been proven effective in randomized clinical trials for treating the severe respiratory effects of COVID-19. Drs. Archer (Medicine) and Snieckus (Chemistry) are confronting this challenge on two fronts. Firstly, they will modify existing antiviral drugs to improve their metabolism and efficiency and reduce their toxic side effects. On a second front they have identified that SARS-CoV-2 kills cells and may impair oxygen sensing by damaging mitochondria in lung cells. They will explore a novel mitochondrial pathway to combat the "happy hypoxemia" (low oxygen without appropriate shortness of breath), which characterizes COVID-19 pneumonia, and to prevent cell death by protecting mitochondria from SARS-CoV-2. Sussex Research Inc. (Ottawa) is collaborating in the antiviral drug synthetic work and dissemination of the results. Dr Snieckus, a globally respected organic chemist, died in December 2020. Despite his apparent poor health, he had contributed significantly to the success of this proposal. Dr Archer said, "I will greatly miss Vic, his passion, drive and expertise; he was a world class chemist.". Dr Archer is now collaborating with his postdoctoral fellow, Dr. Ross Jansen-van Vuuren to complete this project.





Dr. Paula James

Dr. David Lillicrap

Coagulopathy: Understanding and Treating a Novel Entity

Drs. James (Medicine) and Lillicrap (Pathology and Molecular Medicine), leading researchers in clinical and molecular hemostasis, are studying the links between COVID-19 coagulopathy, an unexplained and potentially fatal bloodclotting syndrome associated with SARS-CoV-2, and von Willebrand Factor (VWF), a blood clotting protein. They are collaborating with researchers at St. Michael's Hospital (Toronto) and Vermont Medical Center who are studying the effects of the blood thinner heparin on COVID-19, which has been shown in preliminary research to help these patients. The role of VWF in this disorder has not yet been studied, and the KHSC and KGHRI researchers aim to gain better understanding of the mechanisms of VWF in COVID-19 coagulopathy, potentially leading to the development of new treatments.



Dr. David Maslove



Dr. Michael Rauh

COVID-19 and the Genetics of Mortality in Critical Care

Drs. Maslove (Medicine) and Rauh (Pathology and Molecular Medicine) are part of an international genetics study examining why some patients are affected more severely by COVID-19 than others. They will be looking at the genomes of patients admitted to intensive care units across Ontario and then comparing them to those of a healthy control population. Using advanced computing techniques, they will be able to look at hundreds of thousands of subtle genetic variations across the population, to determine which of these are associated with outcomes. Knowing more about these variations will lead to new strategies for fighting the virus.



Dr. Robert Siemens



Dr. Charles Graham

The Role of BCG-induced innate immune memory in the protection against coronavirus

Countries that use the vaccine Bacillus Calmette Guerin (BCG) to prevent tuberculosis show lower rates of coronavirus infection than those who do not. Intriguingly, this vaccine has also been used to successfully treat bladder cancer. Drs. Siemens (Urology) and Graham (Biomedical & Molecular Sciences) believe that BCG enhances the body's innate immune system. Their research aims to understand the immune-system mechanisms that lead to these protective benefits, and whether this vaccine could be used to protect against SARS-CoV-2, the coronavirus that causes COVID-19.





Dr. Stephen Vanner

Dr. Prameet Sheth

The application of metabolomics to enhance detection of COVID-19 and predict disease severity: A proof-of-principle study

Drs. Vanner (Gastrointestinal Diseases Research Unit) and Sheth (Pathology and Molecular Medicine) will use specialized mass spectrometry to study the metabolites found in nasopharyngeal (upper throat) samples of COVID-19. Their aim is to identify the unique signature of these tiny molecules, compared to other causes of respiratory infections such as the common cold. This metabolomic signature holds promise as a more sensitive, rapid and accurate identifier and predictor of the severity of the disease than current methods. It will also enable future studies on COVID-19 detection, prediction of disease severity, and virus identification in asymptomatic individuals.

SEAMO Innovation Fund Showcase 2020

In the year 2020, SEAMO Innovation Fund awards were received by the following DOM members. These unique projects aim to transform healthcare delivery in Ontario in several domains.

It provides short-term seed funding to support innovative projects and enable academic physicians to develop programs sufficiently to qualify for additional support and to evaluate novel strategies to transform health care delivery in Ontario.



Dr. Wael Abuzeid

Implementation of a structural mitral valve clinic for the management of patients with heart failure refractory to medical therapy.



Dr. Ramana Appireddy

Adoption and Scaling up Home Video Visits in Kingston Health Sciences Center and evaluation of health economics, patient experience of care on home video visit use: A Mixed methods implementation study.



Dr. Robert Bechara

Fistulotomy as the primary cannulation technique for all patients undergoing ERCP: A randomized controlled trial.



Dr. Diane Lougheed

Promoting Evidence-based Asthma Care: Use of Sentinel Surveillance for Quality Improvement (PEACSS-QI).



Dr. Samuel Silver

Improving Care after a Hospitalization with Acute Kidney Injury.



Dr. Don Thiwanka Wijeratne

A Multi-modal Virtual Care Bundle to Improve Quality of Care for Chronic Obstructive Pulmonary disease (COPD) at Kingston Health Sciences Centre (KHSC).

Tri-Council Research Grants

During the 2020 academic year, TIME members were awarded a number of external grants. We especially want to congratulate CIHR funding successes from the following PI's and their teams.

SUCCESS OF TIME MEMBERS IN THE SPRING 2020 GRANT COMPETITIONS



Dr. Annette Hay

Dr. Annette Hay received a Spring 2020 Bridge Grant valued at \$100K for her project entitled, "Randomized Phase 3 Evaluation of Lower Dose (3-2-1 Strategy) vs. Full Dose of Ibrutinib for the Treatment of Chronic Lymphocytic Leukemia."



Dr. Charles Graham

Drs. Charles Graham and Robert Siemens, with co-investigators Drs. Hindmarch, Berman, Cotechini, Jackson, Koti and Francois Paré received a Spring 2020 Project Grant valued over \$1M. The project is entitled, "Role of trained immunity in the response to BCG immunotherapy of bladder cancer."



Dr. Sudeep Gill

Dr. Sudeep Gill is a co-investigator on a project led by **Dr. Mohammad Auais** that was awarded a Spring 2020 Project Grant valued at over \$970K. The project is entitled, "Stronger at Home: A randomized controlled trial to improve functional outcomes for community-dwelling older adults after hip fractures."



Dr. Gord Boyd

Dr. Gord Boyd is a co-investigator on a project led by **Drs. Alexis Turgeon**, **Michael Chasse** and **Shane English**, that was awarded a Spring 2020 Project Grant valued over \$430K. The project is entitled, "The NeurO2 study: optimal brain oxygenation in neurocritically ill patients."



Dr. Nader Ghasemlou

Dr. Nader Ghasemlou, with co-investigator Dr. Mark Ormiston, received a Spring 2020 Project Grant valued at over \$930K. The project is entitled, "Neuro-immune control of postoperative pain via CCL22:CCR4 signaling."



Dr. Andrew Craig

Dr. Andrew Craig received a Spring project grant valued at \$765K. The project is entitled, "Targeting TGF-beta signaling to achieve durable therapy responses in preclinical ovarian cancer models."



Dr. Prameet Sheth

Dr. Prameet Sheth is a co-investigator on a project led by **Dr. Nongnuj Tanphaichitr** that was awarded a Spring 2020 Project Grant valued at over \$734K. The project is entitled, "Preventing HIV infection and pregnancy with the antimicrobial peptide LL-37: a novel Multipurpose Prevention Technology."



Dr. Lynne-Marie Postovit

Dr. Lynne-Marie Postovit received a Spring 2020 Project Grant valued at over \$1M for her project entitled, "Dissecting and targeting SWI/SNF loss in de-differentiated endometrial carcinomas."

SUCCESS OF TIME MEMBERS IN THE FALL 2020 GRANT COMPETITIONS

The funding amount of the following grants will be projected in the 2021 Annual Report



Dr. Amer Johri

Dr. Amer Johri and his team received a CIHR Project Grant valued \$918K for his project entitled, "Intraplaque Composition Combined with Stress Echo for Cardiac Risk Stratification." This application received the top ranking in the extremely competitive CIHR process!



Dr. Michael Rauh

Dr. Michael Rauh with Dr. Stephen Archer as a co-investigator received a Project Grant valued at \$891K. The project is entitled, "Dysregulation of TET2 and DNMT3A promotes pulmonary arterial hypertension (PAH). through inflammation: A new mechanism of PAH."



Dr. Leonie Herx is a co-investigator on three CIHR grants:

- "Use of an automated prospective clinical surveillance tool to drive screening for unmet palliative needs among patients in the final year of life," valued at \$719K.
- "Palliative care at the end of life among patients with cancer before and during the COVID-19 pandemic," valued at \$423K.
- "Effects of dexmedetomidine in patients with agitated delirium in palliative care: an open-label phase 1/2 proof-of-concept, feasibility, and dose-finding clinical trial," valued at \$100K.



Dr. Khaled M. Shamseddin

Dr. Khaled M. Shamseddin is a co-investigator on a CIHR Project Grant entitled, "Calcineurin Inhibitor in NEuRoloGically deceased donors to decrease kidney delaYed graft function trial (CINERGY) – Vanguard," valued at \$447K.



Dr. Tayade Chandrakant

Dr. Tayade Chandrakant received a CIHR Project Grant entitled, "Investigating the role of endocannabinoids in endometriosis pathophysiology and determine efficacy of cannabinoids as a novel therapeutic modality," valued at \$868K.



Dr. Sheela A Abraham

Dr. Sheela A Abraham received a 2020 Project Grant valued above \$1M for her project entitled, "Elucidating the role extracellular vesicles play in leukaemogenesis."

SEAMO Endowed Education & Scholarship Fund 2020

Two of our faculty members received the 2020 SEAMO Endowed Education and Scholarship Fund award in August 2020 which supports projects intended to add value to the continuum of medical education offered through Queen's School of Medicine focusing on undergraduate medical education, popstgraduate training programs or continuing professional development.



Dr. Ramana Appireddy

Telemedicine and medical education: A systematic review.



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Dr. Mala Joneja
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Exploring successful strategies for teaching and learning in the Queen's School of Medicine during the COVID-19 pandemic.

Research Awards - Associations, Foundations & Agencies



Dr. Sam Silver

Dr. Sam Silver was awarded 2020 KFOC Kidney Health Research Grant and received \$178279 for his project entitled "Promot-ing kidney recovery after acute kidney injury receiving dialysis".



Dr. Yuka Asai

Dr. Yuka Asai received the 2020 Canadian Dermatology Foundation Research Grant, Colin Ramsay Endowment Award. Dr. Asai will receive \$ 100,000 over two years for her research project entitled "Retinoid metabolism in basal cell carcinoma: back to the future".



Dr. Ramana Appireddy

Dr. Ramana Appireddy received two grants for his work in Virtual Health. He received a \$50k grant from Canada Health Infoway.

Dr. Apprieddy was also the receipient of a CTAQ grant valued at \$20k for his project entitled "A pilot study of physician and resident experiences and perceived barriers of using virtual care to inform the development of a digital health curriculum".



Dr. Amer Johri

Dr. Amer Johri and his team has received an award from the Canadian Cardiovascular Society for their Accelerated Remote Consultation Tele-POCUS in Cardiopulmonary Assessment (ARCTICA) project.

BY THE NUMBERS

339 6

Journal Articles

Book Chapters

2

Publications by all TIME members and associate members in the year 2020

Disclaimer: Information is based only on the numbers from the updated profiles on the TIME Network



Clinical Care Guidelines

Publications Showcased on the TIME website in 2020

Dr. Stephen Archer

Archer, S. L., Sharp, W. W., & Weir, E. K. (2020). Differentiating COVID-19 Pneumonia From Acute Respiratory Distress Syndrome and High Altitude Pulmonary Edema. *Circulation*,142(2), 101-104. doi:10.1161/circulationaha.120.047915

Dr. Neil Renwick

Nanayakkara, J., Tyryshkin, K., Yang, X., Wong, J. J., Vanderbeck, K., Ginter, P. S., ... **Renwick, N.** (2020). Characterizing and classifying neuroendocrine neoplasms through microRNA sequencing and data mining. *NAR Cancer,2*(3). doi:10.1093/narcan/zcaa009

Dr. Jennifer Flemming

Flemming, J. A., Mullin, M., Lu, J., Sarkar, M. A., Djerboua, M., Velez, M. P., . . . Terrault, N. A. (2020). Outcomes of Pregnant Women With Cirrhosis and Their Infants in a Population-Based Study. *Gastroenterology*,159(5). doi:10.1053/j.gastro.2020.07.052

Dr. Denis O'Donnell

Elbehairy, A. F., Faisal, A., Mcisaac, H., Domnik, N. J., Milne, K. M., James, M. D., . . . **Odonnell, D. E.** (2020). Mechanisms of orthopnoea in patients with advanced COPD. *European Respiratory Journal*, *57*(3), 2000754. doi:10.1183/13993003.00754-2020

Drs. Moogeh Baharnoori & Stephen Scott

Simmatis, L. E., Jin, A. Y., Taylor, S. W., Bisson, E. J., **Scott, S. H., & Baharnoori, M.** (2020). The feasibility of assessing cognitive and motor function in multiple sclerosis patients using robotics. *Multiple Sclerosis Journal - Experimental, Translational and Clinical*,6(4), 205521732096494. doi:10.1177/205521732096494

Dr. Tony Sanfilippo

Sanfilippo, A. J., Kolos, A., Chan, K., Leong-Poi, H., Sasson, Z., Wald, R., ... Yared, K. (2021). Impact of a Mandated Accreditation Process on 1,045 Registered Echocardiographic Service Providers in a Previously Unregulated, Publicly Funded Environment. *Journal of the American Society of Echocardiography*,34(3), 308-315. doi:10.1016/j.echo.2020.09.018

TIME SHOWCASE: Celebrating Excellence In Research RESEARCH IN PRESS

Outcomes of Pregnant Women With Cirrhosis and Their Infants in a Population-Based Study

Jennifer A. Flemming, Monica Mullin, Jacquie Lu, Monika A. Sarkar, Maya Djerboua, Maria P. Velez, Susan Brogly, Norah A. Terrault

READ FULL ARTICLE HERE





EVENTS

RESEARCH 'SPEED DATING' SESSION FOR SCIENTISTS



Every year TIME Speed Dating event is organized for the TIME

Competition. This popular event gives translational researchers

the opportunity to deliver their 'elevator pitch idea' to scientists

members which is followed by the TIME Incubator Grant

who are experts in state-of-the-art technology available at

Elahe Alizadeh, PhD

Queen's Cardiopulmonary Unit

Imaging & Radiation Physics Specialist, Queen's Cardiopulmonary Unit (QCPU) Assistant Professor (Adjunct), Department of Medicine



Charlie Hindmarch, PhD

Queen's Cardiopulmonary Unit Genomics Specialist, Queen's Cardiopulmonary Unit (QCPU) Assistant Professor (Adjunct), Department of Medicine Queen's. The outcome of each 'date' integrated new tools each research proposal and added value to the team. Our speed dating sessions are integrative, transformative and collaborative. List of the Scientists that participated in 'Speed Dating' session February 2020 session includes:



Patricia Lima, PhD

Queen's Cardiopulmonary Unit Molecular Imaging & Cytometry Specialist, Queen's Cardiopulmonary Unit (QCPU), Assistant Professor (Adjunct),

Assistant Professor (Adjunct), Department of Medicine



Dr. Amer Johri, MD MSc FRCPC FASE

Queen's Cardiopulmonary Unit

Cardiovascular Imaging Network at Queen's (CINQ; cinqlab.com) Associate Professor in Department of Medicine



Lisa McAvoy, MA, CCRP

W.J. Henderson Centre for Patient-Oriented Research

Clinical Research Liaison Officer, Kingston General Health Research Institute



Sean Bennet, PhD

Queen's Gastrointestinal Diseases Research Unit (GIDRU)

Postdoctoral Fellow, Queen's, GIDRU, Department of Medicine



Shadi Khalifa, PhD

Centre for Advanced Computing Senior Analytics Developer, Centre for Advanced Computing



Martin Kaufmann, PhD

Department of Medicine Research Associate, Mass spectrometry Applications Specialist



(top left, R-L) Dr. Charlie Hindmarch, Brooke Ring with the participants (top right, R-L) Martin Kaufmann, Sean Bennet with Dr. David Andrew and his student (bottom left, R-L) Dr. Denis O'Donnell and his students with Dr. Amer Johri and Marie-France Hetu (bottom right, L-R) TIME Speed Dating Session 2020

TIME NETWORK LEARNING WORKSHOP



(above) TIME Network learning workshop

TIME Network allows researchers at Queen's to increase visibility, find new collaborations and identify infrastructure available at Queen's to enhance your research. Notably – the TIME Network also allows its users to manage and export their Canadian Common CV (CCV) in a user-friendly manner.

In February 2020, TIME organized two workshops for its members to learn how to use the <u>TIME Network</u>. More than

twenty members participated in each workshop. Dr. Hindmarch, TIME Scientific Director and Phillip Desjardins, Business Development Coordinator, Proximify, demonstrated all the features of the TIME Network in the workshops and showed the users how to use this tool to organize the CCV and also answered all the queries. TIME Manager Dr. Nihal helped the new members to set up their accounts during the workshops.

DECEMBER 12, 2020: HOLIDAY GREETINGS WITH TIME COOKIES WERE GIVEN TO ALL RESEARCH GROUPS







(above) Sam & Ajay-Dr. Jennifer Flemming's kids

Statement of Equity, Diversity and Inclusion Future of TIME

At the Translational Institute of Medicine (TIME), we commit to providing a welcoming and inclusive environment. We recognize that equity and diversity are key elements in promoting a culture of excellence, innovation and inclusion that ensures the success of all of our members. We work in the context of a university that is fully committed to the principles of equity, diversity and inclusion.

We strive to continuously educate ourselves and improve this teaching and learning environment through mutual respect and ongoing conversation.

In alignment with Queen's University, we strive to:

- Maintain an environment of fairness, mutual respect and inclusiveness where all may work, learn and share their perspectives in an environment free of discrimination.
- Support all TIME members regardless of their sex, gender, ethnicity, religion or background.
- Recruit and retain learners, faculty and staff who reflect the diversity of Canadian communities and ensure that our management team, executive team and board of directors reflect the diversity of Canada.
- Ensure our programs prepare our trainees to meet the needs of a diverse groups of stakeholders as they embark on research and clinical careers.
- Ensure that TIME members have access to Equity, Diversity and Inclusion (EDI) training.

Future Considerations

Our Strategic plan 2020-2025 ensure that a defined set of strategies are in place together with milestones by which we can measure our success. While we have placed Research and Teaching excellence at the heart of this, we have ensured that the Growth and Sustainability of our Institute have firm metrics of success so that we can recruit the best students, the best staff and the best faculty to Queen's so that we have the best colleagues with whom we can grow. Our Vision and Impact will ensure that our commitment to forging a cohesive and inclusive interdisciplinary research community will be realized.



Photo credits: Archer Laboratory

The image is Two Human pulmonary artery smooth muscle cells stained with Tetramethylrhodamine, methyl ester (TMRM), a membrane potentiometric dye emitting florescence at 580 nm on the mitochondrial membrane in the presence of a current potential of intact membranes. Nuclei are pseudo colored blue.





For more information about TIME, please visit us at: <u>deptmed.queensu.ca/research/translational-institute-medicine</u>

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