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The greater danger for most of us lies not in setting our aim too high and falling short; but in setting our aim too low and achieving our mark.

*Michelangelo*

# We are the Department of Medicine.



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# A Celebration of Life

## Richard Fedorak 1955–2018

**For his celebration of life, I asked members of the Department of Medicine how they best remember Richard Fedorak.**

**Karen Goodman** wrote, “Richard Fedorak is the reason I moved from Texas to the University of Alberta. He helped establish the connections I needed to address community concerns about *H. pylori* infection in the NWT. He arranged for AHS to donate endoscopy personnel time for the Aklavik project and donated his own time to join the endoscopy team in Aklavik.

“This June he wrote an email to congratulate me on a successful grant application: ‘Karen, Let me add my congratulations as well. Also, to add that the research project you led in Aklavik is still the most memorable and personally impactful research experience I have had in my career. Richard.’ I am so grateful to have had his help and collaboration for all these years.”

**Zaem Siddiqui**, one of our neurologists, was involved in Richard’s care during this last year. “When I mentioned my research,” he wrote, “Richard’s eyes lit up, he smiled and started reminiscing about his work.” He added, “I will always remember his shoes. I kept noticing that they were polished and shining every time I saw him for 16 years. Not a speck!”



**Dina Kao** in the Division of Gastroenterology remembered, “I needed a mentor to help with my academic career. I asked Richard, and he did not hesitate for a minute. He connected me to the right people and got me involved in some of his clinical trials, which helped me develop my own research program. He implemented a plan of monthly meetings, usually at 6 pm or later on Monday nights until I got promoted. He called me the morning after the promotion hearing (which he chaired as Dean) to tell me that I would hear good news from the Department Chair. I would not have the career I have today without him. He was a wonderful mentor and friend.”

A physician in the department who became Richard Fedorak's IBD patient recalled, "Richard met with me in consultation after hours because I was on call. He put together an incredibly accurate picture of my medical condition, and with laser vision he saw through my tendency to minimize my symptoms. His tremendous experience in IBD became clear as he recommended different treatment options. I ended up enrolling in a trial that was very beneficial for me." The physician said, "This was a great example of the power of listening and observing as a consultant, and I realize that Richard brought this same attention to all his patients. He was an incredible physician."

**Juan Gonzales-Abraldes** wrote, "When I came here, Richard asked me to meet to discuss science. I vividly remember him saying, "I wrote papers, and they got rejected because I did not put enough work into them." He added, "It was the first time in my career that I heard a senior academic recognize that he was responsible for the rejection of a paper, rather than assuming that the 'stupid' reviewers did not understand the paper. He was an absolutely fascinating person."

**Bruce Ritchie** responded, "Richard was a classmate of mine, graduating in 1978. He was one of the key people organizing our 40th reunion this year, before he became so ill. My classmates were 'threatening' to put him in a wheelchair and take him down to the Mayfair golf club for our dinner on Homecoming Weekend. But because he wasn't well enough, we streamed the event, and we hope that he watched it live. Richard's son played hockey on the same team as my own son. Richard and I therefore spent many mornings, evenings and weekends drinking coffee in the stands, doing some 'curbside consults,' but mostly talking about our families. Richard was a big supporter of the biobank through CEGIR, and he brought in CFI funding for one of our large blood processing robots."

**Vivian Mushahwar**, in Physical Medicine & Rehabilitation, said, "I feel incredibly fortunate for having had the opportunity to interact with Richard Fedorak when he was Dean. He was very supportive of the Sensory Motor Adaptive Rehabilitation Technology (SMART) Network. He was a leader who enthusiastically supported innovations that improved patient care, took action and made a difference."

Finally, on a lighter note, a professor who wants to remain anonymous said, "Prior to Richard becoming Dean I was often asked by colleagues in other centres whether I knew him and then, probably trying to find out whether I was in the loop, they would ask how well I knew him. Initially, I would say that I knew Richard, but not well, a response that didn't garner much warmth or respect. But, being of a certain demographic cohort, my family doctor felt it was time for my screening colonoscopy. In the endoscopy suite with my IV inserted, I had assumed the ready position for the procedure. Imagine my surprise when I heard Richard Fedorak's voice behind me introducing himself as my endoscopist. Being the consummate clinician, he put me at ease with small talk about my career, research, how's the family etc. and then it was time for la la land.... After that when people asked how well I knew the Dean of Medicine, I replied with an enigmatic smile, 'I feel the Dean knows me very well, one could say almost to my inner core, and I feel I'm definitely in the loop.'"

Richard empowered many in the Department of Medicine to step up to the challenge of academic medicine and to have the courage to lead. He found tangible solutions to complex problems, often through unconventional means, even if they sometimes raised eyebrows. He had a way of finding money and mobilizing resources to move projects forward. He was, and will remain, part of the fabric of this department through the many ways in which he influenced us and changed our paths.

**Barbara J. Ballermann, MD**

December 11, 2018

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Success can  
come from ideas  
that once defied  
the norm.

*Dr. Barbara J. Ballermann*



# Chair's Message



Welcome to our 2018 Annual Report. We chose "Achievement" as the leitmotif this year, largely because this is what I see daily, on all fronts. The drive, hard work, and ambition of each department member has made this one of the top academic Departments of Medicine in the country. What we do every day, our achievements great and small, allows the daughters and sons of Albertans to learn at this medical school and brings the most advanced clinical care to patients in Edmonton and across Northern Alberta.

As you know, I like to look at the whole spectrum of academic medicine, with achievements as varied in their origin as they are in their consequences. I recognize how necessity can drive breakthroughs that sometimes have a global impact; how steady development of new ways of learning, teaching, practice, and administration lead to system changes; how success can come from ideas that once defied the norm; and how new tools, technologies, and care pathways are born from collaborations across disciplines.

The achievements profiled in this report did not happen just in one calendar year. They took years and, in one notable case, that of **Dr. Jean Vance's** identification of lipid uptake in the cell, three decades to happen. Other achievements, such as those of **Dr. Ann Colbourne** in improving systems of care and of **Dr. Stephen Aaron** in contributing to medical education in developing nations, are the sum of a lifetime of vision, dedication, hard work, and perseverance. Still others are "cutting edge" in terms of learning, such as **Dr. Mahua Ghosh's** curriculum development for transgender medicine; the patient care with a wrap-around service approach provided by **Dr. Steven Katz** and **Dr. Stephanie Keeling** through On-TRAAC; **Dr. Justin Weinkauf's** contributions to the Edmonton Lung Transplant Program; and **Dr. Glen Jickling's** development of diagnostic tools to determine the occurrence and cause of stroke. Also among the year's notable achievements were **Dr. Jan Willem Cohen Tervaert's** publication about the effect on the immune system of implantable mesh devices, which contributed to their banning in the US and in Canada, and **Dr. Bernadette Quemerai's** landmark research and work on workplace toxins and hazards.

The report also highlights those of our colleagues and trainees who have won department awards for outstanding publications, resulting from education and from clinical and research scholarship. Too often, publications are relegated, in tiny print, to the back of a report or a CV. In this report, publications are spotlighted at the front, reflecting the importance of scholarship, the beating heart of this department.

Yes, 2018 was a tough year, but one in which hard work and working together have led to success. We began to make major administrative changes to better function in partnership with Alberta Health Services and achieved major milestones in aligning our curriculum with the new standards set by the Royal College of Physicians and Surgeons of Canada's Competency by Design initiative. It was also a year of adjusting to the loss of our cherished colleague and leader, with the passing of **Dean Richard Fedorak**. As he would wish, we will continue our passionate inquiry into all aspects of adult medicine, aiming at one goal: delivering the very best care possible to our patients.

**Barbara J. Ballermann, MD**

*Professor and Chair, Department of Medicine, University of Alberta  
Head, Clinical Department of Medicine, AHS Edmonton Zone*

## DEPARTMENT OF MEDICINE

# 2018/19

# STEERING COMMITTEE



### BACK ROW – LEFT TO RIGHT

- Dr. Wayne Tymchak, Director, Division of Cardiology
- Dr. Douglas Zochodne, Director, Division of Neurology
- Dr. Daniel Baumgart, Director, Division of Gastroenterology
- Dr. Adrian Wagg, Deputy Chair, Associate Chair, Finance and Director, Division of Geriatric Medicine
- Mr. Francois Bouman, Assistant Chair, Administration
- Dr. Robert Gniadecki, Professor and Director, Division of Dermatology

### MIDDLE ROW – LEFT TO RIGHT

- Dr. Sebastian Straube, Professor and Director, Division of Preventive Medicine
- Dr. Branko Braam, Professor and Director, Division of Nephrology
- Dr. Joanne Homik, Ambulatory Clinics Lead
- Dr. Karen Doucette, Director, Division of Infectious Diseases
- Dr. William Dafoe, Associate Chair, Faculty Development
- Dr. Peter Senior, Director, Division of Endocrinology & Metabolism
- Dr. Ron Damant, Interim Director (2018, Division of Pulmonary Medicine

### FRONT ROW – LEFT TO RIGHT

- Dr. John Bradley, Associate Chair, Clinical Faculty
- Dr. Evangelos Michelakis, Associate Chair, Research
- Dr. Steven Katz, Associate Chair, PGME
- Dr. Barbara Ballermann, Chair Department of Medicine and Clinical Department Head
- Dr. Gopinath Sutendra, Associate Chair, Graduate Studies
- Dr. Joseph Brandwein, Director, Division of Hematology
- Dr. Narmin Kassam, Director, Division of Internal Medicine (2018) and Deputy Head, Associate Chair, Clinical Affairs



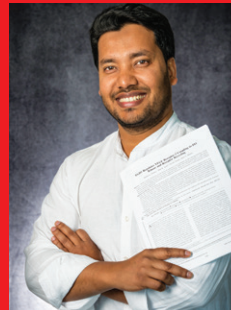
# SPOT LIGHT

# The Science Behind the Medicine

## *Spotlight on Department of Medicine Award Winners*

### ABUL KALAM AZAD

PhD student **Abul Kalam Azad** and his supervisor, **Dr. Allan Murray**, won the Department of Medicine's Translational Research Fellowship Award and Basic Science Publication Award respectively for their abstract in *Arteriosclerosis, Thrombosis and Vascular Biology*: "FGD5 Regulates VEGF Receptor-2 Coupling to PI3 Kinase and Receptor Recycling."



Angiogenesis, the growth of new blood vessels, is fundamental for normal growth and development. It also contributes to the development of cancer. Mr. Azad, Dr. Murray and colleagues investigated the role of an endothelial cell-specific protein called Faciogenital dysplasia-5 (FGD5) in phosphoinositide 3-kinase (PI3K) signalling, the predominant step in new blood vessel formation.

The authors were able to observe FGD5's association with vascular endothelial growth factor receptor 2 (VEGFR2), the key enzyme regulating angiogenesis. While FGD5 loss did not disrupt the expression of VEGFR2, it did lead to a decrease in critical VEGFR2 coupling with PI3K. This study is the first to show how FGD5 regulates VEGFR2 action during an important period of blood vessel development.

## AMINU BELLO

**Aminu Bello** won the Department of Medicine's Clinical Investigation Publication Award for his lead authorship of a 2017 paper in *JAMA*, "[Assessment of Global Kidney Health Care Status.](#)"



Rates of chronic kidney disease (CKD) are rising exponentially around the world, as risk factors such as obesity, diabetes, smoking and high blood pressure increase. Dr. Aminu Bello and colleagues surveyed 125 countries to assess their capacity, ability and readiness to provide kidney care. One finding was that kidney health is not recognized as a health priority, although low income countries

prioritize it at triple the rate of upper-middle income countries. Providing care to prevent or delay the progression of the disease is vital as the health and economic costs of providing dialysis and transplantation to treat end-stage CKD are enormous. Yet the authors found that all but two of the surveyed countries have workforce shortages for kidney care. The assessment is intended to inform policy that will lead to the establishment of kidney care programs that will improve early detection and management of CKD.

# SPOTLIGHT

## CHARL ELS

**Charl Els** won the Department of Medicine's Clinical Faculty Research Award for a 2017 publication in the *Cochrane Database of Systematic Reviews*, "[Adverse Events Associated with Medium- and Long-Term Use of Opioids for Chronic Non-Cancer Pain: An Overview of Cochrane Reviews.](#)"



Opioids make news headlines because of over-prescribing and the potential for addiction. They play an important role in helping to manage the pain from certain cancers and for palliative care, but a better understanding of long-term opioid use in managing chronic non-cancer pain (CNCP) is needed. Dr. Charl Els, along with senior author

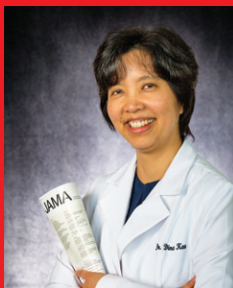
**Dr. Sebastian Straube** of the

Division of Preventive Medicine and the other authors of the study, conducted an overview of *Cochrane Reviews* on medium- and long-term side-effects of opioid drugs when used for chronic, non-cancer pain. Dr. Els' study suggested that a number of adverse events, including serious adverse events, are associated with the use of opioids for CNCP. The absolute rate for any adverse event with opioids in 61 trials was 78%, while for serious adverse events it was 7.5%. The authors suggested that clinically relevant benefits have to be clearly demonstrated before long-term use of opioids is considered for CNCP.

# SPOT LIGHT

## DINA KAO

**Dina Kao** won the Department of Medicine's Translational Research Award for her publication in *JAMA*, "[Effect of Oral Capsule Versus Colonoscopy-Delivered Fecal Microbiota Transplantation on Recurrent Clostridium Difficile Infections. A Randomized Clinical Trial.](#)"



Edmonton has the highest rate of hospital-acquired *Clostridium difficile* infection in Alberta and one of the highest in Canada. Dr. Dina Kao pioneered the use of fecal transplantation in Edmonton to treat patients affected by *C. difficile* infections. The success of the treatment led to the establishment of the Fecal Microbiota Transplantation Program

in 2013. Dr. Kao conducted a multi-centre study to compare capsule versus colonoscopy delivery of donor stool to treat *C. difficile* infection and to test previous findings that colonoscopy delivery had the highest rate of success in uncontrolled studies. Dr. Kao's study concluded that fecal transplant by either method had an equal success rate of 96%, with both resulting in significant improvement in patients' quality of life. Capsule delivery is less expensive, and patients in the capsule group rated their experience more positively than those in the colonoscopy group.

## JAYME KOSIOR

**Jayme Kosior** won the Department of Medicine's Paul Man Award for his article published in *Stroke*, "[Monitoring Reperfusion During Endovascular Therapy.](#)"



Using established fluid mechanics theory, Dr. Jayme Kosior and team developed a way to derive blood flow measurements from angiographic images obtained during endovascular procedures. Their pioneering work presented clinical evidence suggesting that abnormally large increases or decreases in blood flow post-procedure may predict hemorrhagic transformation,

or bleeding into infarcted tissue. Hemorrhagic transformation is the primary safety concern when selecting patients who will benefit from endovascular treatment. Dr. Kosior's observations may provide new therapeutic opportunities post-procedure, such as patient-specific blood pressure management to regulate blood flow. With new guidelines from the Heart and Stroke Foundation of Canada expanding the role of endovascular treatment, this timely innovation could see rapid translation into standard practice because it requires minimal changes to existing protocols. The article was published in and featured on the cover of the September 2019 issue of the American Heart Association's journal *Stroke*.

## MICHELLE GRAHAM

**Michelle Graham** won the Department of Medicine's Paul W. Armstrong Excellence in Research Award for her 2017 publication in *Annals of Internal Medicine*, "Aspirin Before Non-Cardiac Surgery in Patients with Previous Percutaneous Coronary Interventions."



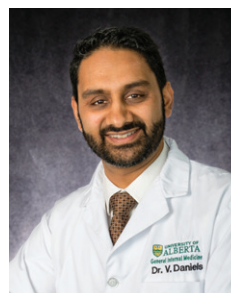
Every year more than 200 million adults around the world undergo major non-cardiac surgery. Dr. Michelle Graham's landmark 2017 publication in the *Annals of Internal Medicine* could potentially change surgical practice globally. The study reviewed the POISE-2 clinical trial data to show reduced risk of heart attack when patients with previous

percutaneous coronary intervention (angioplasty and/or stents) took low-dose aspirin just before, during and shortly after major non-cardiac surgery. Original POISE-2 findings cautioned against using aspirin in patients undergoing non-cardiac surgery because of the risk of bleeding. Dr. Graham's study focused on the sub-set of patients who had had a previous coronary intervention and demonstrated that the reduced heart attack risk far outweighed the bleeding risk. Dr. Graham is past-chair of the Canadian Cardiovascular Society Scientific Program Committee, associate editor of the *Canadian Journal of Cardiology* (CJC), editor-in-chief of the CJC Open and secretary/treasurer and president-elect of the Canadian Cardiovascular Society Academy.

# SPOT LIGHT

## VIJAY DANIELS

**Vijay Daniels** won the Department of Medicine's Medical Education Publication Award for his lead authorship of a 2017 online and 2018 print publication in *Medical Teacher*, "12 Tips for Developing an OSCE that Measures What You Want."



A milestone of a health professional's training is the objective structured clinical examination (OSCE), which assesses competency in simulated clinical scenarios. Each step of the OSCE is standardized to ensure candidates are assessed equitably and reliably, yet an OSCE cannot assess what it is meant to measure without evidence that the entire process is valid for the purpose.

In their paper, Dr. Daniels and co-author Dr. Debra Pugh look at modern approaches to validity that use validity evidence to support the intended use of assessment, such as lower-stake assessments that require less rigorous validity evidence than do higher-stake assessments. They highlight Kane's validity framework, with its division of the validity evidence sources into four stages of inferences, as a touchstone for decision-making. Drawing on Kane's framework and the best empirical evidence, they offer concrete tips on how best to develop an OSCE that fulfils its intended purpose.



# Medical Education Achievement Department of Medicine

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Not enough of our society is trained how to understand and interpret quantitative information. This activity is a centerpiece of science literacy to which we should all strive—the future health, wealth, and security of our democracy depend on it. Until that is achieved, we are at risk of making under-informed decisions that affect ourselves, our communities, our country, and even the world.

*Neil DeGrasse Tyson*

## Medical Education Achievement



### Mahua Ghosh

Mahua Ghosh came to the Department of Medicine in 2011 with a PhD in pharmacology, a residency in internal medicine and subspecialty training in endocrinology. She went on to complete a certificate in medical education from the University of Dundee in 2017.

Dr. Ghosh's passion for medical education resulted in her current appointment as program director of the endocrinology subspecialty resident training program. She's revamped the curriculum to build strengths in all aspects of training—from the integration of social accountability, resource stewardship and triage training to the introduction of divisional quality improvement and quality assurance projects embedded in practice. To increase residents' clinical exposure, she launched a Complex Type 2 Diabetes clinic, which linked to her research interest in Polycystic Ovarian Syndrome.

She also developed a keen interest in faculty development, identifying the need for education in emerging areas of practice, such as transgender medical care. "When I started my practice," she says, "I saw many transgender people for cross-gender hormone therapy. Finding a family physician to transfer their care to was challenging." In response, in 2016 she presented an information session on transgender medicine for healthcare professionals, to a cold reception.

Just a year later, "a second presentation to the same audience had a completely different response," she says. "Despite the positive change in attitude, there's still a lot of work to be done. No matter our specialty, we will all be providing care to people who are transgender."

In addition to developing education sessions on transgender medicine for cardiology residents and Diabetes Canada, she successfully advocated for the incorporation of transgender medicine as an objective of training for endocrinology for the Royal College of Physicians and Surgeons of Canada (RCPSC).

Under Dr. Ghosh's leadership, the endocrinology program received full accreditation from the RCPSC. While she collaborates in clinical and basic science research and is known as a superb physician, it is her prowess in medical education that is contributing to her growing profile as a national leader in the field.

*Dr. Mahua Ghosh is Associate Professor in the Division of Endocrinology & Metabolism in the Faculty of Medicine & Dentistry's Department of Medicine. She serves on the Canadian Society of Endocrinology and Metabolism's Continuous Professional Development (CPD) Committee and implemented the new 2018 national RCPSC Accreditation Standards in CPD activity for endocrinologists. She is also a member of the Program Planning Committee for Diabetes Canada's annual meeting.*



*Dr. Aaron with patient Carl Northwest at Maskwacis Health Services.*

## Stephen Aaron

Rheumatologist, medical education expert and inveterate traveller Stephen Aaron was in Nepal in 2011 when he heard about efforts to establish a new medical school in Patan, a suburb of Katmandu. He became involved, contributing to curriculum development and clinical mentoring in his annual visits. In 2018, the school launched the first rheumatology training program in the country.

*“The school was established on the principle of social accountability, which means working with the people you are trying to serve. You don’t do things just because you think they are good for people; you ask them what they want and include them in the initiative,” says Dr. Aaron.*

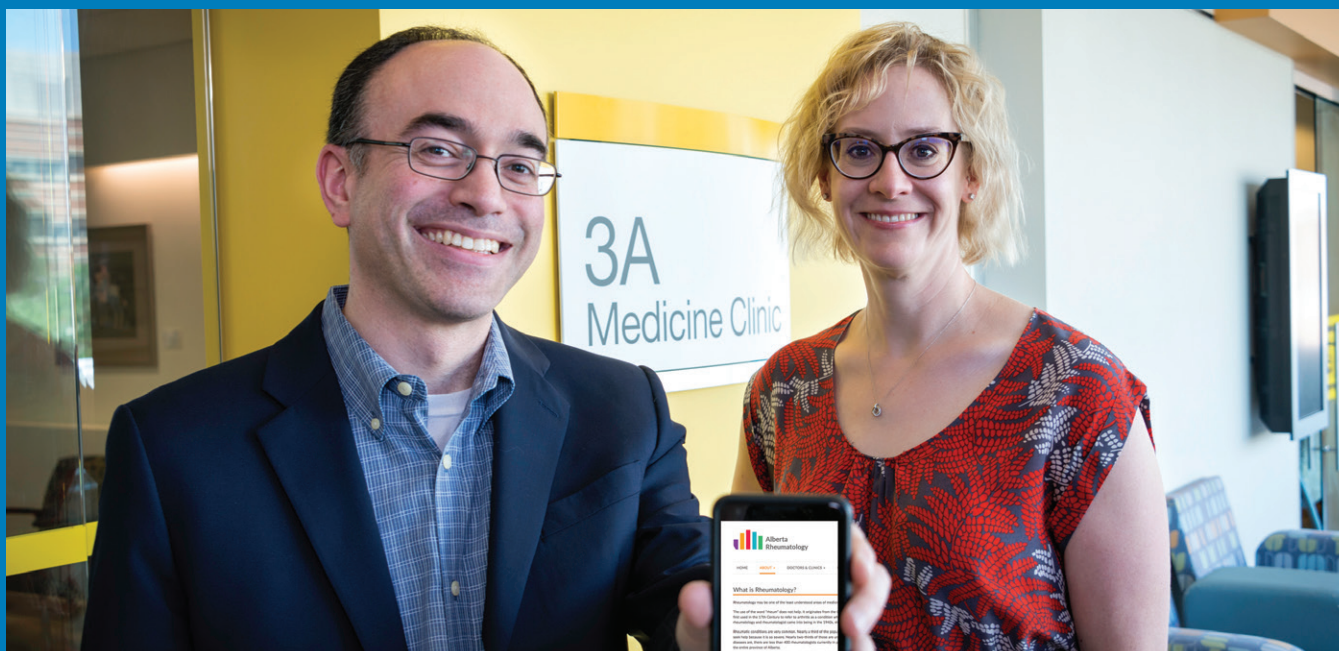
Dr. Aaron saw that the social accountability principle could work in delivering arthritis care in rural, remote and under-served communities in Canada, especially in Indigenous communities. There is a three-fold higher incidence of rheumatoid arthritis in Indigenous communities than in non-Indigenous populations. Much-needed access to specialists—almost all in larger urban centres—is complicated by distance, poverty and distrust because of the history of colonialism, residential schools and “Indian” hospitals.

In 2016, Dr. Aaron began a project to deliver on-site rheumatology clinics in two Indigenous communities in Alberta, Saddle Lake and Maskwacis. He worked with the communities’ health care workers, patients and families, and with the provincial Strategic Clinical Network Arthritis working group to understand the care needed and the best ways to deliver it. They followed the model of “shared care,” with Dr. Aaron training local health care workers to assess and track disease activity, communicate with him about patient status and record data in the database. He travelled to both communities twice a month for two years.

The project experienced some setbacks—staff departures, delays in ethics approval for data collection by staff and Dr. Aaron’s winding down of his workload starting in 2019. “Our division recognizes it is a priority to maintain what we’ve achieved and is actively recruiting for my replacement,” he says.

The clinics yielded robust data on a large cohort of rheumatoid patients and, most importantly, delivered specialized care with a resulting improvement in patients’ health and quality of life. One of Dr. Aaron’s patients in Maskwacis, Carl Northwest, was wheelchair-bound when he first started treatment. Now, thanks to consistent care at the clinic, he walks everywhere and is back to his active lifestyle as a hunter.

*Dr. Stephen Aaron is a consulting rheumatologist with Alberta Rheumatology at the Kaye Edmonton Clinic. He is preparing for retirement in 2019, and his plans include continuing his international medical education volunteerism.*



Dr. Steven Katz with Dr. Jill Hall

## Steven Katz

When he started his career a decade ago, rheumatologist and medical educator Steven Katz saw the need for on-demand information for patients. He developed a website, now called Alberta Rheumatology, that grew into a go-to resource for patients, residents and rheumatologists. One of the site's features was the [Image-of-the-Month](#) contest, which presented a rheumatology puzzle to be solved by trainees.

*"Data showed that this kind of tool increases exposure to formal rheumatology teaching," says Dr. Katz. "Nationally, over the last decade, interest in rheumatology has likely doubled. And in Edmonton, as of 2018, we've become the number one producer of rheumatology trainees in the country."*

Today Dr. Katz is associate chair of Postgraduate Education and program director of the Core Internal Medicine Program. Among his recent successes was leading the initial implementation of competency-based medical education in the internal medicine program well ahead of the mandated schedule.

His ongoing focus on educational and clinical innovations has resulted in a patient-focused YouTube site about disease management and web-based tools for physicians to track disease activity (RheumDAS) and provide physicians with up-to-date lists of rheumatology patients (RheumDASH In-Patient Consult Dashboard).

He also founded and co-directs the Collaborative Rheumatologist-Pharmacist Inflammatory Arthritis Follow Up Clinic with **Dr. Jill Hall** from the Faculty of Pharmacy and Pharmaceutical Sciences. The clinic has significantly increased patient access and satisfaction.

Dr. Katz also co-founded the Treating Rheumatoid Arthritis, Improving Access to Care (On-TRAAC) Clinic, offering multidisciplinary, data-driven care for patients with inflammatory arthritis and additional health conditions, such as cardiovascular risk, bone health and mood changes. He and **Dr. Stephanie Keeling** are On-TRAAC's co-directors.

"Patients see other care providers with advanced arthritis care training," says Dr. Katz. "A nurse might spend half an hour or more with a patient. Care is more comprehensive, I can see 50% more patients and patients are more satisfied because we focus not just on their arthritis, but on the other conditions that often come with it."

Dr. Katz sees the potential for the On-TRAAC approach to be a standard of care for all rheumatology patients. "We would see a 50% increase in patient volume without needing to hire more rheumatologists. It would make a huge impact in terms of wait lists and patient care."

*Dr. Steven Katz is Associate Professor in the Division of Rheumatology in the Faculty of Medicine & Dentistry's Department of Medicine. In 2018, Dr. Katz was listed as one of Edmonton's Top 40 Under 40 by Avenue Magazine.*



“

....to live as a doctor is to live so that one's life is bound up in others' and in science and in the messy, complicated connection between the two. It is to live a life of responsibility. The question then, is not whether one accepts the responsibility. Just by doing this work, one has. The question is, having accepted the responsibility, how one does such work well.”

*Atul Gawande*

# Clinical Achievement Department of Medicine

# Clinical Achievement



## Ann Colbourne

Ann Colbourne's prestigious career began with pre-medical and medical school at Memorial University in Newfoundland, a Rhodes Scholarship at the University of Oxford and a residency at the Mayo Clinic. In 2008, after several years in provincial, academic and clinical leadership positions in Newfoundland and Labrador, Dr. Colbourne joined the Department of Medicine's General Internal Medicine (GIM) Division as professor and division director.

She credits her experiences at Mayo for maturing her core professional values. "The whole ethos of the Mayo Clinic is that the needs of the patient come first," says Dr. Colbourne. "Our reality often is serving in very provider-centric systems."

One of her first transformational initiatives in Alberta was to enhance GIM's care delivery through a patient cohorting project at the University of Alberta Hospital. This meant assigning patients to the clinical ward and team most suited to their needs, instead of to the first available bed, no matter where that bed was.

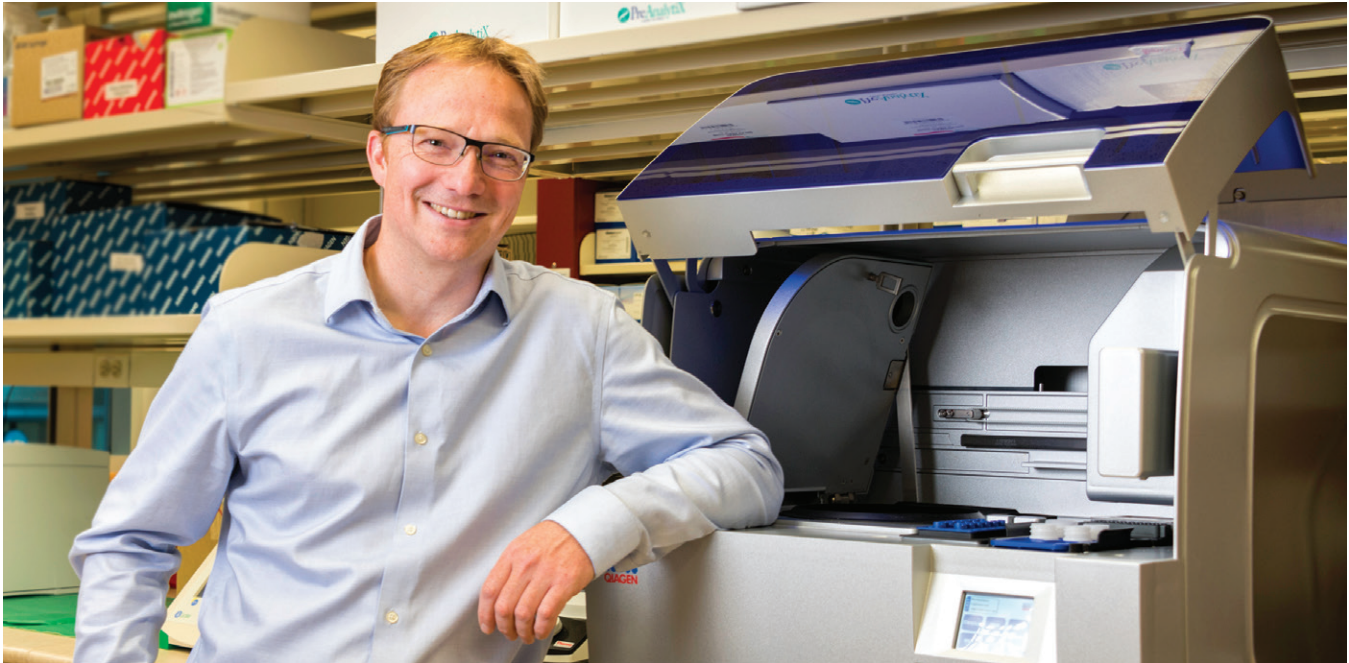
She faced many challenges, including overcoming the reluctance of admitting physicians to transfer care to ward clinical teams. The improvement in care community conversations, focus and efficiency convinced the sceptics.

*"We exceeded benchmarks," says Dr. Colbourne. "And to this day GIM continues to lead in efficiency, with excellent patient care."*

In 2012, Dr. Colbourne became a senior leader with Alberta Health Services. Through the CoACT Program, she developed a provincial collaborative care model, built on the division's care transformation project, which prioritized patient- and family-centred care, team function and effectiveness, and quality management. The model is now being used in non-acute care settings such as long-term care. Having taken the program from project to operational business-as-usual, Dr. Colbourne reflects, "This is a legacy program that will continue to mature over time."

Looking back on her career, Dr. Colbourne comments, "Putting the needs of patients first drove me to really tackle this transformation agenda. I don't think I've done anything that's as impactful and meaningful in my life."

*Dr. Colbourne retired in 2017. She has been recognized throughout her career for her clinical mentorship and care innovations with numerous honours and awards, including Mayo Clinic's Plummer Award for Excellence, Clinical Excellence—Mentorship and Innovator and two President's Excellence Awards from Alberta Health Services. She was appointed Clinical Professor Emerita on July 1, 2019.*



## Glen Jickling

When a stroke occurs, rapid treatment can prevent major disability or death. As a neurologist, Glen Jickling regularly delivers life-saving care. As a researcher, he's developing precision-based tools to improve stroke diagnosis and to prevent strokes from happening. To achieve this, he's set up a new laboratory and research program centred on the genetics of stroke and post-stroke gene expression.

One of Dr. Jickling's research interests is an RNA-based blood test to improve stroke diagnosis. "We know that the immune system has a specific response to the brain when ischemic stroke occurs, and this differs from the response that occurs in brain hemorrhage or migraine or seizure," says Dr. Jickling. "We're using the differences in response as a biomarker to diagnose stroke."

*"If we understand how the immune system disrupts the blood brain barrier, we could potentially target it and help patients with stroke achieve better outcomes," says Dr. Jickling.*

Another biomarker he's developing will be used to predict the cause of stroke. Genes expressed in immune cells have unique patterns depending on whether the stroke originates from a clot in the heart, a problem in a large or small blood vessel or some other cause. "The biomarkers will help us predict the likely cause of stroke in patients where currently the cause is unknown. That will help us provide optimal treatment to prevent stroke."

The role of the immune system in breaking down the blood brain barrier in stroke is another research focus. If the blood brain barrier is sufficiently disrupted, blood can leak into the brain, causing a secondary injury after stroke that worsens patient outcomes. "If we understand how the immune system disrupts the blood brain barrier, we could potentially target it and help patients with stroke achieve better outcomes," says Dr. Jickling.

In other research, Dr. Jickling monitors stroke patients using a home monitoring blood pressure cuff developed by **Dr. Raj Padwal** to study the relationship between blood pressure control and the risk of recurrent stroke and vascular cognitive decline.

A highly regarded teacher and mentor, Dr. Jickling is also a co-director of the Department of Medicine Translational Research Training Program. Among his many honours is the 2018 American Academy of Neurology's Michael S. Pessin Stroke Leadership Prize.

*Dr. Glen Jickling is Associate Professor in the Division of Neurology in the Faculty of Medicine & Dentistry's Department of Medicine. Dr. Jickling's research is supported by the Canadian Institutes of Health Research, Canada Foundation for Innovation, National Institutes of Health, Boehringer-Ingelheim Pharmaceuticals, Heart & Stroke Foundation of Canada, Hypertension Canada, Servier, Economic Development and Trade, and University of Alberta Hospital Foundation.*



Dr. Justin Weinkauf with patient Misty Armstrong

## Justin Weinkauf

As a hockey-loving kid growing up in Saskatchewan, Justin Weinkauf knew first-hand the importance of every team member's contributions to a goal. Fast forward a few decades and Dr. Weinkauf, now an internationally known lung transplant specialist, hasn't changed his view. He credits each person on the Edmonton Lung Transplant Program team, led by Director **Dr. Dale Lien**, as critical to the program's success as one of the foremost lung transplant centres in the world, serving the largest geographical area of any program in the country.

*“Lung diseases—not just smoking-related lung diseases but pulmonary fibrosis, cystic fibrosis, pulmonary hypertension— are an increasing cause of mortality, so transplantation demand has also increased. But the supply of donor organs hasn't been able to meet the demand,” says Dr. Weinkauf. “We realized about 10 years ago that we had to do more with the donors that we were being offered.”*

Dr. Lien's recruitment of Dr. Weinkauf in 2002 led to the program's expansion: more transplants were performed and more doctors from other centres were trained so patients could receive local post-transplant care. As the program team continued to grow over the years, so did transplantation wait lists.

The solution was to extend donor criteria. Previously, lungs from donors with issues such as aspiration, fluid overload, pneumonia or Hepatitis C would have been rejected for transplantation. Now, with strategic donor management and new medications, the lungs can recover and be cleared of infection post-transplant. This change has doubled the number of successful transplants over the past two years, to the highest number per capita of any centre in Canada.

Other actions also contributed to this achievement, including the use of *ex-vivo* lung perfusion to objectively test and improve donor lung function outside of the body. And, to avoid repeat transplantation because of airways that don't heal properly after transplantation, Dr. Weinkauf and Dr. Lien developed post-transplant interventional procedures in the bronchoscopy suite to fix the affected areas.

The program's continuity is a priority. Dr. Weinkauf is developing a lung transplant fellowship program at the University of Alberta Hospital and is involved with the Royal College of Physicians and Surgeons to develop criteria for solid organ transplant training programs in Canada.

*Dr. Justin Weinkauf is Professor in the Division of Pulmonary Medicine. His work has been recognized by the Cooperation, Collaboration & Teamwork Award from the Department of Medicine, by the Neal Brown Award for clinical excellence in the Pulmonary Division, and by three separate Champion of Care Awards from Alberta Health Services.*

# Research Achievement Department of Medicine

“

We must have perseverance and above all confidence in ourselves. We must believe that we are gifted for something and that this thing must be attained.

*Marie Curie*

# Research Achievement

## Jan Willem Cohen Tervaert

For hundreds of thousands of people, medical device implants such as metal-on-metal hip replacements, breast implants and polypropylene meshes for health or cosmetic reasons have changed their lives for the better. But for other implant recipients, the result is chronic pain, fatigue and other debilitating symptoms. These problems have spurred research into the health consequences of implants, including studies of a condition called autoinflammatory/autoimmunity syndrome induced by adjuvants (ASIA). One of the most recognized scientists in the ASIA field is clinician and researcher Jan Willem Cohen Tervaert.

*“Implants can act like an adjuvant in that they are foreign bodies that stimulate the body’s immune system to respond,” says Dr. Cohen Tervaert.*

His research shows that people who are genetically prone to autoimmune diseases are most likely to have an autoimmune response to implants, and their response can occur earlier and be more severe than in people without implants.

In 2018, Dr. Cohen Tervaert published an article about his research, “Autoinflammatory/Autoimmunity Syndrome Induced by Adjuvants (Shoenfeld’s Syndrome) in Patients after a Polypropylene (PP) Mesh Implantation,” in *Best Practice & Research Clinical Rheumatology*—the first scientist to publish on the subject. His paper concluded that PP mesh implants increased the risk of developing autoimmune disease in half the patients he studied, even in those without pre-existing autoimmune disease.

What exactly triggers autoimmune responses is still unknown. “One of the challenges to this research is that the composition of the devices is proprietary, so no one really knows what is in them,” says Dr. Cohen Tervaert. The volume of patient complaints and the growing body of research are having an effect. In April 2019, the US Food and Drug Administration ordered all manufacturers of surgical mesh for transvaginal repair of a prolapse to “stop selling and distributing their products immediately.” Canada banned non-absorbable synthetic transvaginal surgical meshes in July 2019.



These legal decisions reflect the inspiration for Dr. Cohen Tervaert’s research. “There are no good studies that show medical devices are safe,” he says. “We use the devices to correct a problem, but we do not know that they are safe.”

*Rheumatologist/Internal Medicine specialist Dr. Jan Willem Cohen Tervaert was recruited to the Department of Medicine in 2017 as director of the Division of Rheumatology. He is a founding member of the Autoimmunity Consortium, a former chairman of the scientific advisory board of the Dutch Arthritis Foundation and a former advisor to the Dutch Minister of Health.*



## Bernadette Quemerai

Bernadette Quemerai holds a small plastic petri dish lined with what looks like dark brown paper. “This is a sample of the particles captured in welding fumes after three hours of exposure,” she says. The filters are used in a study looking at the effectiveness of respirators on welders’ exposure. Welding fumes are metallic particles that can get deep into the lungs. With constant exposure, the particles accumulate over time and can lead to chronic obstructive pulmonary disease, lung cancer and other diseases.

*“This is a sample of the particles captured in welding fumes after three hours of exposure,” she says. The filters are used in a study looking at the effectiveness of respirators on welders’ exposure. Welding fumes are metallic particles that can get deep into the lungs.*

Monitoring exposure to hazards—welding fumes, noise, vibrations, mould, radiation—is one of the functions Dr. Quemerai performs as an occupational hygienist. An unorthodox academic, she trained as a molecular chemist, then an occupational hygienist, and worked in industry and with government agencies in various provinces in Canada. She was recruited to the Division of Preventive Medicine in 2012, with the goal of developing her practice into an area of academic research and teaching.

Her academic path was challenging. She had to build her lab from scratch and, without an extensive academic publication record and with a limited network, getting funding was difficult. Plus, Dr. Quemerai hadn’t taught before: she took intensive training to prepare herself for the classroom.

By 2018, her determination paid off. She has an occupational hygiene testing laboratory that monitors for airborne particles, built with provincial and national funding. Her research evidence is published in scientific journals and she hopes it will help provincial governments develop or update their health and safety policies. She developed an innovative curriculum involving expertise from other faculties and she is consistently recognized for her teaching in strong student evaluations.

She is also gaining increasing recognition in the work world where people balance the pressures of work pace and place with procedures and equipment required for health. In 2018 she was invited by the Canadian Welding Association to present her findings about welding fume exposure at their annual CanWeld conference in Winnipeg. She posted her presentation on the CanWeld website and published her study findings in the journal *Weld* [in June 2019]. “This kind of interest from people in the trade is what leads to awareness and actions for their own long-term health,” says Dr. Quemerai.

*Dr. Bernadette Quemerai is Associate Professor in the Division of Preventive Medicine in the Faculty of Medicine & Dentistry’s Department of Medicine. In 2018 she completed a Mitacs Career Connect funding grant and a Government of Alberta Operating Grant. She also holds a Canada Foundation for Innovation Infrastructure Operating Fund grant.*



## Jean Vance

It takes years for basic research to become relevant to a disease. At a time when funding is increasingly scarce, Professor Emerita Jean Vance has a simple message: "If people don't do the fundamental, basic research, you've got nothing to translate into health advances."

Dr. Vance knows this more than anyone else. Her curiosity-led basic research resulted in a stunning discovery thirty years ago that only now is being heralded for its potential to change medicine.

Dr. Vance, a cell biologist, started her career tackling a question no one else had answered: how lipids, fatty molecules in cellular membranes and essential to life, move around in cells. "I knew there had to be a mechanism for getting them from where they were made to other cellular membranes," says Dr. Vance. "The problem is, they're not soluble in water, so they can't just diffuse to other membranes."

She tracked the journey of a phospholipid from where it was thought to be made to the mitochondria, the cell's energy-producing structure. Her results confirmed that not only was the phospholipid made where scientific literature said it was made, but that the mitochondria appeared to be making it too, where scientific literature said it shouldn't be.

Dr. Vance calls this early interpretation her "almost mistake." After purifying the mitochondria further, she discovered that the activity she was seeing was occurring on an unknown membrane, tightly attached to, but different from, the mitochondria.

Dr. Vance called this new membrane mitochondria-associated membrane (MAM). "This was how the phospholipid travelled from the membrane where it was made to the mitochondria," she says. "The two membranes would come close together so the phospholipid transfer could occur without going through the water in the cytosol."

Subsequent research showed that similar connections between other cell membranes are common and explain how many molecules get from one membrane to another. Defects in these connections are now implicated in Alzheimer's disease, diabetes and cancer.

Scientific interest in her discovery has resulted in a biennial international scientific meeting specifically about membrane contact sites such as MAM. "It's a very important cell biology question," says Dr. Vance. "If this transfer of lipids didn't occur, there would be no cell."

Among her many honours, Dr. Vance was awarded the 2018 Wilhelm Bernhard International Lifetime Achievement Prize from the European Molecular Biology Organization.

*Dr. Jean Vance is Professor Emerita in the Division of Endocrinology & Metabolism in the Faculty of Medicine & Dentistry's Department of Medicine. She is a member of the Group on Molecular and Cell Biology of Lipids and a Fellow of the Royal Society of Canada.*



# Division Profiles

## Department of Medicine

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What we find is that if you have a goal that is very, very far out, and you approach it in little steps, you start to get there faster. Your mind opens up to the possibilities.

*Mae Jemison*

## DEPARTMENT OF MEDICINE

## 2018 DIVISIONAL LEADERSHIP



**Wayne Tymchak**  
Cardiology



**Robert Gniadecki**  
Dermatology



**Peter Senior**  
Endocrinology & Metabolism



**Daniel Baumgart**  
Gastroenterology



**Peter Hamilton (2019)**  
General Internal Medicine



**Narmin Kassam (2018)**



**Adrian Wagg**  
Geriatric Medicine



**Joseph Brandwein**  
Hematology



**Karen Doucette**  
Infectious Diseases



**Branko Braam**  
Nephrology



**Douglas Zochodne**  
Neurology



**Chester Ho**  
Physical Medicine & Rehabilitation



**Sebastian Straube**  
Preventive Medicine



**Giovanni Ferrara (2019)**  
Pulmonary Medicine

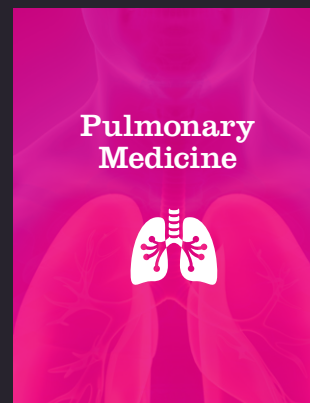
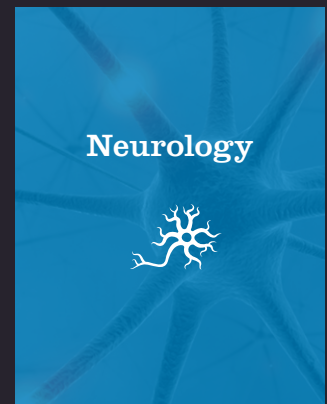
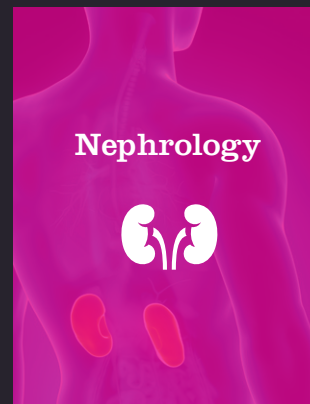
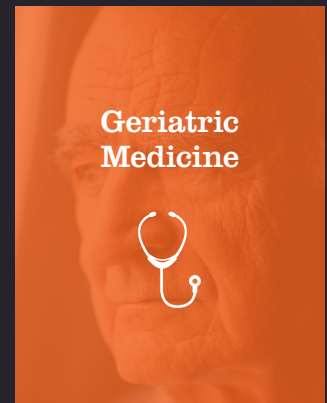
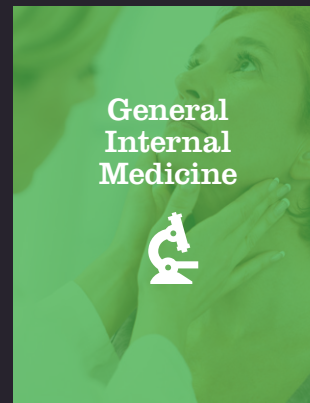
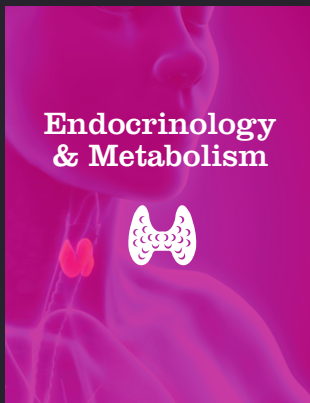
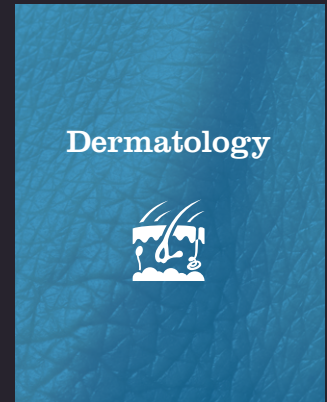


**Ron Damant (Interim 2018)**



**Jan Willem Cohen Tervaert**  
Rheumatology

# DEPARTMENT OF MEDICINE DIVISIONS





# Cardiology

Division Director **Wayne Tymchak** describes 2018 as a banner year of achievements by a number of division members. Canada Research Chair (in Mitochondrial and Applied Molecular Medicine) **Evangelos Michelakis** was featured in the American Heart Association's *Circulation Research* as a Leader in Cardiovascular Science. **Poalo Raggi** received the Order of the Star, equivalent to the Order of Canada, from the president of Italy. The Department of Medicine awarded **Gopinath Sutendra** the Best Scientific Paper Award for a landmark study published in *Science Translational Medicine*.

The division's internationally recognized Canadian VIGOUR Centre (CVC), co-led by **Justin Ezekowitz** and **Shaun Goodman** (University of Toronto), along with **Paul Armstrong**, founding director, has become an epicentre of cardiac research and training with 39 ongoing grant-funded studies and eight industry-funded clinical studies.

In 2018, CVC activity resulted in 126 publications with more than 90 lectures and presentations in Canada and abroad. **Sean McMurtry** and **Roopinder Sandhu** have joined CVC as associate faculty with expertise in polyvascular disease and electrophysiology, respectively.

- 19 division members held department, faculty, Alberta Health Services or research leadership roles
- 15 specialized and multidisciplinary clinics were led by division members
- Two division members were involved in cardiac training in Kenya and in Sudan

## FOR 2019

In collaboration with the Faculty of Medicine & Dentistry and Alberta Health Services, the division is developing an Edmonton Zone-wide cardiac sciences research institute. Recruitment is underway for a cardiac gerontologist to address the needs of high-risk elderly cardiac patients and an academic adult congenital disease specialist.

## KEVIN BAINEY



**Kevin Bainey** is an interventional cardiologist and director of the interventional cardiology fellowship program. Under his leadership, the division achieved the Royal College of Physicians and Surgeons of Canada's Area of Focused Competency (AFC) accreditation in interventional cardiology training. In addition to receiving a commendation, the division was invited to serve as a model site for other AFC interventional cardiology programs across Canada. Dr. Bainey is also the ECG Core Lab director at the Canadian VIGOUR research centre and the newly appointed director of the Adult Cardiac Catheterization and Interventional Cardiology Program at the Mazankowski Alberta Heart Institute.

## GOPINATH SUTENDRA



**Gopi Sutendra's** research is uncovering potential new therapeutic approaches to tackle cardiotoxicity caused by cancer chemotherapies. In 2018, he published an important paper, "Tissue-Specific Regulation of p53 by PKM2 is Redox Dependant and Provides a Therapeutic Target for Anthracycline-Induced Cardiotoxicity," in *Science Translational Medicine*, which proposes a theoretical mechanism to help prevent heart damage in patients receiving anthracyclines, a commonly used chemotherapy. The mechanism's potential as a preventive cardiotoxicity tool underscores the importance of research informing collaborations between cardiologists and oncologists. Dr. Sutendra was awarded the Heart and Stroke Foundation's 2018 McDonald Scholarship for this research.



# Dermatology

Division Director **Robert Gniadecki** highlights the success of a division research team in establishing a method for genome sequencing of cancer cells in cutaneous lymphoma. The team—**Aishwarya Iyer, Dylan Hennessey, Sandra O’Keefe, Jordan Patterson, Weiwei Wang, Thomas Salopek, Gane Ka-Shu Wong and Robert Gniadecki**—was able to show that lymphoma in the skin does not develop from a single precursor cell (as is the case for many other cancers) but most likely involves repeated waves of colonization of the skin lesions with genetically diverse circulating skin cells.

The team’s findings were published in the April 2019 issue of *Blood Advances* in an article titled “Clonotypic Heterogeneity in Cutaneous T-cell Lymphoma (Mycosis Fungoides) Revealed by Comprehensive Whole Exome Sequencing.”

Division members are well represented in leadership roles within the university and at the provincial and national levels, with some members in more than one role. An outstanding example is **Marlene Dytoc**, who is Undergraduate Medical Education Director; Dermatology Deputy Zone Chief; Dermatology Lead, Edmonton Quality Council; and Physician Lead, Connect Care Dermatology Working Group. Division members **Eunice Chow**, **Robert Gniadecki**, **Thomas Salopek**, and **John Elliott** all lead initiatives within Alberta Health Services or nationally with the Canadian Dermatology Foundation.

- Five people in 12 department, faculty, Alberta Health Services or research leadership roles
- Three specialty and multidisciplinary clinics led by division members

## FOR 2019

The division will be building on research findings that circulating cancer precursor cells are potential biomarkers for treatment effectiveness and prognosis. The goal is to develop a method of measuring those cells in the blood as a “liquid biopsy,” eliminating the need for tissue biopsy. Research on cutaneous lymphoma genomics will also continue.

The division will launch a new interdisciplinary clinic with rheumatologist **Elaine Yacyshyn** and **Mohamed Osman** to focus on complex cases of autoimmune diseases with skin manifestations.

## EUNICE CHOW



Dermatologist **Eunice Chow** became an Associate Clinical Professor on July 1, 2018, the same month she started Edmonton’s first clinic specializing in hair loss within the University of Alberta Dermatology Clinic. The hair loss clinic provides diagnoses, treatment plans and prognoses to patients and is a dedicated teaching clinic for dermatology residents. Because many conditions can cause hair loss, including some that are chronic and progressive and others that are incurable, the clinic is in high demand. Dr. Chow’s goal with the clinic is to stabilize patient symptoms and work with referring physicians to provide care over the long term.

## JOHN ELLIOTT



**John Elliott** is a dermatologist, researcher and founder of the Patch Test Clinic at the University of Alberta for people suffering from itchy, uncomfortable rashes. The unknown cause of some rashes inspires his research. For example, working with chemistry colleagues, Dr. Elliott identified two new allergens in dyes used in plastics and textiles. In 2018, he filed patents on an improved patch test device. Dr. Elliott presents internationally and publishes prolifically. In 2018, he co-authored “Right Forearm Eruption Associated with Playing Minecraft: A Case of Contact Dermatitis Related to Computer Gaming,” published in the *Journal of Cutaneous Medical Surgery*.

# Endocrinology & Metabolism



Division Director **Peter Senior** remarks that members' achievements in 2018 exemplify the division's reputation for collaborative, translational research results that directly affect patients' lives.

**Rose Yeung Laiwah** led a partnership with NAIT students for a project called "Improving Gestational Diabetes Education: Co-Creating Change" to put information and the ability to care into patients' hands. They created video footage that let **Eddie Ryan** revise and update the diabetes-pregnancy.ca website to help women with diabetes navigate pregnancy for optimum health of mothers and their babies.

**Peter Senior** and **Rose Yeung Laiwah**, working with the Divisions of Cardiology and Radiology, demonstrated a new imaging technique to identify high risk coronary artery blockages in people with diabetes before they can cause heart attacks. Dr. Senior received the 2018 Department of Medicine Mentoring Award. **Anna Rogers** led the endocrine input for the Gender Program, an integrated clinic for transgender patients that aims to reduce waiting times for diagnosis and gender affirming treatment.



Summer student **Alanna Dunn** was first author on a paper, "Autoimmune Thyroid Disease in Islet Transplant Recipients Discontinuing Immunosuppression Late After Lymphodepletion," published in the *Journal of Clinical Endocrinology & Metabolism* in November 2018. Her co-authors were **Luis Hidalgo, Anna Lam, James Shapiro** and **Peter Senior**.

- Five people in department, faculty, Alberta Health Services or research leadership roles
- Four specialty and multidisciplinary clinics led by division members
- All division members provide care in remote locations using telehealth and eHealth, with some (Peter Senior and Rose Yeung Laiwah) also visiting rural communities

## FOR 2019

For 2019, **Anna Lam** will be working with international partners to develop a "Made in Edmonton" tool for assessing pancreas function into a new and simpler test that will determine whether new treatments for Type 1 diabetes should be approved. The pituitary team will continue to work with neurosurgical colleagues to provide streamlined care for a population with unique and complex health needs.

## TAMMY MCNAB



**Tammy McNab's** sophisticated approach to administrative procedures is widely recognized by her peers. In 2018 she was appointed assistant dean, Academic Affairs for the MD program, where she focuses on students in academic difficulties or those at risk to provide the support they need to succeed and feel safe. Another focus is further integrating human rights legislation into policies and procedures affecting students and staff in the MD program. In addition to this demanding role, Dr. McNab is Edmonton Zone medical lead for inpatient diabetes and maintains a thriving practice in diabetes, diabetes in pregnancy, and endocrinology.

## ANNA ROGERS



**Anna Rogers** is lead endocrinologist with the University of Alberta's Gender Program. She is part of a multidisciplinary team that provides streamlined care for transgendered and gender diverse people. An academic teaching and research site, the Program has studies underway on local demographics, health care status and metabolic health outcomes. Dr. Rogers is helping to plan the extension of the Program within Edmonton and into Northern Alberta. She is also on the planning and teaching committee that offered the first Canadian Global Education Initiative (GEI) course, hosted by the World Professional Association for Transgender Care in Edmonton in February 2019.

# Gastroenterology



Division Director **Daniel C. Baumgart** identified several notable achievements by members in 2018. Newly recruited **Rahima Bhanji** has taken on a leadership role in the liver transplant centre and in clinical research to improve outcomes and quality of life in liver transplant patients. **Juan Abraldes** was appointed director of the Liver Unit of the Division of Gastroenterology. Dr. Baumgart was appointed provincial lead of the Connect Care digestive diseases working group and national chair of Future Leaders in Inflammatory Bowel Diseases (FLIBD).

**Ali Kohansal** was nominated for an Alberta Health Services President's Excellence Award for work on Edmonton Zone Quality Improvement Council and was awarded funding through the Edmonton Zone Quality Improvement funding competition. The Alberta Society of Gastroenterology Distinguished Educator Award went to **Lana Bistriz**.

**Adriana Lazarescu** established a monthly multidisciplinary Foregut Round with thoracic and bariatric surgeons. Dr. Lazarescu also developed a motility course that was attended and highly reviewed by gastrointestinal residents from across Canada. **Mang Ma**, with the Fatty Liver Disease Clinic and Triage Program in the Hepatology Clinic, received funding from the University Hospital Foundation to purchase a Fibroscan. This portable tool quickly detects signs of early liver disease and is used in the clinic and in the Indigenous community outreach program.

**Leah Gramlich** and **Puneeta Tandon** helped establish a collaboration with the University of Alberta Hospital Foundation, Takeda (Shire) and the provincial government to create the Alberta Collaboration for Excellence in Nutrition and Digestive Health (AsCEND). One of AsCEND's signature projects, led by Dr. Gramlich, is the development of a patient care-based provincial nutrition dashboard within Connect Care for research and evaluation of specialized nutrition care, including intestinal failure and malnutrition. Dr. Gramlich was invited to sit on the board of directors for the American Society for Parenteral and Enteral Nutrition.

Several members were co-authors on top publications in 2018: **Daniel C. Baumgart** for "Vedolizumab Concentrations in the Breast Milk of Nursing Mothers with Inflammatory Bowel Disease" and "Long-Term Efficacy and Safety of Stem Cell Therapy (Cx601) for Complex Perianal Fistulas in Patients with Crohn's Disease," both in *Gastroenterology*; **Sergio Zepeda-Gomez** for "Competence in Endoscopic Ultrasound and Endoscopic Retrograde Cholangiopancreatography, from Training through Independent Practice," in *Gastroenterology*; **Gurpal Sandha, Pernilla D'Souza, Brendan Halloran** and **Aldo Montano-Loza** for "A Cholangioscopy-Based Novel Classification System for the Phenotypic Stratification of Dominant Bile Duct Strictures in Primary Sclerosing Cholangitis: The Edmonton Classification" in *Journal of the Canadian Association of Gastroenterology*; **Constantine Karvellas** for "Continuous Renal Replacement Therapy is Associated with Reduced Serum Ammonia Levels and Mortality in Acute Liver Failure" in *Hepatology*; and **Aldo**

**Montano-Loza** for "Global PBC Study Group. Factors Associated with Recurrence of Primary Biliary Cholangitis After Liver Transplantation and Effects on Graft and Patient Survival" in *Gastroenterology*.

**Karen Goodman, Karen Madsen** and **Andrew Mason** each received Canadian Institutes of Health Research (CIHR) Project grants—Dr. Goodman for her study of *H. pylori* in Indigenous communities, Dr. Madsen for a research core based on integrated microbiome platforms and Dr. Mason for his study of therapies for primary biliary cholangitis. **Puneeta Tandon** was awarded a Canadian National Transplant Research Program and a CIHR Catalyst grant for pre-habilitation program development for liver transplant patients.

**Constantine Karvellas** was keynote speaker at the International Society of Intensive Care and Emergency Medicine (ISICEM) Annual Congress in Brussels. **Daniel C. Baumgart** was an invited plenary speaker at four international conferences in Asia and Europe.

## FOR 2019

The division will continue its structured change process with a review of all its activities in patient care, education, research and innovation. Top priorities include the urgent replacement of ten departed and retired division members, reorganization of clinical services and the referral system, restructuring of clinical research, preparation for the Connect Care launch and the adoption of the Royal College of Physicians and Surgeons of Canada Competence by Design physician training model.

## KAREN GOODMAN



**Karen Goodman** teaches epidemiologic research methods and leads the Canadian North *Helicobacter pylori* (CANHelp) Working Group, which conducts community-driven projects to address Northern Indigenous communities' concerns about *Helicobacter pylori* (Hp) infection, which causes chronic inflammation and can lead to stomach cancer. In 2018, Dr. Goodman received Canadian Institutes of Health Research funding to develop a grant application for a support network for community self-determination in Indigenous health research. She also received joint funding from Genome Canada and the Social Sciences and Humanities Research Council to develop a proposal for investigating how Hp genomics research affects Arctic Indigenous communities.



# General Internal Medicine (GIM)

Division Director **Peter Hamilton** highlights the roster of division member achievements in 2018 in all areas of scholarship.

In the clinical domain, **Narmin Kassam** is co-chair of the Edmonton Zone Medicine Quality Council Strategic Clinical Improvement Committee (SCIC), whose membership includes **Anca Tapardel, Winnie Sia, Rany Al-Agha, Mona Gill, Inka Toman and Anita Au**, all representing Edmonton-area hospitals. The SCIC held its second annual Quality Improvement Day in November.

**Dr. Kassam**, in collaboration with Alberta Health Services, developed the Virtual Hospital, a model of personalized, virtual care delivered by an integrated team that includes pharmacy and nursing staff. **Greg Hrynychshyn** was appointed co-director of the Virtual Hospital, one of eight clinical services offered at the University of Alberta Hospital overseen by GIM Site Chief **Fraulein Morales**. Under the leadership of **Shannon Ip**, the hypertension clinic physicians participated in the Festival of Health sponsored by the Faculty of Medicine and Dentistry .

At the provincial level, GIM Division members heavily involved in Connect Care clinical system design are Chief Medical Information Officer **Rob Hayward**, Medical Informatics Lead **Tim Chan** and Clinical Knowledge and Content Management Lead **Ben Sugars**.

The division continues to excel in its contribution to medical education. **Cheryl Goldstein** is assistant dean, Learner Advocacy and Wellness, and **Vijay Daniels** is assistant dean, Assessment for the MD Program.

**Vijay Daniels** won a McCalla Professorship to study the provision of rural and remotely located physician professional development. He also received the Department of Medicine's Medical Education Publication Award and the Association of Faculties of Medicine of Canada Clinical Teacher Award. GIM resident **Caity Collins** won the A.M. Edwards Award, the Ethel Marliss Award, and Best Presentation Quality Improvement (QI) Award for a QI project that she also presented at the Canadian Society of Internal Medicine meeting.

Under the leadership of **Jennifer Ringrose**, the GIM Residency Program grew from seven residents to fifteen. GIM is now the number-one-ranked subspecialty in the Medicine Canadian Resident Matching Service. Dr. Ringrose, with assistance from Competence Committee Chair **Thirza Carpenter**, has also laid the foundations for Competency by Design to be launched in July 2019.

**Jennifer Ringrose, Peter Hwang, Raj Padwal** and **Finlay McAlister** published a total of 46 papers among them in top journals, spanning research areas from quality of care and health service utilization to clinical innovation and basic biomedical investigation.

- 34 people in department, faculty, Alberta Health Services or research leadership roles
- Nine specialty and multidisciplinary clinics led by division members

The GIM Division trains and encourages physicians to work in centres outside of Edmonton with the result that most cities and mid-sized towns in Alberta have internists.

### FOR 2019

Two of the most significant events in 2019 for the division involved changes in leadership roles. **Bruce Fisher**, whose contributions to mentorship, clinical medicine and medical education were unmatched, retired from clinical practice. **Narmin Kassam**, who most ably led the division through fundamental changes both in the medical school and in the faculty's relationship with Alberta Health Services (AHS), stepped down as division director.

### FRAULEIN MORALES



**Fraulein Morales** holds several internal and external leadership positions, including that of site chief for General Internal Medicine (GIM) at the University of Alberta Hospital, where she leads GIM clinical service operations and collaborations with other departments. Dr. Morales is the objective structured clinical examination (OSCE) director for the Internal Medicine Clerkship and oral exams director for year IV residents. She is associate chair, Clinical Faculty of the Department of Medicine and contributes to the recognition of clinical faculty in the research, education and clinical mission of the department as as chair of the Clinical Faculty Promotion Committee.

### ANCA TAPARDEL



Soon after **Anca Tapardel** joined the division in 2010, she became principal teaching physician for the undergraduate medical program at the University of Alberta Hospital. Concurrently, she launched the medical wards observership program for Year 1–2 medical students. Appointed Internal Medicine Residency Program associate program director (Academic) in 2017, Dr. Tapardel works with residents to develop innovative curriculum delivery on academic half days. She also collaborated with the Edmonton Zone Quality Improvement (QI) Council on a new initiative to instill QI culture among residents, and she is chair of Move Energy Take Action: General Internal Medicine Quality Council.



# Geriatric Medicine

Geriatric Medicine Division Director **Adrian Wagg** emphasizes how the achievements of 2018 involved continuing efforts to expand expertise, to broaden services delivered both locally and rurally and to deliver continence education to audiences in Alberta and internationally. The recruitment of geriatrician **Rebecca Lee** from Edinburgh both provided additional specialist input at the university site and expanded the continence clinic's services. Rural outreach services grew to include Westlock and Athabasca, furthering Primary Care Network partnerships and allowing older people to receive specialist services closer to home.

**Dr. Wagg** was co-lead of the Seniors Health Research Priority Setting Partnership project run by Alberta Health Services' Seniors Health Strategic Clinical Network. The Partnership engaged extensively with seniors to determine research directions to address their unanswered health questions. **Dr. Wagg** and **Dr. Triscott**, from Care of the Elderly, working with Alberta Health, led the launch of a groundbreaking clinical Alternative Relationship Plan for the provision of specialized geriatric services, which is expected to be the single alternative plan for provision of specialized geriatrics within the Edmonton zone within the next few years.

**Adrian Wagg** continues to bring continence science and education to international audiences in invited lectures, presentations and seminars and by way of a prodigious scientific output. He also works within Alberta's nursing home sector, empowering aides to make improvements in the quality of care for older residents and in their quality of working life.

**Darryl Rolfson** works with the University of Alberta in its liaison with Jilin University's Norman Bethune Health Sciences Center to encourage joint programs for medical training. The division's popular community engagement lectures led to the launch of a research study and intervention called Supporting Healthy Aging by Peer Education and Support (SHAPES). The 12-week study and peer-to-peer education program was fully subscribed and received considerable television and radio coverage.

- four people in department, faculty, Alberta Health Services or research leadership roles
- 27 specialty and multidisciplinary clinics led by division members in Edmonton, Spruce Grove, Sherwood Park, Fort Saskatchewan, Vegreville, Mayerthorpe, High Prairie, Westlock and Athabasca. Telehealth provided to Wood Buffalo Primary Care Network and Peace River.

## FOR 2019

The division will continue to concentrate on community engagement, undergraduate medical student teaching and working with Indigenous populations in NWT to build local capacity in health care to improve continence care, identified by Indigenous seniors as a significant problem.

## DARRYL ROLFSON



After completing two terms as Core Internal Medicine residency program director, **Darryl Rolfson** wanted to invest more time into building research in frailty and clinical initiatives within the Division of Geriatric Medicine. In 2018, Dr. Rolfson opened three outreach clinics for geriatric assessment in Westlock, Athabasca and Grande Prairie. He works in partnership with the Seniors Health Strategic Clinical Network (Primary Health Care Integrated Geriatric Services Initiative) to build the local capacity of teams and community organizations, starting in Westlock, raising awareness of the needs of older adults living with frailty, especially those who live outside of major urban centres.

## WILLIAM GIBSON



Rural Alberta has a higher proportion of older people than urban centres, where most specialized geriatric services are offered. **William Gibson** is one of the Geriatric Medicine Division's members providing access to specialized care through rural outreach. Dr. Gibson travels monthly to Vegreville where he sees people with dementia, delirium, frailty and incontinence. He does rounds of the long-term care centre, sees patients in hospital and in an outpatient clinic, where people come from as far away as Viking for treatment. In 2018 he saw approximately 100 people, saving them a total of 20,000 kilometres of travel.



# Hematology

Achievements in clinical innovation and education within the Division of Hematology came partially in response to changing demographics, observes Division Director **Joseph Brandwein**.

The influx of new immigrants to Edmonton has resulted in a rapid increase of patients with sickle cell disease and transfusion-dependent thalassemia seen in the Hemoglobinopathy Clinic at the Kaye Edmonton Clinic. The medical issues patients experience related to this disease are complicated by the financial and social challenges of moving to a new country, most acutely felt by those undergoing the transition from adolescence to adulthood.

To address these challenges, **Lauren Bolster**, in collaboration with **Aisha Bruce** from the Division of Pediatric Hematology in the Department of Pediatrics, established the Multidisciplinary Northern Alberta Transition Clinic for Hemoglobinopathies (MATCH). This clinic provides medical and psychosocial care for young patients with thalassemia and sickle cell disease.



The Royal Alexandra Hospital (RAH) is a large inner-city teaching hospital that, prior to 2014, had only one clinical hematologist, **Melaku Game**. Recruitment of clinical hematologists **Sarah Takach-Lapner** in 2014 and **Andrei Fagarasanu** in 2016 has led to a full-time rotating hematology consultative and teaching service at the RAH, a major achievement for the division. Dr. Fagarasanu has been recognized as an outstanding clinical teacher, having received multiple resident teaching awards over the past three years.

- 7 people in department, faculty, Alberta Health Services or research leadership roles
- 14 people involved with specialty and multidisciplinary clinics
- 12 people delivering rural and/or remote services

## FOR 2019

**Arabesque Parker** and **Daniel Sawler**, both well recognized for their clinical teaching skills, are joining the RAH staff.

## LAUREN BOLSTER



The influx of new immigrants to Edmonton has resulted in an increase of young people with blood diseases such as sickle cell disease and transfusion-dependent thalassemia. Hematologist **Lauren Bolster** and pediatric hematologist Aisha Bruce developed the Multidisciplinary Northern Alberta Transition Clinic for Hemoglobinopathies (MATCH), specifically to help these patients transition to adulthood. The care team includes adult and pediatric hemoglobinopathy physicians, nurses, pharmacists and social workers, and provides psychosocial supports including peer support, age-appropriate education regarding their disease and assistance with accessing new drugs. MATCH was funded by the Marshall Eliuk Fund for Clinical Innovation in Hematology.

## ANDREI FAGARASANU



**Andrei Fagarasanu** joined the Hematology Division in 2016 after completing residencies in internal medicine and hematology, and prior to that, a PhD in cell biology. He has rapidly established himself as an outstanding clinical educator, having won the Postgraduate Teacher of the Year Award for three years in a row and the Internal Medicine Resident Osler Award in 2018. His clinical interests are in chronic lymphocytic leukemia, hairy cell leukemia and complementopathies such as atypical hemolytic uremic syndrome. Dr. Fagarasanu has published in top journals such as *Nature Cell Biology* and *Developmental Cell* with more than 1200 citations to date.



# Infectious Diseases

Division Director **Karen Doucette** highlights how the division's goal of enhancing its research productivity and international profile gained momentum with the recent recruitment of research-intensive faculty. In 2018 **Ilan Schwartz**, whose research is in emerging fungal infections and global health, joined the division. **Nelson Lee**, an established international expert in clinical research focused on respiratory viral infections, was appointed chair of the Infectious Diseases Division Research Committee. Under his leadership, the committee has completed a research inventory, identified core areas of strength in the division and created a section on the divisional website to [highlight research](#).

The focus on research led the Clinical Trial Unit to expand its scope to support additional investigators conducting both industry-sponsored as well as grant-funded/investigator-initiated studies. Division members published 65 peer-reviewed publications in 2018, with several faculty as co-authors in high-impact journals.

Among them were **Nelson Lee** (significant co-author) with “Baloxavir Marboxil for Uncomplicated Influenza in Adults and Adolescents” in *The New England Journal of Medicine*; **Stephen Shafran** (senior author) with “Identification of a Novel Hepatitis C Virus Genotype from Punjab, India: Expanding Classification of Hepatitis C Virus into 8 Genotypes” in *The Journal of Infectious Diseases*; Geoffrey Taylor (significant co-author) with “The Evolving Epidemiology of Clostridium Difficile Infection in Canadian Hospitals During a Postepidemic Period (2009–2015)” in *The Canadian Medical Association Journal*; **Karen Doucette** (senior author) with “Lung Transplantation from Hepatitis C Viremic Donors to Uninfected Recipients” in the *American Journal of Respiratory and Critical Care Medicine*; and **Ilan Schwartz** (first author) with “Emergomyces Canadensis, a Dimorphic Fungus Causing Fatal Systemic Human Disease in North America” in *Emerging Infectious Diseases*.

**Stuart Rosser** has taken on a major provincial administrative role as a physician design lead for Alberta Health Services’ clinical information system, Connect Care.

A major clinical achievement was **Justin Chen’s** successful rollout of an Antimicrobial Stewardship Program (ASP) at the University of Alberta Hospital. This is the first comprehensive ASP in an Alberta Health Services facility and a fundamental program in improving the quality and safety of patient care.

- 11 members of the division have significant department, faculty, Alberta Health Services or research leadership roles

- All division members participate in one or more of four multidisciplinary clinics
- The division supports ID consultation in all of Northern Alberta and Western NWT, with two division members delivering direct service to remote locations

## FOR 2019

**Joel Dacks**, Canada Research Chair (Tier II) in Evolutionary Cell Biology, joined the division on January 2, 2019. Dr. Dacks is an established researcher with a focus on microbial parasitology and global health who will increase the divisional profile in this field. The division will continue to increase research capacity, building on the primary research themes defined with core participants identified. A team grants strategy is currently under development, as is a defined academic track for ID subspecialty residents.

## AMEETA SINGH



**Ameeta Singh** was appointed the provincial medical lead of the HIV pre-exposure prophylaxis (PrEP) program, launched in 2018. She set up the program across the province, managing its transition to Alberta Health Services’ Sexually Transmitted Infections (STI) program in 2019. Dr. Singh oversaw all aspects of the program development, from guidelines to educational content to accreditation with the Royal College of Physicians and Surgeons of Canada.

Approximately 1000 patients are in the program, supported by more than 200 designated prescribers. Dr. Singh maintains a general infectious diseases practice in Edmonton and is the territorial syphilis medical consultant for Nunavut.

## GEOFFREY TAYLOR



**Geoffrey Taylor** was appointed senior medical director of Alberta Health Services’ Infection Prevention and Control (IPC) in 2018. Dr. Taylor came to the position with many years’ experience in IPC at the local and national agency level. In his new role, Dr. Taylor and his team have successfully increased hand hygiene adherence to 87% from less than 50% six years ago. The result is infection reductions across the spectrum of care. In addition, multidisciplinary teams have produced a Clostridium difficile hospital infection rate 40% lower than six years ago, thus preventing 400 infections and 20 deaths in Alberta in 2018–19.



# Nephrology

**Branko Braam** became the division's director after serving as interim director for two years. His vision for nephrology centres on addressing patient needs in three ways: halt or delay kidney disease progression before dialysis or transplantation is needed; provide dialysis in the comfort of patients' homes; and increase the number of transplantations. "Slowing down kidney disease progression will help patients delay or avoid the need for dialysis treatment and kidney transplantation. To do this we're working with them to enhance their cardiovascular care, blood pressure control and lifestyle issues," Dr. Braam says. "We've started our 'home-first' project for people needing dialysis, which will take several years to fully launch."

One of the achievements in 2018 that he describes as pivotal to this vision was the success of **Syed Habib** and **Nikhil Shah** in changing renal care delivery. The two had spearheaded earlier quality improvement projects in hemodialysis. These projects, coupled with recent insights into multidisciplinary care delivery in renal care, led them to initiate a multidisciplinary hemodialysis clinic and transitional care unit to support chronic and new hemodialysis patients. Given the number of disciplines involved, this change in care delivery is complex but a game-changer in an academic clinical environment.

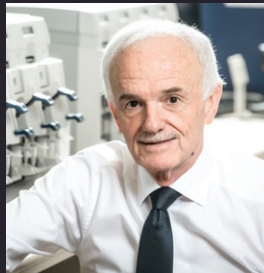
**Philip Halloran**, after years of dedicated investment and major intellectual efforts, developed the genomic assessment of renal transplants from the bench into a fully operational clinical tool: the molecular microscope. Division members **Scott Klarenbach** and **Neesh Pannu** are part of the Interdisciplinary Chronic Disease Collaboration that published "Association of Angiotensin-Converting Enzyme Inhibitor or Angiotensin Receptor Blocker Use with Outcomes After Acute Kidney Injury" in *JAMA*. **Sara Davison** and her Conservative Kidney Management team received the Alberta Health Services President's Award: Outstanding Achievement in Innovation and Research Excellence. Dr. Davison continues to be recognized internationally as a leader in the field of conservative kidney care. **Steven Caldwell** was appointed a Fellow of the Royal College of Physicians of London.

- Seven people in department and Alberta Health Services leadership roles
- Division members participate in five multidisciplinary clinics
- 10 division members deliver service to remote locations

## FOR 2019

Over the next year, the division will be improving the living donor process, making it smoother and easier for people to donate kidneys. This improvement will increase the number of transplantations and reduce wait times for patients. A cardiovascular management program in the kidney disease unit will be launched to help with disease management. Bolstering the kidney research program will also be a priority, as will preparations to go live with Connect Care.

## PHILIP HALLORAN

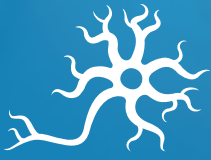


Nephrologist **Philip Halloran's** achievements contributed strongly to the University of Alberta's international recognition as a centre for organ transplantation. He launched the Alberta Transplant Applied Genomics Centre for molecular studies of organ transplants and organ diseases and developed a highly precise system to read organ transplant biopsies using microarrays, the Molecular Microscope® Diagnostic System (MMDx), now licensed for global application. Dr. Halloran founded the world's leading transplantation journal, the *American Journal of Transplantation*. He is an Officer of the Order of Canada, Fellow of the Royal Society of Canada, and recipient of the Paul Terasaki Award and the Prix Galien.

## NIKHIL SHAH



One of the several quality improvement projects Assistant Clinical Professor **Nikhil Shah** leads is a transitional care unit that provides focused team support for patients with end-stage kidney failure starting dialysis to improve their transition experience. Staff members work one-on-one with patients to explain the world of dialysis, help allay fears and promote the best possible renal replacement therapy options. Patients and staff find the approach very satisfying. Dr. Shah also co-chairs a provincial working group for promoting home dialysis for both current and new dialysis patients.



# Neurology

Division Director **Doug Zochodne** highlights several achievements in core areas of neurology as illustrative of the division's successful partnerships, particularly with the Neuroscience and Mental Health Institute of the Faculty of Medicine & Dentistry. The Parkinson and Movement Disorders Program, a Parkinson Foundation Center of Excellence led by **Janis Miyasaki**, has a multidisciplinary team that is advancing understanding and treatment of movement disorders, including deep brain stimulation to alleviate tremors. The deep brain stimulation program, co-led by **Fang Ba**, conducted more than 80 surgery consultations in 2018 and was featured on CBC and Global TV. The team developed a patient-centred decision-making algorithm that was presented at the International Parkinson and Movement Disorders Congress and Parkinson Foundation Center of Excellence meeting. **Dr. Ba** and **Dr. Miyasaki** were co-winners with colleagues from Surgery and Rehabilitation Medicine of Kaye Awards for their Parkinson's disease research.

**Glen Jickling** was awarded competitive operating grants from the Canadian Institutes of Health Research (CIHR) and Canada Foundation for Innovation (CFI) for his work on the genomics of stroke. **Brian Buck** is the principal investigator on a multicentre, randomized trial comparing two approaches to cardiac monitoring post-stroke (PER-DIEM, NCT02428140). The final patient was enrolled in November 2017, with the last follow-up visit completed in November 2018.

**Zaeem Siddiqi**, director of the Neuromuscular Program, was lead author on an article in *Neurology* describing the results of the first-ever clinical trial on the use of subcutaneous immunoglobulin (SCIg) in myasthenia gravis. He was awarded a program grant of \$529,000 to establish a SClg program for various neuromuscular diseases over the next three years. The first and largest international initiative of its kind, the SClg program will fundamentally change the management of neuromuscular patients on high dose chronic immunoglobulin therapy.

**Jack Jhamandas**, Chair of Campus Alberta Neuroscience (CAN) Steering Committee, provided leadership for the successful funding renewal of CAN at \$2.7 million over four years. **Chris Power** was appointed as the vice dean of research by the Faculty of Medicine & Dentistry.

**Jason Plemel** joined the Division of Neurology in 2018. His work focuses on neuroinflammation and mechanisms of multiple sclerosis.

**Satya Kar** was awarded a five-year CIHR operating grant for his work on Alzheimer's disease and neurodegeneration. In 2018 he published "A Role for Astrocyte-Derived Amyloid Beta Peptides in the Degeneration of Neurons in an Animal Model of Temporal Lobe Epilepsy" in the high-impact journal *Brain Pathology*.

Division members **David Westaway**, **Satya Kar**, **Jack Jhamandas**, **Valerie Sim** and **Richard Camicioli**, working with team lead **Dr. Roger Dixon**, were instrumental in securing a \$1-million SynAD grant from Alzheimer's Society of Alberta and Northwest Territories and matching funds from the University Hospital Foundation.

- 15 people in department, faculty, Alberta Health Services or research leadership roles
- two multidisciplinary clinics involve division members
- Rural and remote services, especially for epilepsy, stroke and neuromuscular disorders, mostly provided through telehealth.

## FOR 2019

The division is recruiting specialists in movement disorders, migraine, multiple sclerosis and stroke. Plans include hosting the second neurology update in March for primary care physicians and helping neurology patients use the provincial Connect Care system to optimize their care. Ongoing partnerships with the Neuroscience and Mental Health Institute and Campus Alberta Neuroscience will continue to be integral to the division, as will participation in the development of the new Neurosciences, Rehabilitation and Vision (NRV) strategic clinical network (SCN).

## THOMAS JEERAKATHIL



Canada's first computer tomography scanner-equipped stroke ambulance, created by the Edmonton-based ACHIEVE Stroke Ambulance Project, is the first in the world to target patients from rural areas. **Thomas Jeerakathil** is medical co-lead of

ACHIEVE, which has had its University of Alberta Hospital Foundation funding extended until 2021. Dr. Jeerakathil is also the Cardiovascular Health and Stroke Strategic Clinical Network's (SCN) Northern Stroke lead, the SCN's Endovascular Thrombectomy Project Evaluation Committee's co-chair, the Edmonton Stroke Program's associate medical director and the Alberta Innovates-funded QUICR Project's Knowledge Translation lead.

## JANIS MIYASAKI



**Janis Miyasaki** is the multidisciplinary Parkinson and Movement Disorders Program's director. Over the past two years, the program has doubled the number of deep brain stimulation and functional surgery patients seen annually. The program is the second busiest in Canada, with 6500–7000 patients seen every year, and is one of three national Parkinson Foundation Center of Excellence sites participating in the Foundation's registry. Dr. Miyasaki also co-directs the Complex Neurologic Symptoms Clinic (Neuropalliative care). She is the American Academy of Neurology's treasurer, the highest position ever held by a Canadian in the organization, and active in its mentoring programs.

# Physical Medicine & Rehabilitation



Division Director **Chester Ho** is delighted with the growing international reputation of the division due to the high calibre of basic and translational research activity. He notes several outstanding achievements in 2018.

Neuromuscular specialist **Ming Chan** was co-author on a publication, "The Nerve Conditioning Lesion: A Strategy to Enhance Nerve Regeneration," in the *Annals of Neurology*. A member of the internationally recognized Peripheral Nerve Injury Clinic team at the Glenrose Rehabilitation Centre, Dr. Chan is also co-principal investigator with **Christine Webber** on a Canadian Institutes of Health Research project grant investigating electrical stimulation and nerve regeneration. The Chan lab was featured in the *Japanese Journal of Rehabilitation Medicine* as an exemplary experience of post-doctoral training in Canada.

Another top publication, "Illusory Movement Perception Improves Motor Control for Prosthetic Hands," was co-authored by **Jacqueline Hebert** and appeared in *Science Translational Medicine*. Dr. Hebert's work with colleagues at the Cleveland Clinic to surgically rewire amputees' nerves so they can use prosthetics more effectively earned her international media attention.



**Chester Ho** was appointed the Alberta Health Services Neurosciences, Rehabilitation & Vision Strategic Clinical Network senior medical director. **Vivian Mushahwar** was awarded a Canada Research Chair (Tier 1) in Functional Restoration by the Government of Canada. **Dhiren Naidu**, the Edmonton Oilers hockey team's physician, co-chaired and presented at the International Collision Sports Meeting in London, England. **Patrick Pilarski's** trainees visited German Aerospace (DLR) and ETH Zurich and presented the Amii Adaptive Prosthetics Program research there.

**Jaime Yu** and **Lalith Satkunam** co-chaired the Canadian Comprehensive Review Course in Physical Medicine and Rehabilitation (10th Edition) at the Glenrose Rehabilitation Hospital, attended by residents from around the world. They also co-chaired the Canadian Association of Physical Medicine & Rehabilitation Annual Scientific Planning Committee in Whitehorse, Yukon. **Mario Dipersio** provides care at the Outreach Pediatric Rehabilitation Clinic in Grande Prairie.

- 12 people in department, faculty, Alberta Health Services or research leadership roles
- 20 specialty and multidisciplinary clinics led by nine division members
- 1 person offering rural and remote services

## FOR 2019

The Section of Physical Medicine & Rehabilitation completed a year-long process of strategic planning, identifying priorities that will build on the strengths of its hospital- and community-based members. Based on these strategic priorities, a three-year plan will be determined for the division's development.

## DHIREN NAIDU



**Dhiren Naidu**, head team physician for the Oilers and the Eskimos, is renowned for his national and international leadership in the area of sports concussion. In addition to serving on numerous medical and research committees with the National Hockey League and Canadian Football League (CFL), he represents the CFL on the International Collision Sports Committee, the latter comprising several international sports leagues. Dr. Naidu's research includes studies comparing active rehabilitation to rest following concussions, sideline detection of concussion, and effect of core stability in abdominal and lower back injuries in professional hockey players.

## RAJ THIARA

Physical medicine and rehabilitation specialist **Raj Thiara** is medical lead of the Brain Injury Rehabilitation Program in Edmonton. As a staff physician at the Glenrose Rehabilitation Hospital, he sees patients with stroke, spina bifida, brain injury and those requiring vestibular rehabilitation. Dr. Thiara's clinical interests often involve collaborations to expand and improve care, such as an initiative with Ponoka and Calgary to better integrate provincial services for acute brain injury rehabilitation. In partnership with the Glen Sather Sports Medicine Clinic and the Division of Neurology, he's helping to develop a framework for specialist assessment of subacute concussions in the Edmonton region.



# Preventive Medicine

Division Director **Sebastian Straube** notes that one of the division's achievements in 2018 was the development of a position statement on cannabis and safety-sensitive work that was endorsed by the Occupational and Environmental Medical Association of Canada. This association, composed of physicians in the environmental and occupational health field, is a leader in promoting health and safety in the workplace.

**Dr. Straube** highlighted two top research publications produced by division members. He was the senior author of an article "Occupational Interventions for the Prevention of Back Pain: Overview of Systematic Reviews" published in the *Journal of Safety Research*.

**Alexander Doroshenko** was the lead author of an article “Epidemiological and Genomic Determinants of Tuberculosis Outbreaks in First Nations Communities in Canada” published in *BMC Medicine*.

**Charl Els’** and **Sebastian Straube’s** poster “Introducing an OnSite Marijuana Impairment Test (OMIT)” won the poster prize at the 36th annual meeting of the Occupational and Environmental Medical Association of Canada.

- 3 people in department, faculty, Alberta Health Services or research leadership roles
- 3 specialty and multidisciplinary clinics involve division members
- one person offering rural and remote services

## FOR 2019

In April 2019, the division recruited **Quentin Durand-Moreau**, an occupational health physician, to help expand scholarly work in the occupational medicine area.

## ALEXANDER DOROSHENKO



Preventive Medicine Associate Professor **Alexander Doroshenko** is also with the School of Public Health as Adjunct Professor. His interests are infectious disease epidemiology, environmental health and public health surveillance systems. Dr. Doroshenko is a medical officer of health for Alberta Health Services Edmonton Zone, physician at the Provincial Tuberculosis Services and a clinician at the Children’s Environmental Health Clinic (ChEHC) at Misericordia Hospital. At ChEHC, a WHO Collaborating Centre in Children’s Environmental Health and the only Canadian program of its kind, he is part of a multidisciplinary team dedicated to child health concerns associated with environmental exposure.

## SEBASTIAN STRAUBE



**Sebastian Straube** received his medical (BM BCh) and research (DPhil) training at the University of Oxford and his postgraduate medical training in Occupational Medicine and Social Medicine at the University of Göttingen, Germany. He came to the University of Alberta in 2014 and was appointed Division Director for Preventive Medicine in 2016. His research interest is systematic reviews and meta-analyses. He has published widely, including several Cochrane Reviews. Recent work has been on opioids and cannabis. He is director of the Foundation Course in Occupational Medicine and president of the Section of Occupational Medicine of the Alberta Medical Association.



# Pulmonary Medicine

The division welcomed a new director, **Giovanni Ferrara**, who was recruited from the Karolinska Institutet in Sweden. **Ron Damant** did an admirable job as the *ad interim* divisional director and continues to serve as deputy divisional director.

Several division members received awards in 2018 for their achievements in all areas of scholarship—from clinical innovation to research and education—and were recognized by their peers locally, nationally and internationally.

**Mohit Bhutani** was named Chair of the Canadian Thoracic Society (CTS) Chronic Obstructive Pulmonary Disease (COPD) Clinical Assembly and was one of the lead authors on the updated CTS COPD Pharmacotherapy Guideline. He is a member of the Royal College of Physicians and Surgeons of Canada's Competency by Design Development Committee, which is modernizing the way future lung specialists are trained and assessed. He was also invited to organize and teach the American College of Chest Physicians Chest Prep COPD course. Dr. Bhutani was chair of the Scientific Committee of the 2018 Canadian Respiratory Conference.

**Richard Long** was the Canadian delegate to the first-ever United Nations General Assembly high-level meeting to accelerate efforts to end tuberculosis (TB). Dr. Long was a senior co-author of two important studies published in the *New England Journal of Medicine*, changing clinical practice in the field of latent TB.

**Meena Kalluri** was recognized internationally for her multidisciplinary work in interstitial lung disease with an invitation to present at the American Thoracic Society Congress 2018 in San Diego.

The division remained active in providing quality education in the field of respirology for undergraduate and post-graduate students. **Kieran Halloran** won the Department of Medicine award for the best academic half-day lecture on "Interstitial Lung Disease." He and **Alim Hirji** co-authored five publications and were successful in obtaining a Canadian Foundation for Healthcare Improvement grant.

Several members of the division had a significant influence in the research field in 2018. **Paige Lacy** and **Harissios Vliagoftis** and their respective teams produced high-impact publications that further the current understanding of the mechanism of airway inflammation. Their work paves the way for potential new therapies. **Michael Stickland** and his team continued their valuable work in pulmonary rehabilitation with strong leadership and numerous publications.

- 20 people in department, faculty, Alberta Health Services or research leadership roles
- 15 specialty and multidisciplinary clinics involving division members
- Four physicians offering rural and remote services

## FOR 2019

The Division of Pulmonary Medicine will aim to fine-tune its tertiary clinical programs to improve access and quality-outcomes, and to provide the best environment for high-quality clinical and translational research and education.

**Ron Damant** will continue his work with the clinical network and the University of Alberta hospital, in order to improve the flow and timely care of patients with chronic obstructive pulmonary disease. The Alberta Respiratory Centre will increase its visibility and impact in respiratory research, thanks to internal and external collaborations, and active involvement of Division members.

## PAIGE LACY



Professor **Paige Lacy** is research director for Alberta Respiratory Centre and has made substantial contributions to eosinophil biology in asthma and allergic disease. A greater understanding of eosinophil actions has potential for new therapeutics for these diseases, and eosinophils are emerging as major effector cells in asthma. Dr. Lacy has published extensively, including a 2018 paper in a new *Nature* journal, *Communications Biology*, demonstrating a role for eosinophil activation, called degranulation, in a model of allergic airway inflammation. She also collaborates with Synergy Respiratory Care on lung health in insulators and with McMaster University on eosinophils in asthma-related autoimmunity.



# Rheumatology

Division Director **Jan Willem Cohen Tervaert** sees 2018 as the year in which division members achieved the highest standards in teaching, clinical research and clinical care.

**Carrie Ye** collaborated with **Michael Smylie** in the Division of Oncology to launch a specialized clinic for patients who receive immune checkpoint inhibitors cancer treatment and experience the onset of rheumatic disease. While treatment can dramatically improve survival and quality of life, arthritis and arthralgia can be persistent and require therapy even after immunotherapy is stopped. The clinic provides early diagnosis of rheumatic diseases, and patients are triaged to the Rheumatology Clinic. Given their cancer treatment, conventional steroid treatment is limited, and a new therapeutic agent, hydroxychloroquine, is given instead. In 2018, three papers were published about this clinical innovation, including one as a letter in the *New England Journal of Medicine*.

**Walter Maksymowych** published “Modification of Structural Lesions on MRI of the Sacroiliac Joints by Etanercept in the EMBARK Trial: A 12-week Randomized Placebo-Controlled Trial in Patients with Non-Radiographic Axial Spondyloarthritis” in the *Annals of the Rheumatic Diseases*. In this study, Dr. Maksymowych showed that etanercept, a tumor necrosis factor blocker, can help repair the erosions that result from early axial spondylarthritis and is associated with new tissue growth at erosion cavities. This study suggests that early disease might benefit from early therapy with anti-TNF blockers.

In November, an international consortium of research journalists published *The Implant Files*, exposing problems regarding the registration, surveillance and reporting of adverse effects occurring after implantation of medical devices. Jan Willem Cohen Tervaert, an expert on rheumatic diseases associated with medical devices, was interviewed by international media. In December he was co-author of a paper, “Silicone Breast Implants and the Risk of Autoimmune/Rheumatic Disorders: A Real-world Analysis,” published in the *International Journal of Epidemiology*.

- 2 people in department, faculty, Alberta Health Services or research leadership roles
- 2 specialty and multidisciplinary clinics involving division members
- 2 physicians offering rural and remote services

## FOR 2019

The division will focus on translational research. New division recruit Mo Osman will play a pivotal role in this work by developing a research laboratory.

## CARRIE YE



Rheumatologist **Carrie Ye** founded the Multidisciplinary Bone Health Clinic in 2017. The clinic has grown into a team of three pharmacists, a dietitian, a physiotherapist and an occupational therapist, who have seen more than 400 patients through partnerships with high-risk specialty clinics in oncology and medicine. Dr. Ye successfully advocated changes in coverage criteria to allow patients with osteoporosis more access to parenteral therapies. She co-founded a new national collaboration of rheumatologists, CanRIO, dedicated to studying the adverse rheumatologic effects of immunotherapy. The group has started a national prospective registry to collect both clinical and biomarker data.

## STEPHANIE KEELING



**Stephanie Keeling**, along with Dr. Stephen Katz, co-directs the On-Treating Rheumatoid Arthritis Access to Care (On-TRAAC) Clinic, inspired by an earlier pilot clinic Dr. Keeling led that evaluated heart risk in inflammatory arthritis patients. On-TRAAC’s allied health arthritis care practitioners help manage not only inflammatory arthritis but also the risk for other conditions that accompany the disease, such as cardiovascular problems, osteoporosis and mood disorder. With On-TRAAC, Dr. Keeling worked with the Epidemiology Coordinating and Research Centre to create a data platform for collecting patient-reported outcomes and disease activity that inform treatment decisions and improve the biologics registry for inflammatory arthritis.

A smiling female scientist in a lab coat looking through a microscope. The image is overlaid with a semi-transparent red filter.

# Stats & Funding Department of Medicine

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Medical science has proven time and again that when the resources are provided, great progress in the treatment, cure, and prevention of disease can occur.

*Michael J. Fox*



## RESEARCH FUNDING

Alberta Health Services  
 Alberta Innovates  
 Alberta Innovates Bio Solutions/Alberta Alzheimer's Research Program  
 Alberta Innovates Bio Solutions/Alberta Prion Research Program  
 Alberta Innovates Health Solutions  
 Alberta Innovates Health Solutions/Accelerating Innovations into CarE (AICE)  
 Alberta Innovates/Partnership for Research and Innovation in the Health System  
 Alberta Innovates/Pfizer Translational Research Fund Opportunity  
 Alberta Innovates/Training and Early Career Development  
 Alberta Prion Research Institute  
 American College of Gastroenterology  
 Arthritis Society  
 Brain Canada Foundation  
 Canadian Stroke Prevention Intervention Network  
 Canada Foundation for Innovation  
 Canada Research Chairs  
 Canadian Association of Gastroenterology  
 Canadian Cancer Society  
 Canadian Dermatology Foundation  
 Canadian Foundation for AIDS Research (CANFAR)  
 Canadian Foundation for Pharmacy  
 Canadian Geriatrics Society  
 Canadian Institutes of Health Research  
 Canadian Liver Foundation  
 Canadian Nutrition Society  
 Canadian Obesity Network  
 Canadian PBC Society  
 Canadian Pulmonary Fibrosis Foundation  
 Canadian Society of Transplantation  
 Canadian Urological Association  
 Cancer Research Society Inc  
 CHDI Foundation Inc.  
 Cleveland Clinic Foundation  
 Crohn's and Colitis Canada  
 Diabetes Canada  
 Government of Alberta/Economic Development & Trade  
 Heart & Stroke Foundation Canada  
 Hypertension Canada  
 International Society of Nephrology  
 Leukemia & Lymphoma Society of Canada  
 Lung Association Alberta & NWT  
 MITACS Inc  
 Multiple Sclerosis Society of Canada  
 National Parkinson Foundation  
 Network of Centres of Excellence  
 National Sciences and Engineering Research Council (NSERC)  
 Public Health Agency of Canada  
 Social Sciences and Humanities Research Council (SSHRC)  
 University Hospital Foundation  
 W. Garfield Weston Foundation

## NEW TO THE DEPARTMENT IN 2018

**Rahima Bhanji**, Gastroenterology, Assistant Professor  
**Timothy Chan**, General Internal Medicine, Assistant Clinical Professor  
**Eunice Chow**, Dermatology, Assistant Clinical Professor  
**Wasif Hussain**, Neurology, Assistant Clinical Professor  
**Steven Katz**, Rheumatology, Associate Professor  
**Karen Lee**, Preventive Medicine, Associate Professor  
**Adalberto Loyola-Sanchez**, Physical Medicine & Rehabilitation, Assistant Professor  
**Jason Plemel**, Neurology, Assistant Professor  
**Ilan Schwartz**, Infectious Diseases, Assistant Professor  
**Carrie Ye**, Rheumatology, Assistant Clinical Professor

## LEFT THE DEPARTMENT IN 2018

**Jeffrey Burton**, Cardiology, Professor  
**Patricia Campbell**, Nephrology, Professor  
**Pernilla D'Souza**, Gastroenterology, Clinical Lecturer  
**Shaun Gray**, Physical Medicine & Rehabilitation, Associate Professor  
**Kim Mulchey**, Pulmonary Medicine, Assistant Clinical Professor  
**Lalit Saini**, Hematology, Associate Professor

## ACADEMIC PROMOTION

**Kevin Baine**y, Cardiology, Associate Professor  
**Aminu Bello**, Nephrology, Associate Professor w/ tenure  
**Ryan Cooper**, Infectious Diseases, Teaching Associate Professor (FSO III)  
**Karen Doucette**, Infectious Diseases, Professor  
**Juan Gonzalez Abrales**, Gastroenterology, Professor  
**Gabor Gyenes**, Cardiology, Professor  
**Joanne Homik**, Rheumatology, Professor  
**Gavin Oudit**, Cardiology, Professor  
**Patrick Pilarski**, Physical Medicine & Rehabilitation, Associate Professor w/ tenure  
**Lalit Saini**, Hematology, Associate Professor w/ tenure  
**Sergio Zepeda-Gómez**, Gastroenterology, Associate Professor w/ tenure

*Promoted effective July 1, 2018*

## IN MEMORIAM

**Richard Fedorak**  
**Sumit (Me2) Majumdar**

## CLINICAL PROMOTION

**Ibrahim Bader**, Cardiology, Assistant Clinical Professor

**Neeja Bakshi**, General Internal Medicine, Associate Clinical Professor

**Lindsay Bridgland**, General Internal Medicine, Associate Clinical Professor

**Thirza Carpenter**, General Internal Medicine, Assistant Clinical Professor

**Frances Carr**, Geriatric Medicine, Assistant Clinical Professor

**Sarah Cawsey**, Endocrinology & Metabolism, Assistant Clinical Professor

**Justin Chen**, Infectious Diseases, Assistant Clinical Professor

**Heidi Choi**, General Internal Medicine, Assistant Clinical Professor

**Eunice Chow**, Dermatology, Associate Clinical Professor

**Carol Chung**, Pulmonary Medicine, Assistant Clinical Professor

**Mona Gill**, General Internal Medicine, Assistant Clinical Professor

**Perry Grewal**, Dermatology, Associate Clinical Professor

**Naseem Hoque**, Gastroenterology, Associate Clinical Professor

**Shannon Ip**, General Internal Medicine, Associate Clinical Professor

**Humaira Iqbal**, Pulmonary Medicine, Assistant Clinical Professor

**Jennifer Jin**, Gastroenterology, Assistant Clinical Professor

**Dima Kabbani**, Infectious Diseases, Associate Clinical Professor

**Jamil Kanji**, Infectious Diseases, Associate Clinical Professor

**Sayra Khandekar**, Cardiology, Associate Clinical Professor

**Michael Knash**, Neurology, Associate Clinical Professor

**Cheryl Laratta**, Pulmonary Medicine, Assistant Clinical Professor

**Hernando Leon**, General Internal Medicine, Assistant Clinical Professor

**Lilia Olaru**, Rheumatology, Assistant Clinical Professor

**Tolulope Olateju**, Endocrinology & Metabolism, Assistant Clinical Professor

**Cecile Phan**, Neurology, Associate Clinical Professor

**Brian Rambaransingh**, Physical Medicine & Rehabilitation,  
Associate Clinical Professor

**Maher Saqqur**, Neurology, Clinical Professor

**Christopher Sikora**, Preventive Medicine, Associate Clinical Professor

**Benjamin Sugars**, General Internal Medicine, Assistant Clinical Professor

**Muba Taher**, Dermatology, Clinical Professor

**Stephen Tilley**, Cardiology, Assistant Clinical Professor

**Sheela Vijay**, General Internal Medicine, Assistant Clinical Professor

**Winnie Wong**, Endocrinology & Metabolism, Assistant Clinical Professor

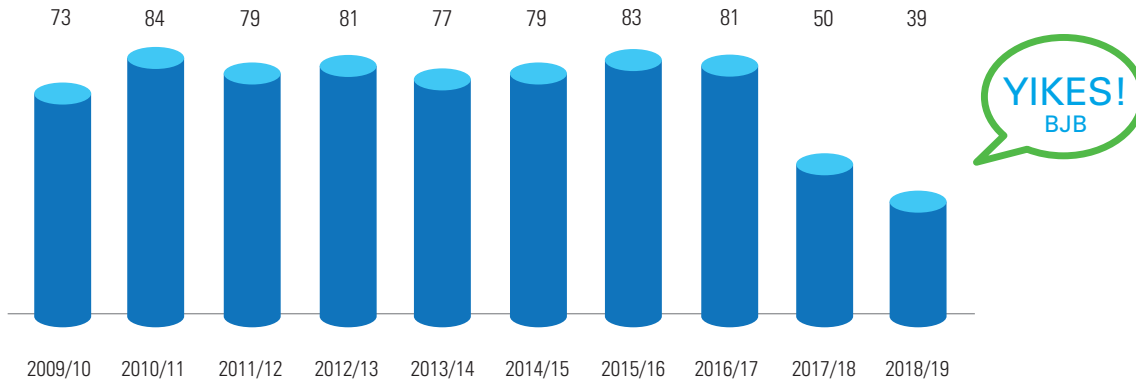
**Carrie Ye**, Rheumatology, Assistant Clinical Professor

*Promoted effective July 1, 2018*

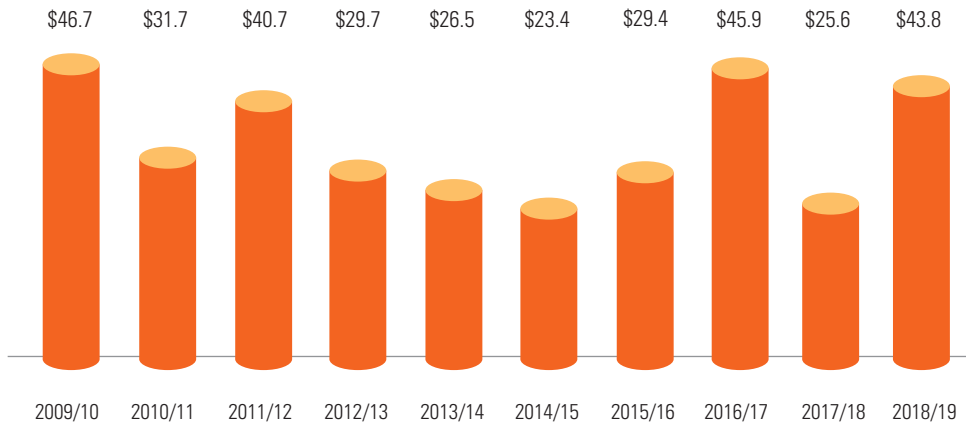
## RECRUITMENT & ATTRITION SUMMARY

	RECRUITMENT				TOTAL	ATTRITION				TOTAL
	Male		Female			Male		Female		
	AMHSP	FFS	AMHSP	FFS		AMHSP	FFS	AMHSP	FFS	
2009/10	9	3	9	3	24	5	0	1	0	6
2010/11	2	6	6	9	23	1	0	0	1	2
2011/12	2	14	1	12	29	5	1	8	4	18
2012/13	3	2	3	1	9	3	4	6	4	17
2013/14	4	0	2	1	7	2	3	3	1	9
2014/15	6	2	4	7	19	10	0	2	0	12
2015/16	9	5	11	8	33	5	3	2	3	13
2016/17	3	11	5	6	25	1	0	1	7	9
2017/18	8	17	3	10	38	2	5	4	6	17

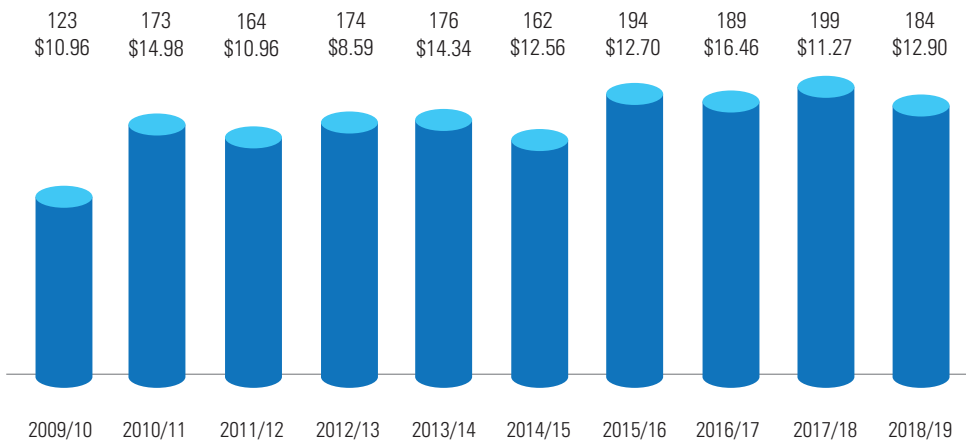
TRI-COUNCIL FUNDING (# OF INVESTIGATORS)



TOTAL RESEARCH FUNDING (\$MILLIONS)



CLINICAL TRIALS FUNDING (NEW CLINICAL STARTS/YEAR – INCOME/YEAR \$MILLIONS)



**ENDOWED FUNDS AND CHAIRS**

<b>FUND NAME</b>	<b>PRINCIPAL VALUE MARCH 31, 2019</b>
AstraZeneca Chair in Asthma Research	\$3,000,000.00
Atkin BFA WarrenCatz MS Research	\$2,935,027.14
Brown WF Lecture Physical Medicine and Rehabilitation	\$50,669.30
Cars-Rheumatic Disease	\$14,535.07
Edwards AM Lecture Clinical Education	\$106,007.66
Gastrointestinal Visionary	\$115,895.00
King EG Memorial Endowment	\$164,956.66
Majumdar S Me2 Legacy Endowment	\$122,335.00
Muttart Chair Clinical Immunology Endowment	\$1,675,100.00
Royal Canadian Legion Kidney Research	\$405,021.95
Toupin HM Chair Neurology Science	\$1,413,627.76
<b>TOTAL</b>	<b>\$10,003,175.54</b>

<b>OTHER ENDOWMENTS</b>	<b>PRINCIPAL VALUE MARCH 31, 2019</b>
Alberta Health Services Chair in Aboriginal Health	\$3,000,000.00
Alberta Health Services Chair in Cardiac Health Outcomes	1,500,465.84
Alberta Health Services Chair in Healthy Aging Research	3,000,500.00
GlaxoSmithKline/RxD/CIHR Chair in Airway Inflammation	\$1,393,465.05
Heart and Stroke Foundation of Alberta, NWT & Nunavut Chair in Cardiovascular Research	\$1,561,650.00
Henri M. Toupin Chair in Neurology	\$2,389,202.54
Kidney Health Research Chair—Translational Research & Health Outcomes	\$8,297,480.62
Spinal Cord Injury Chair	\$3,023,034.24
Tripartite Chair in Occupational Health	\$573,174.94
Mazankowski Alberta Heart Institute Medical Imaging Consultants Research Chair	\$1,500,000.00
<b>TOTAL</b>	<b>\$26,238,973.23</b>

## ENDOWED EXTERNALLY FUNDED CHAIRS

**Sangita Sharma**, Endocrinology  
Alberta Health Services Chair in Aboriginal Health

**Finlay McAlister**, General Internal Medicine  
Alberta Health Services Chair in Cardiac Health Outcomes

**Adrian Wagg**, Geriatric Medicine  
Alberta Health Services Chair in Healthy Aging Research

**Harissios Vliagoftis**, Pulmonary Medicine  
GlaxoSmithKline/RxD/CIHR Chair in Airway Inflammation

**Harald Becher**, Cardiology  
Heart and Stroke Foundation of Alberta, NWT & Nunavut  
Chair in Cardiovascular Research

**Ken Butcher**, Neurology  
Heart and Stroke Foundation of Alberta, NWT & Nunavut  
Professorship in Stroke Research

**Oksana Suchowersky**, Neurology  
Henri M. Toupin Chair in Neurology

**Scott Klarenbach**, Nephrology  
Kidney Health Research Chair—Health Outcomes

**Branko Braam**, Nephrology  
Kidney Health Research Chair—Translational Research

**Philip Halloran**, Nephrology  
Muttart Research Chair in Clinical Immunology

**Chester Ho**, Physical Medicine & Rehabilitation  
Spinal Cord Injury Chair

**Nicola Cherry**, Preventive Medicine  
Tripartite Chair in Occupational Health

## CANADA RESEARCH CHAIRS

**Evangelos Michelakis**, Cardiology  
Tier 1, Chair in Applied Molecular and Mitochondrial Medicine

**Vivian Mushahwar**, Physical Medicine & Rehabilitation  
Tier 1, Chair in Functional Restoration

**Chris Power**, Neurology  
Tier 1, Chair in Neurological Infection & Immunity

**David Westaway**, Neurology  
Tier 1, Chair in Prion Disease

**Joel Dacks**, Infectious Diseases  
Tier 2, Chair in Evolutionary Cell Biology

**Gavin Oudit**, Cardiology  
Tier 2, Chair in Heart Failure

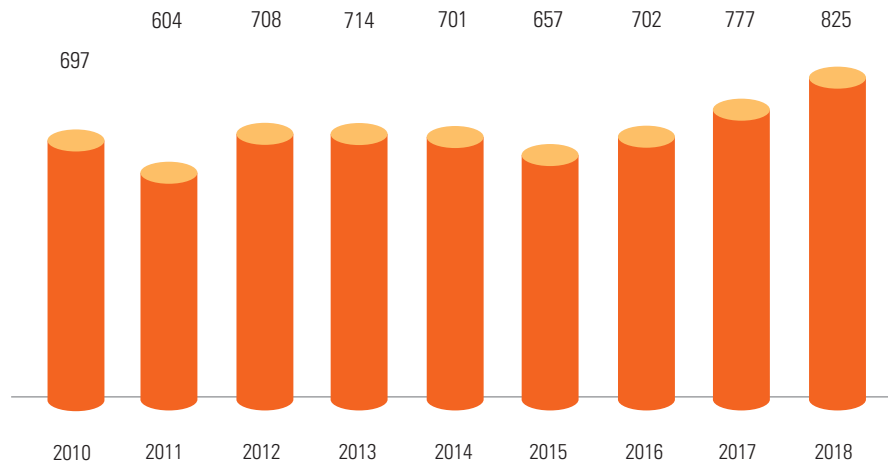
**Patrick Pilarski**, Physical Medicine & Rehabilitation  
Tier 2, Chair in Machine Intelligence for Rehabilitation

**Kenneth Butcher**, Neurology  
Tier 2, Chair in Cerebrovascular Disease

## OTHER CHAIRS

**Gopinath Sutendra**, Cardiology  
AIHS Translational Health Chairs, Chair in Cardio-oncology

## PUBLICATIONS



## GRADUATE STUDENT SUMMARY

Currently enrolled	94
MSc program	64
PhDs	30
# of Students Who Published in 2018	41
Total Publications	94
Total Students (including graduated, withdrawn, & transferred)	122
Average Publications per Student	0.84
Active Postdoctoral Fellows	23



## COVER PHOTOS

### FRONT

(left to right) Dr. Antonia Barnes (R4),  
Dr. Vijay Daniels, Dr. Mohyung Min (R2)

### BACK

Dr. Vijay Daniels, Dr. Antonia Barnes



**UNIVERSITY OF ALBERTA**  
**FACULTY OF MEDICINE & DENTISTRY**  
Department of Medicine

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