

RAPPORT

Schulich School of Medicine & Dentistry
Western University / Alumni Magazine / 2016

THE POWER OF TWO

Twins, Drs. Jennifer Coulson, MD'12, and Jaclyn Ernst, MD'12, are sharing their story with the hope of inspiring the next generation of Indigenous learners

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SCHULICH MEDICINE & DENTISTRY

The Schulich School of Medicine & Dentistry at Western University is one of Canada's preeminent medical and dental schools. Since 1881, the School has helped educate generations of physicians, dentists, scholars and scientists who continue to transform the practice of medicine and dentistry, and research, in Canada and around the world.

Schulich Medicine & Dentistry's reputation has been built by dedicated teachers, breakthrough discoveries, a commitment to social responsibility, strong strategic partnerships and extraordinary leadership. The School continues to be a global leader in optimizing life-long health.

RAPPORT

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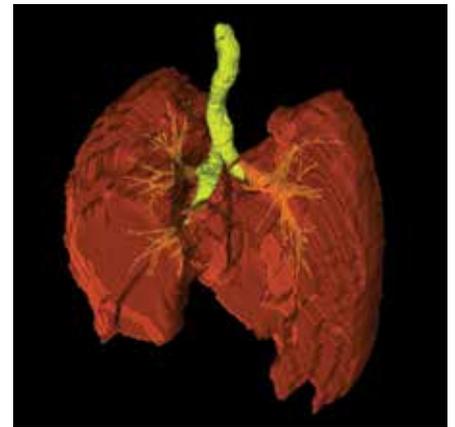
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Dr. Michael J. Strong
Dean, Schulich School of
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"It was the best of times, it was the worst of times." We are all familiar with this quote from Charles Dickens' historical 1859 novel *A Tale of Two Cities*. If you are like me, the quote raises its head every now and then. But how often do we complete the quote? In full, it actually reads, "It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair..."

I think of this passage far more frequently now than I have done before—sometimes in the context of our School, sometimes in the context of our country, and, increasingly, in the context of the chaotic world in which we live.

Scholars and historians have analyzed this passage endlessly, so far be it from me to opine about a literary treasure. But for me, this passage has always embodied the distinction between good and evil, between hope and despair, and between actions based on knowledge and those that are not.

We have all been touched by the events across the world this past year, whether it was the horrendous mass murders of innocent peoples in any one of a number of countries, or the seemingly endless horrors of civil wars and genocides. We live in the belief that it cannot happen to us, that in the "Western world," this would never be tolerated, that we will stand up to it.

Yet, even a momentary glance south of our border shows that we are not above exclusionary rhetoric. Peoples of all races and backgrounds are being turned against one another. So, in some senses, it is a time of great darkness.

Or is it?

As Canadians, we opened our doors to 25,000 Syrian refugees this past year. And while there were issues and criticisms, it was a moment that we should, as Canadians, be intensely proud of.

Not that long ago, I listened to a CBC interview of a Syrian living in the States who noted that when the call went out to help, it was only the Canadians who opened their doors widely and without hesitation.

The Canadian response was different than the no less remarkable action of some European countries who responded to the plight of those displaced from their homes and forced to cross borders in search of a new home. The speaker noted that this response of Canadians did not go unnoticed and in time, has only served to bring emphasis of the view of Canadians worldwide as a 'just society.'

It invoked thoughts of the role of great Canadian visionaries such as former Prime Minister Lester B. Pearson, retired Lieutenant-General and Senator Roméo Dallaire, and former Ambassador to the United Nations Stephen Lewis. Individuals who have been or are shining examples of what we, as Canadians, stand for.

I recently listened to Fort McMurray's fire chief Darby Allen as he, months after the fire was out, described how no lives were lost in the fire itself, but more poignantly, how individuals fought to stop the fire home by home using whatever was available to them. How we, as Canadians, in this instance, rallied to help.

Even closer to home, we have, as a University, opened our doors to eight Syrian students to study and advance.

Is it enough? Perhaps not, but it is a start.

I have seen first-hand the impact that even a single individual can make in helping and befriending a family that has lost everything. It's all the more reason to be a proud father. I have also seen our faculty members respond earnestly when we've raised the plight of a family or an individual.

What about closer to home?

I have watched in horror the dissolution of our treasured national peer review system for the Canadian Institutes of Health Research. This accompanied the loss of the funding of certain MD/PhD programs—one of the proven pathways to ensuring a bright future for our academic health centres.

But out of this seeming chaos has arisen a national voice to help realign our research programs, to bring back rigorous peer review, and to reclaim a national sense of pride in our research programs.

Individuals from within our own faculty have responded by dedicating immense time and skills to improving the situation. And in this past year, I have seen innumerable colleagues dedicate themselves fully to redeveloping many of our already great programs. It is a time of unselfishness.

I have seen our University step up to the plate and continue to strive for excellence on the national stage.

So, is it a time of darkness? Perhaps. But it is also a time of great light.

I look around at what our alumni, faculty and students have achieved, of the dedication of so many to help those who are truly less fortunate, of those who are prepared to speak out against all levels of injustice—just a few of whom you will read about in *Rapport*. And I'm reminded of the School's four Pillars of Professionalism—Altruism, Integrity, Responsibility and Respect. It's then that I recall again why it is with such great pride that I get to serve as the Dean of this wonderful School in a country whose values remain first and foremost a source of inspiration across the globe.



David Cechetto continues frontline health care training in Rwanda and Burundi with \$8.9-million grant

■ David Cechetto, BSc'74, BA'78, PhD'84, professor, Anatomy and Cell Biology, has worked with Rwandan officials since 2000 to help rebuild the country's health care system. Cechetto is now training frontline health care workers in Rwanda and Burundi to treat the most common causes of infant and maternal mortality as the Director of Training, Support and Access Model for Maternal Newborn and Child Health in Rwanda and Burundi (TSAM).

Thanks to an \$8.9-million grant from Global Affairs Canada as part of the Partnerships for Strengthening Maternal, Newborn and Child Health program, Cechetto will continue his work focused on training health care providers to assess and treat common and critical health care factors directly tied to maternal and child health outcomes, such as hemorrhaging, hypertension, pre-eclampsia, eclampsia, sepsis, infant infection and poor nutrition.

The Mighty Dents prevail

■ It was the match-up of the year when Schulich Dentistry's hockey team, The Mighty Dents, faced off against the University of Toronto for the 2016 ODA President's Cup Hockey Classic. Cheered on by an enthusiastic crowd, the Mighty Dents prevailed, bringing home the

ODA Cup to its rightful place at Schulich Medicine & Dentistry. The School's Dental Outreach Community Service (DOCS) program was the real winner of the game, however, benefiting from fundraising efforts and receiving a donation of \$1,500.



Honours and distinctions

■ Each year, faculty from across the School are recognized with national and international honours in research and education. Their commitment to excellence is celebrated by the Schulich School of Medicine & Dentistry.

Dr. Hugh Allen, MD'48, received the Order of Ontario for his more than six decades of commitment to the field of medicine.



Dr. Hugh Allen, MD'48

Stefan Everling, PhD, Physiology and Pharmacology, and **Grace Parraga, HBSc'84, MSc'86, PhD,** Medical Biophysics, were selected as Western University's 2016 Faculty Scholars. This honour recognizes the significant achievements that Everling and Parraga have made in teaching or research. Both scientists are considered all-around scholars and will hold the title of Faculty Scholar for two years.

Drs. Kevin Fung, BA'94, Otolaryngology—Head & Neck Surgery, **Cyrus Hsia, MD'03** and **Sheri-Lynn Kane, Medicine,** received the Canadian Association for Medical Education Certificate of Merit Award for 2016. The award recognizes faculty commitment to medical education at the undergraduate, postgraduate and continuing professional development levels.

Dr. Anthony Jevnikar, MD'81, Medicine, received the 2015 Lifetime Achievement Award from the Canadian Society of Transplantation. He was recognized for dedicating his career to improving the lives of kidney transplant recipients.

Hon Leong, PhD, Pathology and Laboratory Medicine, received the Prostate Cancer Canada and Movember Foundation Fund 2016 Rising Star Award. This is the second time Leong has received the Rising Star Award, making him the only researcher to ever receive it twice. Leong will receive approximately \$450,000 over three years for his research project, which will deliver novel drugs that halt the spread of prostate cancer.

Ravi Menon, PhD, Medical Biophysics, was recognized as a Fellow of the Canadian Academy of Health Sciences. The Fellowship recognizes Menon's international leadership and significant contributions that have meaningfully advanced the academic health sciences.

Dr. Jeff Nisker, Obstetrics and Gynaecology, was awarded the Canadian Fertility and Andrology Society Award of Excellence. He was recognized for his outstanding contribution to, and leadership in, the field of reproductive medicine and science, particularly regarding ethical and social consequences of reproductive and genetic technologies.

Dr. Michael Shimizu, Schulich Dentistry, was inducted as a Fellow of the International College of Dentists. This honour is bestowed upon those dentists who have made significant contributions to the profession, their community, and successfully completed a thorough peer review process.

Matthew Teeter, PhD'12, Medical Biophysics, received the 2015 John Charles Polanyi Prize. The \$20,000 award recognizes the excellence of Teeter's research into joint replacement.

Dr. Kenneth Wright, Schulich Dentistry, received the Governor General's Caring Canadian Award, which recognizes Canadians who have made a significant, sustained and unpaid contribution to their community. Working behind the scenes, recipients volunteer their time and effort to help their fellow citizens. The award also brings to light the example set by volunteers, whose compassion and engagement are part of the Canadian character.

Forward looking



■ Schulich Medicine & Dentistry's 10-year strategic plan, entitled Optimizing Lifelong Health, received a refresh as it reached its five-year mark. Under the leadership of Dr. Margaret Steele, MD'87, former Vice Dean, Hospital and Interfaculty Relations, a steering committee worked for months gathering information and analyzing progress to date on the six strategic directions.

A full-day retreat engaging faculty, staff and students also advanced the plan refresh.

Schulich Dentistry launched its strategic plan with five major projects: human resource and organizational structure; clinical education, technology strategy; faculty development; and the Schulich Way. Work is underway on these projects by teams comprised of faculty, staff and students.





Eric Arts, HBSoc'90, PhD



Andrew Pruszynski, PhD

New CRCs bolster research mission

■ Eric Arts, HBSoc'90, PhD, Microbiology and Immunology, and Andrew Pruszynski, PhD, Physiology and Pharmacology, were announced as the School's newest Canada Research Chairs (CRC). Arts is a Tier 1 CRC in HIV Pathogenesis and Viral Control. As one of the world's leading HIV researchers, Arts is developing vaccines to prevent new HIV-1 infections and vaccines to cure people already infected and living with HIV. Pruszynski is a Tier 2 CRC in Sensorimotor Neuroscience. He leverages expertise in robotics and neuroscience to understand the basic neural circuitry that underlies healthy and impaired movement including reaching, grasping and object manipulation. This work will lead to better interventions and rehabilitation strategies following injuries and disease that compromise movement.

Aspiring for medical education excellence



Han Yan, Medicine Class of 2017, played a key role in the ASPIRE award submission

■ The Schulich School of Medicine & Dentistry's Undergraduate Medical Education (UME) Program received an international honour when it was recognized with the 2015 ASPIRE Award of Excellence for Student Engagement in a Medical School. This award, sponsored by the Association for Medical Education in Europe, recognizes the School's commitment to student engagement and the valuable role students play in shaping teaching and learning experiences within the UME Program.

The UME Program also received full accreditation status for eight years. News of the achievement was received after the Program underwent an intensive four-day review, which in turn was preceded by more

than two years of preparation during which all aspects of the Schulich Medicine curriculum were reviewed.

Accreditation is a standards-based mandatory process that demonstrates that medical schools possess the essential standards and elements necessary to deliver students a quality medical education program and are meeting the needs of stakeholders. It was led by the Committee on Accreditation of Canadian Medical Schools in collaboration with the Liaison Committee for Medical Education.

"We are proud of the eight-year accreditation status that was earned as a team effort from faculty, staff, residents, health care partners, graduates and our students through strong leadership and tireless collaboration," said Dr. Michael J. Strong.



Dr. Dani Cadieux, MD'16, served as Co-Chair of the Students Accreditation Task Force

Decades of research excellence celebrated

■ Robarts Research Institute is enjoying two anniversaries in 2016, celebrating 30 years since its founding and 20 years since the establishment of the Centre for Functional and Metabolic Mapping (CFMM).

More than 600 people continue to advance Robarts' research mission investigating some of the most debilitating diseases of our time, from heart disease and stroke to diabetes, Alzheimer's and many forms of cancer. Founded in 1986, under the leadership of Dr. Henry Barnett, Robarts continues to grow, remaining one of the country's leaders in translational research and the commercialization of new technologies.

Ten years after Robarts opened, MRI was just starting to make its mark in the field of imaging. And the first MRI system was delivered to Robarts, marking the opening of the CFMM. The MRI was a 4 Tesla (4T), and at the time it had the highest magnetic field in Canada.

Currently inside the \$35-million CFMM are Canada's only



Robarts Research Institute

large-bore 9.4T MRI for studying animal models of disease; Canada's first and only 7T human MRI; and the world's first customer-delivered Siemens Prisma 3T MRI. That represents an increase in the strength of the scanners by almost 100-fold since the Centre opened its doors more than two decades ago.

ONLINE SHIFT

HOW E-LEARNING IS CHANGING THE WORLD OF EDUCATION

By Emily Leighton, MA'13

The same scene plays out hundreds of times each day on Western's campus—hunched figures scuttling along paths and across roadways, heads down, distracted by the pocket-sized screens in front of them.

But what may be dismissed as trivial entertainment could be the key to the future of education, as these electronic distractions are some of the very tools now being used to teach a new generation of learners.

Student-centred approach

Schulich Medicine & Dentistry is taking a student-centred and pragmatic approach to e-learning, viewing it as an opportunity to accommodate a diversity of learning needs, styles and environments.

"E-learning provides a great deal of flexibility in how students can and choose to learn," said Sarah McLean, PhD, an assistant professor in Physiology and Pharmacology and e-learning coordinator for the Basic Medical Sciences program at Schulich Medicine & Dentistry. "Courses can be more learner-paced and focus on the community and collaboration aspects of education."

In addition to increased accessibility and collaborative possibilities, online resources allow for more accurate evaluations for students and instructors.

"We put a lot of emphasis on tracking progress to make sure students are achieving the outcomes of our courses," said Jay Loftus, EdD, a dedicated instructional designer and researcher with the School's Digital Learning & Simulation Division. "I call it informed instruction. We know more about what's going on in our classes and can make improvements."

Course instructors can monitor student log-ins, activity and online assessments. E-learning platforms, such as Western's OWL system, also allow them to pinpoint course concepts that students aren't understanding and revamp how they are being presented.

Kem Rogers, PhD, chair, Anatomy and Cell Biology,

uses and manages Echo360, a live lecture broadcast and capture program, to deliver two basic medical sciences courses at the School. He likes Echo360 for its convenience and usability.

"Putting a course online doesn't have to be complicated or time consuming for the instructor," he said. "It's complementary to what we're already doing in the traditional classroom model. But we can teach and learn from anywhere."

The flexibility, ease of use and possibilities for innovation suggest the demand for e-learning will only continue to grow.

"We can't create more time or add more hours to the day. This is the only way to create content and have people access it when they need it and how they want it," said Loftus. "It's going to be a very important component of learning moving forward."

New tech on the block

Part of Loftus' role is educating faculty members on what e-learning is and how it can be used effectively to complement their current teaching methods. This includes exploring the latest gadgets and tech accessories available for the postsecondary classroom, from augmented reality to sensory inputs to advanced online learning platforms.

And while devices like Oculus Rift or Google Cardboard definitely have the 'cool factor,' the more suitable tools for the purposes of education at Schulich Medicine & Dentistry are less flashy—such as online games or activities that train students in realistic environments and real-life scenarios.

One successful example is an online course offered through Physiology and Pharmacology, which incorporates a virtual CSI-like crime scene to help students work through the curriculum.

Another example comes from one of Rogers' fully online courses, Systemic Human Anatomy. Part of the lab component requires students to draw features of the human anatomy, such as bones, muscles or nerves, using special software called Draw It To Know It.

"Pedagogical research shows us that we learn more effectively when we have more than one mode of learning—audio, visual and/or kinesthetic," Rogers explained. "So we're bringing the kinesthetic element of the gross anatomy lab to the online environment."

From videos and apps to blogs and social media, many faculty members at Schulich Medicine & Dentistry have integrated at least some elements of the digital world into their courses.

"We all want to be awesome teachers and get our students excited about what they're learning," explained Anita Woods, PhD, an associate professor in Physiology and Pharmacology. "E-learning can make our lives easier if it's done well, and it's a lot of fun. But it always has to come back to the impact and cost for the students."

Enhancing quality of learning

A major challenge of implementing e-learning technology is the rapid pace of change paired with ongoing costs—the initial purchase price of the technology or software as well as the required continual updates.

Weighing the cost-benefit is an important part of the School's process in determining which technologies and platforms will have the most impact and longevity.

"The cool factor gets people to try new things, but we don't know if they'll use the technology long-term," explained Loftus. "What we try to emphasize is ensuring the quality of learning. And we try to keep everything fairly standard, so the look and feel of our online courses and modules are the same, and so the students and instructors know what to expect."

The emphasis on quality over quantity allows time for faculty and staff to study and analyze the benefits and limitations of e-learning tools, which helps determine which ones are valuable to the School and which ones aren't needed.

For McLean, using technology for the sake of keeping up with the Joneses isn't the right approach. "We need to look at what we're trying to achieve and the purpose, and then look at the tools that help us accomplish that goal," she said.

Leading in teaching excellence

Despite advances in e-learning, researchers at the School believe face-to-face experiences remain

essential to the learning process—and something many students still prefer.

"We have a large cadre of students, about 60 per cent, that still attend lectures," explained Rogers. "There is an interactive piece they get in the classroom that they don't get online; a nuance that is lost."

Rogers and his team have conducted comparative research through open-ended interviews with students and professors. "We've discovered certain preferences with both groups when it comes to e-learning," he said. "But we know that if you're good at what you do as a teacher, the students will come, whether they're sitting directly in front of you or they're at home in their pyjamas."

Insights like this demonstrate the continuing need for excellence in teaching—something the School has been a leader in at the national and international level—even in online settings.

Woods points out that the basics of teaching excellence won't change simply because there are new tools of the trade. "The School is embracing e-learning in a way that takes new technology and combines it with things we're already good at," she said. ■



"PEDAGOGICAL RESEARCH SHOWS US THAT WE LEARN MORE EFFECTIVELY WHEN WE HAVE MORE THAN ONE MODE OF LEARNING—AUDIO, VISUAL AND/OR KINESTHETIC. SO WE'RE BRINGING THE KINESTHETIC ELEMENT OF THE GROSS ANATOMY LAB TO THE ONLINE ENVIRONMENT."—KEM ROGERS, PhD

FOSTERING A CULTURE OF SUPPORT

SCHULICH MEDICINE &
DENTISTRY'S FOCUS ON
MENTORSHIP HELPS FACULTY
AND LEARNERS SUCCEED

By Pat Morden, BA'77

When Kelly Anderson began looking for an academic appointment, she interviewed at a number of universities. One of the things that attracted her to Schulich Medicine & Dentistry was its strong faculty mentorship program. "I've been fortunate to have great mentors throughout my training, so I recognize the importance of mentorship," said Anderson, now an Assistant Professor in Epidemiology and Biostatistics. "I really liked the idea that I would have that support in place when I started my first academic position."

As soon as Anderson was hired, she and her department chair put together a mentorship committee. She meets formally with the committee a few times a year, and also on an impromptu basis. She's received advice on everything from navigating department politics and recruiting graduate students to being an effective teacher and supervisor. "It's nice to have a group of people to turn to with those dumb questions everyone has when they're new," she said with a smile.

Schulich Medicine & Dentistry stands apart from most medical schools in having a formal mentorship policy and program that must be offered to all faculty members. Dr. Mithu Sen is Assistant Dean, Faculty, Equity & Wellness, and Chair of the Mentorship Oversight Committee. "The offer of a mentorship committee is unconditional," she said. "The committee is not set up to judge you, nor to evaluate your performance. It's there to offer you advice—and support you no matter what."

There's a growing understanding of the importance of mentorship in academic medicine. "We know that without mentorship, faculty members are less likely to succeed," said Dr. Sen. "Whether you are early, mid or late career, you can accomplish more when you have a team who will support you."

Doug Jones, PhD, vice dean, Basic Medical Sciences, is a member of the Faculty Mentorship Oversight Committee. He conducts mentorship workshops and researches best practices. He says the research is clear: "People who have a strong support system are happier, more productive, and more creative."

The School's faculty mentorship program is unique in a number of ways. Jones says that the committee approach, rather than one-on-one mentorship, reflects best practice. "We feel, after studying the literature, that a mentorship committee offers a wider perspective and broader context," he said. He underlines the flexibility of the program, which encourages people to seek out informal mentorship as well.

Jones and Dr. Sen both emphasize Schulich Medicine & Dentistry's scholarly approach to mentorship. Their team is also conducting a four-year survey, which will be completed next year. "The program is dynamic, not static," said Dr. Sen. "It will continue to grow and evolve."

Schulich Medicine & Dentistry also has a strong reputation for mentoring medical students. This long tradition became entrenched in the School by Drs. Fraser Fellows and James Silcox, MD'67, who wanted to create something outside the classroom to help students understand how their careers related.

Dr. Robert Hammond, MD'87, associate dean, Admissions and director of Student Wellness, oversees the mentorship program for undergraduate medical students. Dr. Hammond believes that medical education has a very rich apprenticeship component. This includes learning from each other, as much as learning from books. "Our mentorship program recognizes the empathetic, caring nature of our profession, and also the importance of team," he said.



Kelly Anderson, PhD



Dr. Robert Hammond

The student program in medicine involves some 50 or so mentors and 350 students across all four years. A hallmark of the program is flexibility. Dr. Hammond usually meets with his group at his home about three times a year. Not surprisingly, many students find medical school quite overwhelming. “Sometimes they just need simple advice and reassurance, to help build their confidence and make them feel grounded,” he said. “Gradually, as they move into years three and four, they make the transition from being mentored to providing mentorship. It’s amazing to watch them grow before your eyes.”

Dr. Jim Jean, DDS’73, is an Assistant Professor at Schulich Dentistry, which has a mandatory mentorship program for students in third and fourth year. This is the time when dentistry students begin their training in clinical practice. In addition to helping students organize, maintain and balance their patient portfolios, Dr. Jean and his team of mentors also ‘lend an ear’ to help students with whatever challenges they may face. When problems are personal, they are often referred to the appropriate experts. “Our doors are always open,” said Dr. Jean.

Almost one-third of the graduating students are international. This is a critical time for them, as they learn to adjust to life in Canada and become familiar with the dynamics of a Canadian dental office.

Dr. Jean says mentorship is part of Dentistry’s overall strategy to become one of the top 10 dental schools in North America. “I believe our student mentorship program greatly enhances our ability to succeed,” he said.

Schulich Medicine & Dentistry has become well-known for its friendly and supportive culture, which attracts both students and faculty. Anderson, now going into her third year of research and teaching, feels that this culture of support has been a big help in her transition to assistant professor. “In addition to my mentorship committee, I receive informal mentorship from people within my department, as well as peer mentorship,” she said. “I’m also trying to foster this in the graduate students I supervise.”

This is exactly what Dr. Sen loves to hear. “I feel it’s impossible to miss the culture of support that exists at Schulich Medicine & Dentistry,” she said. “Mentorship creates openness, and an opportunity for growth for everyone.” ■

TEACHABLE MOMENTS

AN INNOVATIVE BOOT CAMP HELPS RESIDENTS DEVELOP THEIR TEACHING SKILLS

By Pat Morden, BA'77

“Teaching helps us consolidate our knowledge. If we do it well, students will be able to provide better care and be better colleagues in the future.”



That's Dr. Charles Ho, MD'13, a fourth-year resident in psychiatry. Last year, Dr. Ho and 31 other residents from 24 programs at Schulich Medicine attended the first-ever Boot Camp for Resident Teachers to learn new teaching strategies and approaches.

There's growing recognition that residents play an important role as teachers of undergraduate students and junior residents. "Residents have a natural empathy and rapport with learners and that makes them powerful teachers," said Joan Binnendyk, an educational developer with the School's postgraduate medical education program. "Often physicians looking back on their training will identify residents as their most important and influential teachers." In fact, it's estimated that more than one-third of a medical student's knowledge is attributed to resident teaching.

To develop the Boot Camp, Binnendyk held focus groups with residents and medical students, reviewed the literature, and worked with key faculty members. Program directors were asked to nominate one or two residents to attend.

"We brought together residents who cared about teaching with engaged, passionate clinical educators," said Binnendyk. "There was such energy in the room."

Residents took part in faculty-led workshops on topics such as effective feedback, teaching in the moment, and bedside teaching.

During the bedside teaching session, they had an opportunity to interact with real patients. "The patients were able to tell them what makes them uncomfortable or more comfortable when teaching is happening beside them," said Binnendyk. "That was a powerful moment."

Dr. Daniel Pepe, MD'14, a second-year resident in family medicine, attended the Boot Camp. "For me the value in learning how to teach other residents is that it makes you a better teacher of your patients," he said. "The program taught us not just teaching styles and strategies, but also to be more aware of the person sitting across the desk or bed from us."

"Residents have a natural empathy and rapport with learners and that makes them powerful teachers. Often physicians looking back on their training will identify residents as their most important and influential teachers."

—Joan Binnendyk, Educational Developer

Dr. Ho agrees, adding, "Before, I always thought about what students need to learn. The Boot Camp got me thinking about what they want to learn. Now I make a point of asking my students what they want to get out of our time together." He also appreciates the opportunity to interact with residents from other programs.

The participants completed self-assessments before and after the Boot Camp. Results showed that the percentage of residents who felt well prepared to teach went from 38 per cent before to 88 per cent after the Boot Camp. Other measures showed similar improvements. Drs. Ho and Pepe and several participants presented what they'd learned to other residents in their own programs. Binnendyk observed some of these teaching sessions and provided feedback. "It was exciting to see them using their new-found skills," she said. "They took what we taught them and personalized the content by making it program-specific."

The Boot Camp will be held again this year. "I definitely recommend it," said Dr. Ho. "When residents learn to teach in a better way, students have more buy-in. It's a more positive experience for everyone." ■



Dr. Daniel Pepe participated in the Boot Camp and gained new perspectives in teaching and providing care

Virtual reality tool box enhances translational research

Often times the translation of research from animal models to humans fails because the experiments don't look alike. In research, most spatial memory experiments include animal models being tested in actual, real-world mazes while humans are assessed virtually, using computer screens, more often than not in a two-dimensional setting.

Dr. Julio Martinez-Trujillo, Physiology and Pharmacology, and his team have developed a new virtual reality 'tool box' that can be used to build video games with a unique capacity for teaching and testing both humans and animal models which enhance translational research.

Using standardized, pre-existing software, the new virtual reality tool box allows investigators to homogenize psychological tests across species by creating three-dimensional environments with specific learning tasks and end goals.

With the tool box, investigators can test humans and animal models within exactly the same environment and very similar settings, allowing for generalization from animal models into humans and translational research findings.



Researchers link stress and epilepsy

Researchers at Robarts Research Institute have shown that epilepsy changes the way the brain reacts to stress and have used these findings to point to new drugs that may prevent stress-induced seizures. Studies have shown that as the disease produces changes in neuronal signalling, that increases seizure occurrence by converting a beneficial stress response into an epileptic trigger.

Michael Poulter, PhD, and his team studied a neurotransmitter called corticotropin-releasing factor (CRF) that coordinates many behavioural responses to stress in the central nervous system. Using a rat-model of epilepsy, they examined the effect of this neurotransmitter on the piriform cortex, a region of the brain that easily supports seizures

in humans.

They found that in a normal brain, CRF diminished the activity of this seizure-producing part of the brain. But in the diseased brain, it did the exact opposite—ramping up the activity of the piriform cortex instead.

Further, they identified a switch in the molecular signalling in the brain. In the model of epilepsy, the CRF switches from signalling through one cascade to one that's completely different. The researchers discovered that the catalyst for this is a protein in the brain called regulator of G protein signalling protein type 2 (RGS2).

The research indicates that CRF-blocking drugs might prevent stress-induced seizures in epileptic patients.

New rapid test for E. coli

Dr. Michael Rieder, Paediatrics, and his team have created a new rapid test system to detect E. coli. The test allows manufacturers to identify contaminated food quickly before it leaves the processing plant and enters the grocery store.

This new rapid test system allows food to be sampled at the end of one day, and the results would be available before the food is shipped the following day. This is a vast improvement upon the current system which can take from three to 21 days for testing results and can lead to food already being distributed prior to results being received.

The rapid test relies on targeting proteins that are only present in the organisms that cause people to become ill. By collaborating with the Toronto-based company International Point of Care, Dr. Rieder's team was able to use flow-through technology to mark the protein with colloidal gold so that it is visible to the naked eye. The process is similar to that used in pregnancy tests—one line for negative, two lines for positive.





Research reveals gap in health care services for transgender Ontarians

Greta Bauer, PhD, Epidemiology and Biostatistics, led a study examining the factors associated with transgender patients' access to and comfort with family physicians. She found that approximately half of transgender Ontarians who have a family physician are not comfortable discussing transgender-related health issues with their family physician.

Issues which impacted a patient's level of discomfort with their family physician included whether they perceived their doctor was knowledgeable about transgender-related issues, their medical transition status, previous marital status and negative experiences with family physicians.

The study also found that transgender patients were less likely to have a family physician, compared with the general

population in Ontario—83.1 per cent and 90.9 per cent, respectively.

"Universal access to health care is a tenet of our health care system, but in reality, not everyone has true access to the same level of health care," said Bauer. "All patients need to feel comfortable with their doctor, otherwise there are barriers to accessing care—whether it's for medical transition-related care or bronchitis."

Data were collected through the Trans PULSE Project—a community-based research project initiated by Bauer and a broad group of academic and community colleagues in 2005 that is investigating the impact of social exclusion and discrimination on the health of transgender people in Ontario.

Gulf War technology advances prostate cancer testing

Hon Leong, PhD, and his team in Pathology and Laboratory Medicine, have repurposed a machine once used to detect airborne pathogens in the second Gulf War to aid in prostate cancer testing. The machine is now used for fluid biopsies—a non-invasive way to detect prostate microparticles in the blood in a matter of minutes. Microparticles are essentially garbage released by prostate cells that circulate throughout the bloodstream.

Most men who are more than 40 years old, regardless of their health, have detectable levels of prostate microparticles in their bloodstream. Leong's research is the first clinical cancer research project to correlate the number of microparticles in the blood to the risk of having prostate cancer—the more microparticles, the higher the risk.

The machine uses flow cytometry to detect microparticles measuring the specific characteristics of a fluid, such as blood, as it passes through a laser.

Leong's research provides a more accurate and less invasive testing method for patients suspected of having prostate cancer, and helps to identify patients who are at a higher risk of dying from prostate cancer.



Chemical in marijuana shows promise as treatment option for schizophrenia

In this first-of-its-kind study by Steven Laviolette, PhD, Anatomy and Cell Biology, a chemical found in marijuana called cannabidiol, or CBD, was shown to affect the brain in a way that makes it an ideal treatment option for schizophrenia.

Using pre-clinical models in rodents, Laviolette and his team showed that CBD normalizes schizophrenia-like disturbances in the brain's dopamine system. By doing so, CBD alleviates schizophrenia-related symptoms linked to abnormal dopamine activity, such as psychosis and cognitive problems. The team also demonstrated that the chemical is bypassing the molecular pathway in the brain that causes the negative side effects typically seen in traditional antipsychotic medications.

While CBD has shown promise as a treatment for schizophrenia in previous studies, this research is the first to show exactly how it acts on the brain to have positive results in mitigating psychiatric symptoms without causing the fatigue, lack of motivation and other side effects associated with traditional medications.



CREATIVE COLLABORATION

A UNIQUE SCHOOL GRANTING PROGRAM IS FUNDING OUT-OF-THE-BOX RESEARCH PROJECTS FOR INTERDISCIPLINARY TEAMS FROM ACROSS BASIC AND CLINICAL SCIENCES

By Jessica Hurst, BA'14

What would happen if physicians helped critically ill patients exercise while they were still receiving treatment in the intensive care unit (ICU) of a hospital?

It's a question that had not been well studied before a group of researchers at Schulich Medicine & Dentistry came up with the novel idea.

For the past century, the typical clinical approach has been to let critically ill patients rest, as physicians did not want to harm them or put them at higher risk.

Studies have shown that exercise is beneficial to the recovery of these patients after they are awake and able to take part in physical activity themselves, but no one had ever attempted to study the effects of helping these patients exercise sooner.

Drs. Doug Fraser and Claudio Martin and Kevin Shoemaker, PhD, came together in 2012 to discuss the possibility of challenging the typical approach. They wanted to look at the effects of targeted passive exercise on patients with sepsis—a potentially life-threatening complication that occurs after a severe infection.

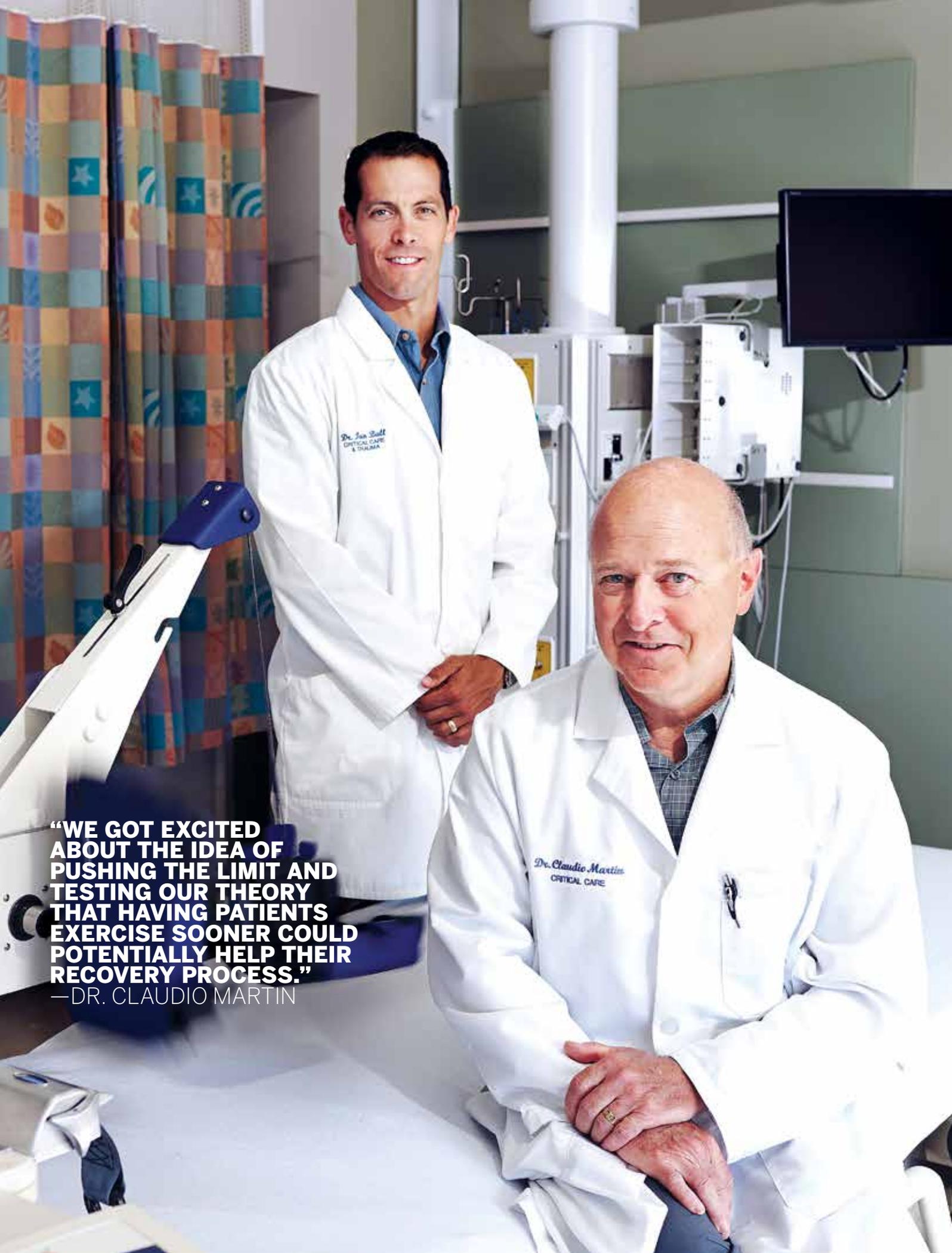
Their plan was to utilize passive cycle ergometers, which are motorized cycling machines that patients can be hooked up to while resting or under medically-induced comas.

"We all asked the question, why do we have to wait until the patient has been released from the ICU to start the process of exercise and rehabilitation?" Dr. Martin said. "We got excited about the idea of pushing the limit and testing our theory that having patients exercise sooner could potentially help their recovery process."

"Many of these patients can't move, because they are immobile or have severely damaged muscle and/or cognitive abilities," Shoemaker added. "The idea was to simply induce passive exercise at an earlier stage, have the machine do all of the work for the patients, and to study the outcomes on the blood vessels."

Shortly after the three researchers met, they developed a large interdisciplinary team of basic scientists and clinician researchers to work together on the project, which is comprised of Dr. Ian Ball; Gedas Cepinkas, PhD; Chris Ellis, PhD; Dr. Fraser; Keith St. Lawrence, PhD; Dr. Martin;





“WE GOT EXCITED ABOUT THE IDEA OF PUSHING THE LIMIT AND TESTING OUR THEORY THAT HAVING PATIENTS EXERCISE SOONER COULD POTENTIALLY HELP THEIR RECOVERY PROCESS.”

—DR. CLAUDIO MARTIN

RESEARCH PROFILE

Dr. Tina Mele and Shoemaker. They come from a variety of departments, including Medical Biophysics, Medicine, Pathology and Laboratory Medicine, Surgery, Anesthesia & Perioperative Medicine, Paediatrics and the Faculty of Health Sciences.

The group applied for Schulich Medicine & Dentistry's Collaborative Research Seed Grant (CRSG) competition's first round, and received the funding they needed to move forward with their innovative project, which included recruiting 10 patients for their clinical study.

When Dr. Ball was recruited from Queen's University by Dr. Martin to help lead the clinical portion of the study and manage the day-to-day activities of the group, he was incredibly excited. Known as 'the exercise guy' by colleagues, he never thought he would be able to blend his professional work with his passion for exercise, health and fitness.

Dr. Ball helped recruit the patients they needed to

"Patients in the ICU spend a lot of time lying in bed, so to feel that they were able to do something that could actually contribute to their improvement was very appealing to them."

—Dr. Ian Ball

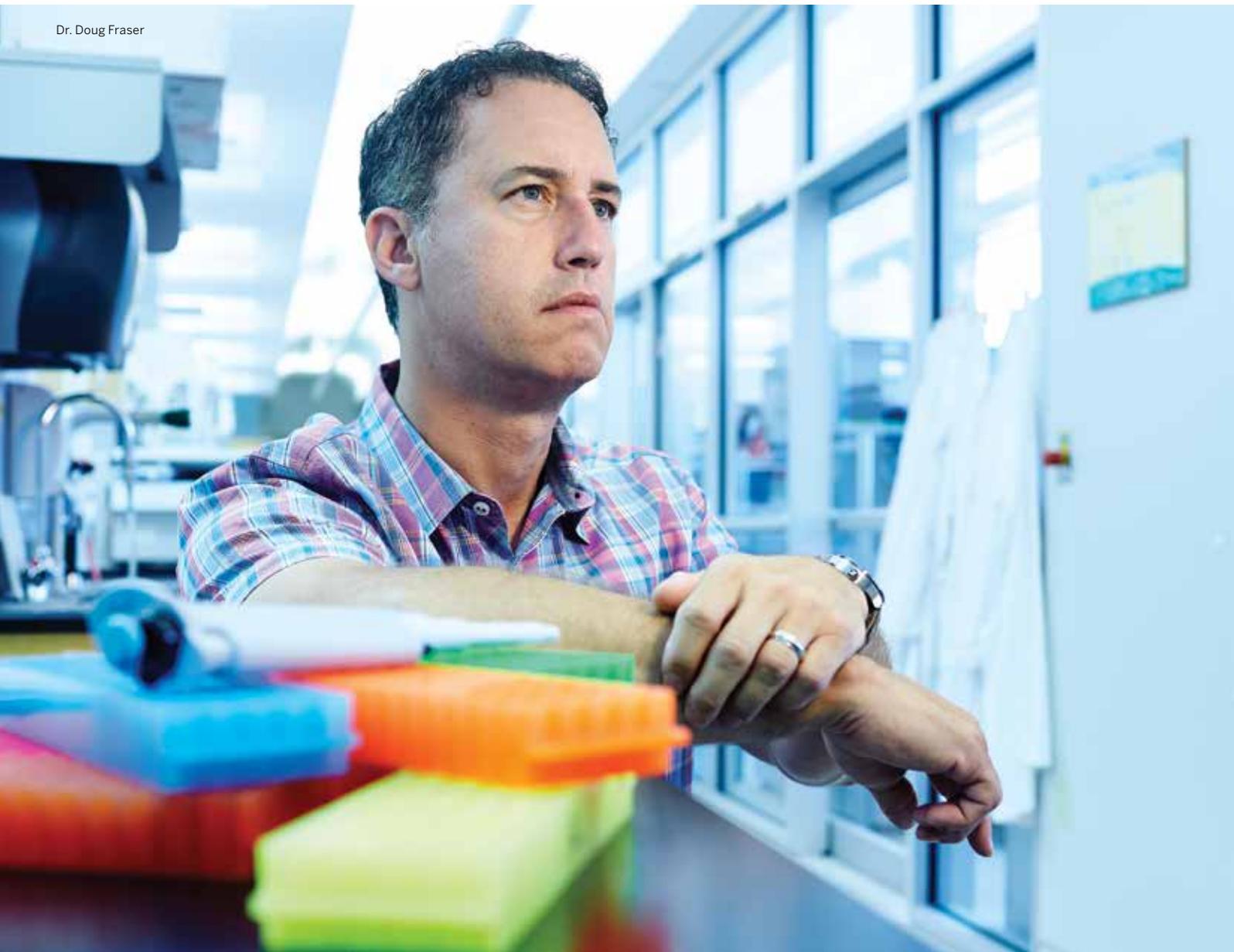
complete the clinical portion of their research.

"It was interesting how families and patients themselves were really excited about the idea of participating in this novel study," Dr. Ball said. "Patients in the ICU spend a lot of time lying in bed, so to feel that they were able to do something that could actually contribute to their improvement was very appealing to them."

The first step of the clinical portion of the study is now complete, and the next step is for Dr. Fraser, Cepinkas and Ellis to analyze the findings. This will help them determine how to move forward with the research.

"Before and after the patients took part in the passive exercise, we took blood from them to analyze," Dr. Fraser said. "Gedas and I are currently working together to look at various biomarkers of inflammation that could help determine whether or not there is any indication that there is a positive effect."

Dr. Doug Fraser



“When it comes to large externally-funded grants, there really is no place to take risks because granting agencies want to ensure researchers can deliver positive findings.”

—Denise Figlewicz, PhD

Ellis had been working with Martin and his team for years on projects related to sepsis and inflammation, but never considered passive exercise as a potential therapy for critical care patients. Like Dr. Ball, the idea made him excited and intrigued.

Ellis and his lab members developed what they consider a ‘replica ICU’ for animal models—a place where they could mimic what the clinician-researchers would be studying in the hospitals.

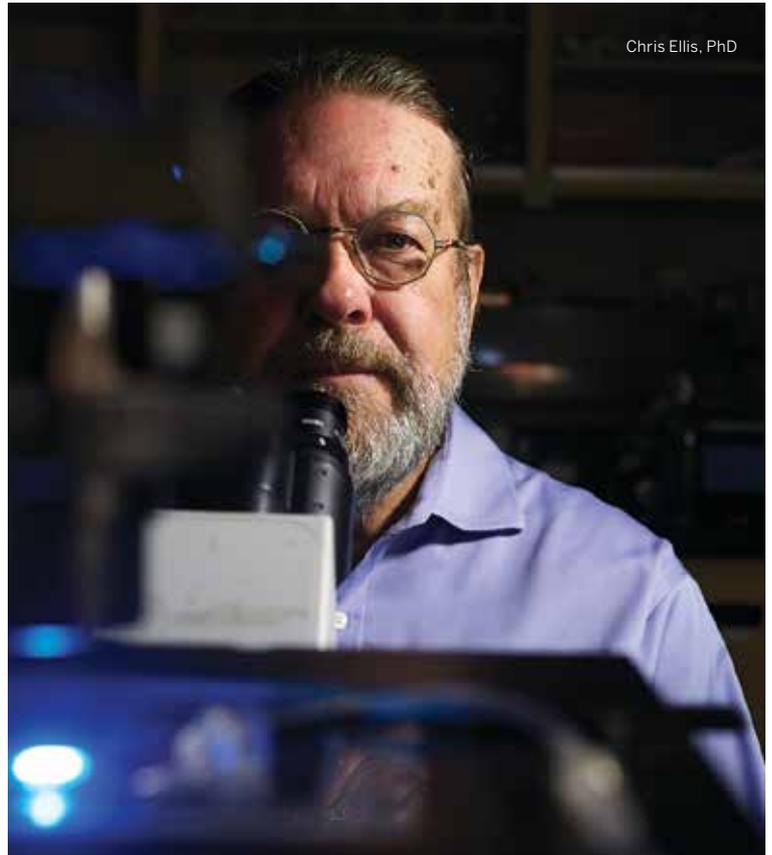
“I thought it would be neat to reproduce the clinical work they were doing in our lab by reproducing the same type of disease of sepsis in our animal models, and reproducing passive exercise to study its effect,” Ellis explained. He added that it is important to include the basic science aspect of the research because they can study the animal models in much more depth and detail than the clinicians could study the human patients in the ICU.

Denise Figlewicz, PhD, vice dean, Research & Innovation, explained that the idea of launching the CRSG competition came from conversations about how to fulfil the objectives of the School’s strategic plan.

“In the strategic plan, there is a mandate to do several things including strengthening knowledge translation, promoting an interdisciplinary research environment, and fostering interactions between researchers and knowledge users through the formation of teams,” Figlewicz said. “Many new funding opportunities with large awards require multidisciplinary teams to tackle the complex problems involving the development of new care approaches, therapies or methods of care delivery. Thus, in creating the CRSG program, we are responding to both internal and external mandates.”

Figlewicz added that the most exciting part of this internal funding competition is the fact that the projects most likely will be high risk—they want researchers to bring novel ideas forward, acknowledging that their hypotheses could potentially be wrong.

“When it comes to large externally-funded grants, there really is no place to take risks because granting agencies want to ensure researchers can deliver positive findings,” she explained. “While that does make sense,



what happens is the cool ‘lightbulb’ ideas never get their chance, and that is sometimes where the real research magic happens.”

Since its launch in 2013, the Research Office has received at least 25 applications per year. The Office has funded 20 innovative projects to date.

Dr. Mele said the opportunity to work on a project with both clinician researchers and basic scientists is not only exciting and more rewarding, but it can also lead to more meaningful results.

“A lot of what we do in the ICU is supportive care, but by changing the focus to the cellular mechanisms of what is going on in patients, we could potentially improve their mortality,” Dr. Mele said. “Bringing two groups of researchers together who have two different perspectives could potentially help us solve this problem.”

Shoemaker agreed, adding that a collaborative approach to research problems like this one can identify results that can help patients sooner.

“If exercise is going to be implemented as a treatment, there is still so much that we need to know,” Shoemaker said. “In order to find those answers we need to work as a team—we need a lot of people and their expertise, and we need these funding opportunities to further the work we have started.” ■



“THE GREATEST PART ABOUT SCIENCE IS THAT YOU DISCOVER THINGS YOU TOTALLY DIDN’T EXPECT—THINGS THAT NO ONE THOUGHT COULD EVER HAPPEN. IT IS A JOY BEING ABLE TO SHARE THOSE MOMENTS WITH YOUR COLLEAGUES AND STUDENTS, AND FOR US DISCUSSIONS AT HOME OFTEN SPUR NEW IDEAS IN THE LABS.”

—PATRICK O’DONOGHUE, PhD

FINDING [BIO] CHEMISTRY IN THE LAB

WHILE COMPLETING
POSTDOCTORAL FELLOWSHIPS
ILKA HEINEMANN AND PATRICK
O'DONOGHUE DIDN'T JUST
FALL IN LOVE WITH THEIR
RESEARCH PROJECTS

By Jessica Hurst, BA'14

You hear about it in songs, read about it in books, and watch it happen on the big screen. The notion of finding love right in front of your eyes may seem cliché to some, but to others it is not far from reality.

While Ilka Heinemann, PhD, found herself falling in love with the research she was conducting during her postdoctoral fellowship, she simultaneously had her sights set on someone else close by—another postdoctoral fellow working on research in the same lab as her.

“When I first arrived at Yale University in 2008 to complete a postdoctoral placement, I thought I would be there for only two or three years. Then I met this guy,” Heinemann said with a laugh, gesturing to her partner Patrick O’Donoghue, PhD.

“It’s funny, because our benches were right next to each other,” O’Donoghue added. “And now look at where we are.”

It’s been eight years since the couple first met. They now have three children spanning the ages of one to six, as well as blossoming careers in the field of biochemistry.

In 2013, the young scientists came to work at Schulich Medicine & Dentistry. Heinemann took on the position of Assistant Professor in Biochemistry, and O’Donoghue took on the position of Assistant Professor in Biochemistry, and Chemistry in the Faculty of Science. They have been hard at work developing their lab spaces and research projects ever since.

“There are so many academic institutions out there, and you don’t really know what they are going to be like until you visit the campus and meet your potential colleagues,” said O’Donoghue, Tier 2 Canada Research Chair in Chemical Biology. “We both liked this environment and received positive responses about our research from potential colleagues. We knew it would be a good fit.”

Even though Heinemann and O’Donoghue work in the same department, their research areas are quite different.

O’Donoghue studies post-translational modifications of proteins, which takes place when proteins are chemically modified in the cell. These modifications can ultimately change what kind of signals are sent inside of a cell, and can turn on and turn off kinases, which modulate their behaviour. When proteins are mis-modified, it can be associated with cancer and other diseases such as neurodegeneration—a process he is trying to understand.

Heinemann and members of her lab are focused on more upstream steps in gene regulation. They are interested in the cellular and molecular mechanisms that control the fate of ribonucleic acid (RNA) and the role of a family of RNA polymerase enzymes in the process.

“If you have a mis-regulation in the micro-RNAs, you have a global mis-regulation of the amount of RNA that is in a cell, and that can also lead to diseases like cancer and promote viral infections like Hepatitis C,” Heinemann explained.

Even though their research topics are different, Heinemann and O’Donoghue enjoy blending their professional lives. They often have joint group meetings that include all of their lab members, and they take time to discuss their research ideas during their lunch hour and on the way to pick up their kids.

“The greatest part about science is that you discover things you totally didn’t expect—things that no one thought could ever happen,” O’Donoghue said. “It is a joy being able to share those moments with your colleagues and students, and for us discussions at home often spur new ideas in the labs.”

Heinemann agreed, adding that she believes they’ve found the ideal way to blend their personal and professional lives.

“I think being able to share these moments together has made our careers that much more enjoyable,” she said. ■

A MARATHON OF RESEARCH INTO JOINT PRESERVATION

BY INVOLVING HIMSELF IN RESEARCH ENDEAVOURS, DR. ALAN GETGOOD HOPES TO MAKE AN IMPACT ON PATIENTS WITH SPORTS-RELATED INJURIES WORLDWIDE

By Crystal Mackay, MA'05

Above Dr. Alan Getgood's desk at the Fowler Kennedy Sport Medicine Clinic hangs a poster of the Sahara Desert; a wide-open expanse of sand and heat. Only when you look very closely do you see a cluster of runners, like a line of tiny ants moving through two valleys.

"That's me. In the middle of the pack somewhere," he said with a distinctive Irish lilt. Along with 900 runners, Dr. Getgood ran 250 kilometres over seven days through the Moroccan Sahara. "It was a pretty crazy race, and it was a lot of fun," he said. "It was a good experience, but it was a test of mental toughness for sure."

That was 2012, just before he began his career as an orthopaedic surgeon and researcher at Schulich Medicine & Dentistry. He has the poster in that prominent spot in his office as a constant reminder of what's possible when you focus on the end goal.

"Very similar to a marathon, you have to just have the mindset that you are going to complete it, and focus on getting things done."

And using that mantra, Dr. Getgood has published more than 60 research papers and has completed more than 1,200 knee surgeries since he began his career at the School, with an end goal of making a significant impact on the lives of not just his own patients, but all patients with sports-related injuries.

"As a surgeon, if you don't do any research you really only get to influence the number of people you can see in your career," he said. "Whereas by doing research, you can influence an awful lot more."

The impact of his work is already being felt in the world of sport medicine. One of Dr. Getgood's biggest accomplishments has been investigating the role of a ligament that stretches onto the lateral side of the knee called the anterolateral ligament. "I had a surgeon say to me at a recent meeting that he has one of our papers on his wall in the



operating room," he said. "So that's validation of our work in a tangible way."

Dr. Getgood and his team are exploring how this ligament might benefit patients who are undergoing anterior cruciate ligament (ACL) reconstruction. Currently, orthopaedic surgeons only repair the ACL, and leave the ligament on the lateral side of the knee alone. By combining these two techniques, he hopes to show improvements in the preservation of the joint over the long-term.

Since 2014, he and his team of collaborators (seven centres in Canada and two in Europe) have been recruiting patients into what will be the world's largest randomized clinical trial for ACL reconstruction. Already 500 patients have been randomized with a further 100 to go.

Furthermore, he and his Western colleagues in the Bone and Joint Institute will commence a second randomized clinical trial in the fall looking at what they call the "mechano-biology" of knee injuries. They

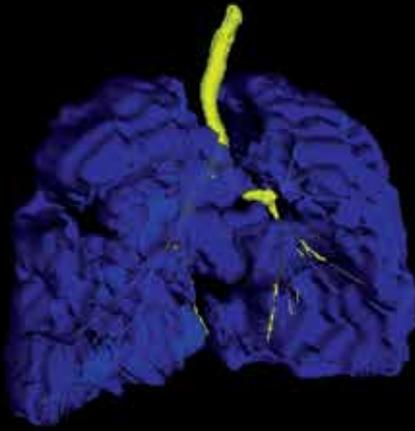
plan to investigate ways to prevent the cascade of biological effects that happen in the joint after a mechanical injury like a torn ACL. By using a person's own bone marrow, they will be investigating whether or not they can stop this cascade that often leads to post-traumatic osteoarthritis (OA).

"Because bone marrow has stem cells in it and other anti-inflammatory properties, we are hoping that it will help modulate the degeneration that leads to post-traumatic OA," he said.

With the marathon of research and clinical work that he does every day, it is particularly important to him to make time for himself and his family, and he still laces up his running shoes several times a week to get out for a run with his dog.

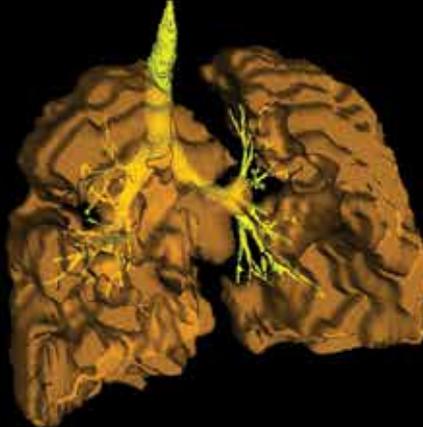
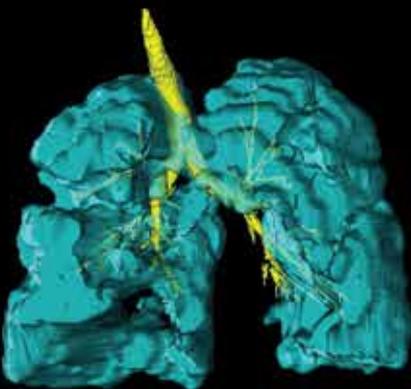
When asked what parallels he can draw between his professional life and his personal life, he chuckled. "Well, my knee hurts," he said. ■

DISCOVERY



ART ATTACK

Using sophisticated imaging Robarts scientists are detecting chronic lung disease to support the development of treatment plans



A NEW PICTURE OF CHRONIC LUNG DISEASE

A NOVEL APPROACH TO IMAGING IS LEADING TO CHANGES IN THE WAY ASTHMA AND COPD ARE UNDERSTOOD AND TREATED

By Pat Morden, BA'77

When Grace Parraga, HBSc'84, MSc'86, PhD, talks about Javier Avina, you can hear the frustration in her voice.

Avina is a 10-year-old Wallaceburg boy who died during an asthma attack at school in early April 2016. Parraga believes that the innovative imaging technique developed by her team can be used to predict and perhaps help prevent severe asthma attacks like Avina's.

Parraga is a scientist who started her career using nuclear magnetic resonance spectroscopy to study protein structure and function, and protein/DNA binding. "I was trained as a hard core basic researcher and determined some fundamental protein structure-function findings," she said. After completing post-doctoral training in Switzerland,

she joined a major multinational pharmaceutical company "in the gap between basic and clinical research." She joined Robarts in 1998, first as a research administrator and then as a scientist in 2004.

Today she and her team work in a facility created in part through the philanthropy of Richard (LLD'79) and Beryl (LLD'97) Ivey. "They wanted a space where imaging research could be tested in patients and translated into clinical practice," she said. "This was their dream and vision."

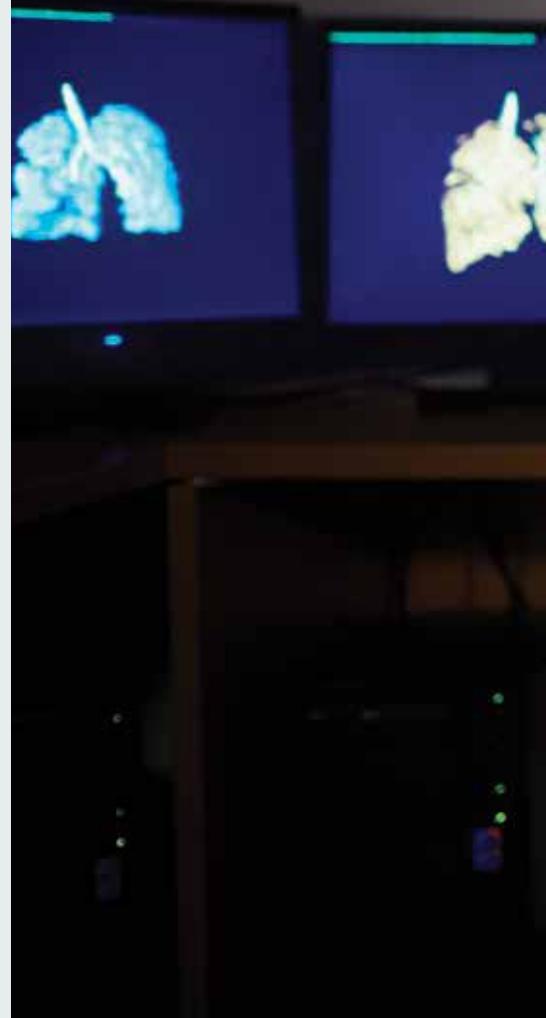
Under Parraga's leadership, a remarkable program has taken shape and is making important advances. "Grace is leading the world in lung imaging innovation," said Dr. Chris Licskai, a respirologist who collaborates with the program. "She has developed a novel tool that has great promise."

Chronic lung disease is one of the leading causes of death and disability in Canada. More than 2.5-million Canadians, most of them children, live with asthma. It's also estimated that 1.5-million Canadians have chronic obstructive lung disease (COPD), including one in four hospitalized patients in Ontario.

The standard clinical method for measuring lung function involves quantifying airflow using a spirometer. In the clinic, patients with asthma or COPD blow into the spirometry device and, in some cases, chest X-rays and CT images are also used to help better understand the disease.

Parraga and her team have developed a technique called pulmonary functional Magnetic Resonance (MR) imaging. During testing, the patient breathes in a novel gas contrast agent (produced on-site) while in the MRI scanner. Within a few seconds a high resolution three-dimensional image is produced that shows where the inhaled gas goes and where it can't go due to airway and other lung abnormalities. "This technique gives us a really good ability to correlate lung structure and function," said Dr. David McCormack, a respirologist and another clinical collaborator in the program. "That's pretty unique and a powerful tool."

The inhaled gases used are not radioactive and are completely inert, so the test is safe and well-tolerated by patients. As a result, it's possible to image patients before and after taking their medications,

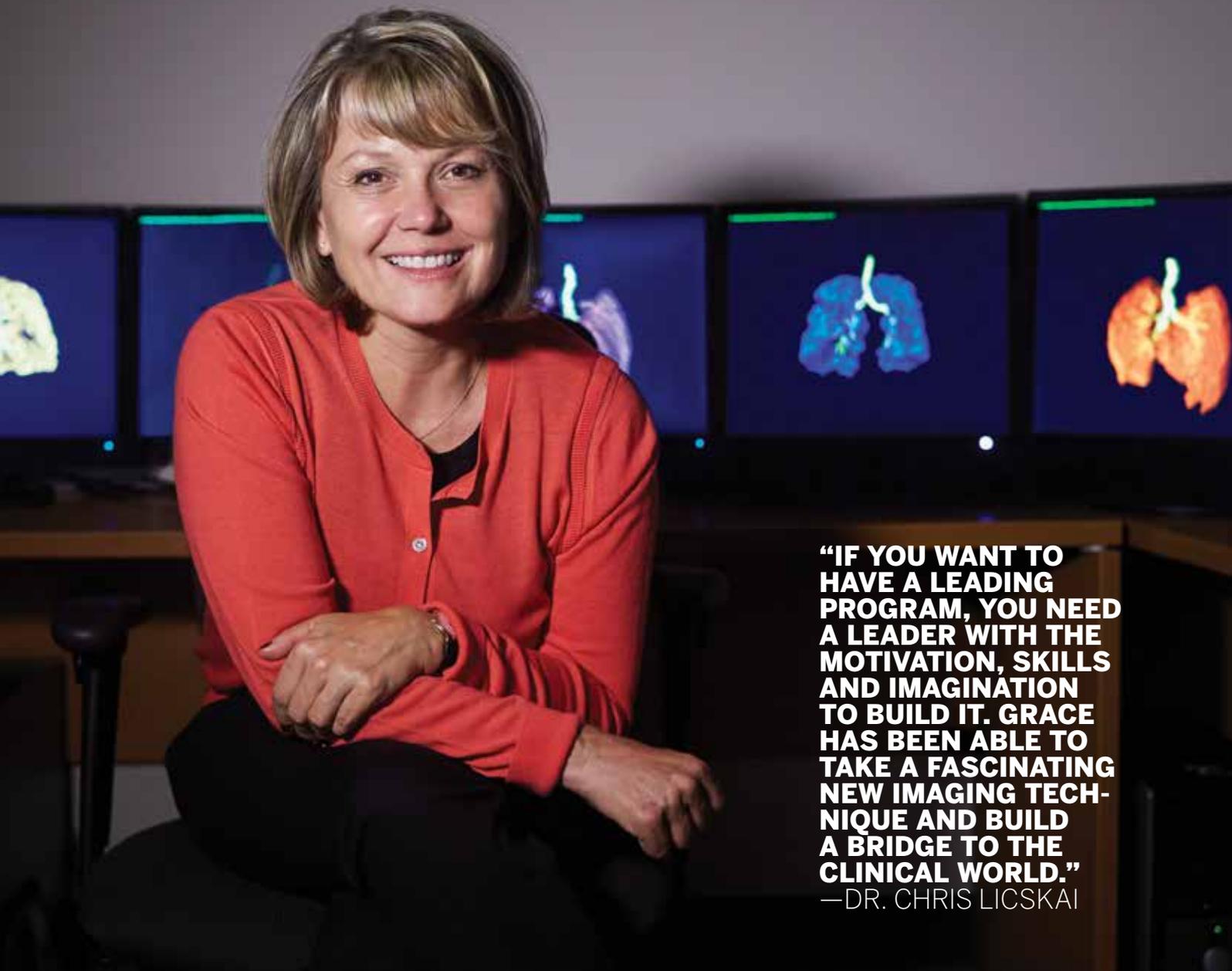


before and after walking, and before and after an induced asthma attack.

The images produced by this technique have led to a major shift in the understanding of lung disease. "We used to think about asthma as a fairly homogeneous disease, affecting all areas of the lung to a similar degree," said Dr. McCormack. "Our data have revealed that it's a very regionally heterogeneous disease."

Similarly, COPD affects some parts of the lungs more than others. One analogy, Dr. McCormack says, is to coronary artery disease, in which some, but not all, arteries are blocked with atherosclerotic plaque.

This understanding, in turn, is leading to new therapeutic approaches. "Clinically we're moving toward a better understanding of the individual pheno-



“IF YOU WANT TO HAVE A LEADING PROGRAM, YOU NEED A LEADER WITH THE MOTIVATION, SKILLS AND IMAGINATION TO BUILD IT. GRACE HAS BEEN ABLE TO TAKE A FASCINATING NEW IMAGING TECHNIQUE AND BUILD A BRIDGE TO THE CLINICAL WORLD.”
—DR. CHRIS LICSKAI

type in these diseases,” said Dr. Liciskai. “These images may help us to personalize therapy.” For example, the program is part of a study on the use of thermal ablation delivered via a bronchoscope. The goal is to improve asthma control by reducing smooth muscle in the airways. Right now, the whole lung is treated. Knowing where the problem areas are in each patient could lead to a more targeted approach.

The technique is also helping to account for unexplained symptoms reported by patients.

“We have patients who don’t appear to be severely ill, based on spirometry measurements but they have a terrible quality of life,” said Parraga. “When we image them, we can see why.”

The images can also be used to

track disease progression, and to identify biomarkers of severe disease that lead to repeated hospitalizations. They can also be used to measure the efficacy of potential new treatments and delivery methods. Ultimately, they may shed light on many other questions about lung disease, including why some people with asthma develop a form of permanent lung damage via remodelling of the airways.

Parraga says there is still some work to do before the technique becomes standard clinical practice worldwide and in Canada. A health economics project is currently under way with collaborators across Canada. “We have to justify, based on patient outcomes, the rationale for MRI in these patients,” she said. “But with our approach, patients are only in the scanner

for 10 seconds which will certainly help to contain costs. Improved treatment could lead to fewer hospitalizations,” she added. The average cost of a hospital stay due to COPD is estimated at \$10,000.

Parraga’s leadership is a key factor in the program’s remarkable success, said Dr. Liciskai. “If you want to have a leading program, you need a leader with the motivation, skills and imagination to build it. Grace has been able to take a fascinating new imaging technique and build a bridge to the clinical world.”

Dr. McCormack agrees, adding, “If you have the technology but not the patients and clinical expertise, it doesn’t work as well. Here we have a really nice interaction between basic scientists and clinicians. And it’s working.” ■

INNOVATION AGENDA

MARLYS KOSCHINSKY
IS CHAMPIONING A
BOLD, CREATIVE AND
INCLUSIVE VISION
FOR THE FUTURE OF
ROBARTS RESEARCH
INSTITUTE

By Emily Leighton, MA'13

Marlys Koschinsky, PhD, walks into Robarts Research Institute on a warm morning in early summer. She's been making the same trek to work for nine whirlwind months since starting as Scientific and Executive Director.

On the second floor of the building, she enters a bright and inviting office space. It is 8:00 a.m. and Koschinsky's day begins as it always does—with a cup of coffee.

Energy is a necessity in this dynamic yet demanding environment. "Robarts is a big and busy place, with lots going on, and with many exciting avenues for development," she said, taking a sip from her West Highland Terrier-themed coffee mug.

These avenues are top-of-mind for Koschinsky in her new role—the Institute's future dominates her daily conversations. But the leadership job doesn't come with a crystal ball; rather, it relies on collaboration and consultation.

"The Institute's future vision has to be a shared vision, and it has to build to our strengths," she explained.

Koschinsky's desktop PC dings with an incoming email. It is 9:24 a.m. The morning continues in a pattern of electronic interruptions, scheduled meetings and drop-in visitors.

At 12:15 p.m. Koschinsky heads to a meeting with the Robarts Executive Committee.

The Committee, made up of senior Robarts scientists and group directors, is responsible for leading the strategic planning process currently underway.

"We are developing a strong, robust and creative strategic plan that will provide the blueprint for how the Institute will move forward during the next five years," Koschinsky explained. "We've been hearing from stakeholder groups and collecting their input to understand what we need to do to pave the way for Robarts' sustainability and growth."

Innovation is a cornerstone of the

“We are developing a strong, robust and creative strategic plan that will provide the blueprint for how the Institute will move forward during the next five years. We’ve been hearing from stakeholder groups and collecting their input to understand what we need to do to pave the way for Robarts’ sustainability and growth.”

—Marlys Koschinsky, PhD



new plan, and Koschinsky hopes it will continue to elevate Robarts’ international reputation for cutting-edge research. “We want to excel at precision medicine approaches to translational health research and research excellence, all fuelled by a very high level of technology,” she said.

“And innovation is not limited to research. We are actively thinking of new ways to foster innovation as it relates to training the next generation of scientists,” she added with emphasis.

Robarts’ strategic plan is expected to be complete by June 2017, and the groundwork is being laid now, particularly in the area of strategic partnerships.

“Strategic partnerships will enable us to move an innovation agenda forward and to make sure we’re translating our fundamental research discoveries,” said Koschinsky. “There are a number of organizations in the London area who we could better work with to drive aspects of our innovation agenda.”

This list includes London’s teaching hospitals. “We’re looking at how we can more productively partner with our clinical colleagues to enhance both research and training at Robarts,” she said. “These linkages will be critical in driving translational research forward at the Institute.”

At 5:57 p.m., as the hot afternoon sun begins to fade, Koschinsky takes an elevator up to the fourth floor to view the progress on her new laboratory space. In addition to leading Robarts, she is also maintaining a research portfolio at the Institute—studying lipoprotein(a) as a risk factor for cardiovascular disease alongside her collaborator and spouse, Michael Boffa, PhD.

“My research is always a secondary priority to my role as the Scientific and Executive Director of the Institute, but I never want to step away from it entirely because it’s something I’m very passionate about,” she said.

Koschinsky describes the sense of pride and optimism that comes with being a part of the team at Robarts, celebrating its 30th anniversary this year. “Robarts is filled with vibrant and exciting people who are committed to the Institute,” she said with enthusiasm. “I continue to be inspired by the immense research impact we have.”

It is nearly 6:00 p.m. when Koschinsky switches off her office lights. The building is quiet this evening, save for the soft hum of machines and equipment that lingers faintly in the background—a fitting reminder that science never really sleeps at Robarts, even if the people behind the Institute’s success must. ■

CANCER HUNTER

JOHN RONALD IS USING OUT-OF-THE-BOX IDEAS TO DETECT AND TREAT CANCER

By Crystal Mackay, MA'05

“The best ideas don’t come from sticking with the status quo.”

—John Ronald, PhD'09



John Ronald, PhD'09, holds up his well-worn, ear-marked copy of the *Emperor of All Maladies*. The book, a biography of cancer, brings the reader through a journey of how far we’ve come in the treatment of this complex disease; from crude surgeries to very sophisticated targeted therapies.

“The best ideas,” he says tapping the cover of the book, “don’t come from sticking with the status quo.” And that’s why he and his team at Robarts Research Institute are pushing the boundaries and thinking outside the box when it comes to cancer detection and treatment.

“This kind of innovating means that you are going to fail a lot and you are going to get people who say, ‘that’s never going to happen,’ but it also means that the success will lead to even bigger breakthroughs,” he said.

Ronald, an Assistant Professor in Medical Biophysics and one of the newest scientists at Robarts Research Institute, is working to build technologies that will be able to both detect and treat cancer. The field, called cancer theranostics, is a relatively new one, and his team is taking it to the next level by using engineered gene vectors that are essentially rings of double-stranded DNA built in his lab.

“We engineer them to be smart,” he said, “so that when we inject them into

the body, they are silent, but when they find a cancer cell, we encode them to turn on a gene that we can detect.”

The idea is to be able to hunt down cancer cells at the earliest stages using imaging or blood tests to see these turned on gene vectors, and then using that same technology to treat the cancer at the same time. Current practices often find cancer when it’s too late, making the prognosis for survival grim. If you could detect even the first sign of cancer cells in the body and then treat them instantly, you would have a much better chance of beating it every time.

He admits that it sounds like something out of a science-fiction movie, but that it’s not unreasonable to think that it will be a reality in the future.

“To do it in patients is probably still 30 years off; it’s my whole career,” he said. “And we’ll make mistakes along the way, but that doesn’t bring me down. Why would it?”

Ronald says he gets immense satisfaction from coming up with a brand new idea and building it from scratch in the lab and he hopes he can pass that excitement on to his students.

“I want them to see science as big ideas and not to be afraid to explore the unique angles,” he said. ■

AN INTELLECTUAL ADVENTURE

WATARU INOUE, IS ON A RESEARCH JOURNEY TO UNLOCK THE MYSTERY OF STRESS-RELATED DISORDERS LIKE PTSD AND DEPRESSION



By Crystal Mackay, MA'05

As someone who set out originally to explore the world and discover new places, Wataru Inoue, PhD, never expected that the most interesting journey would be understanding his own mind.

“When I started my undergrad I wanted to become an anthropologist or someone who went to the field and travelled the world,” he said. “As I travelled and visited new places, I started to realize

I was more intrigued by the response that I had when I went to a new place instead of seeing it from the outside.”

That desire to understand how the brain works and how it influences our perception of the world was the initial spark in Inoue to become a neuroscientist examining the brain’s response to stress.

As one of Robarts Research Institute’s recruits and a new faculty member in Physiology and Pharmacology, Inoue

and his team are looking for the mechanisms in the brain that allow the body to maintain a state of homeostasis. In other words, they are looking for the signals in the brain that cause it to regulate our heart rate, blood pressure, and the levels of hormones in a normal way and then are trying to understand what changes occur in stressful situations to alter that state.

The end goal is to discover why it is that some people are resilient to stress and some are more susceptible.

“In some contexts, feeling stressed is completely normal,” he said. “If you are being chased by a dog or a bear you should feel stressed (along with increased heart rate, raised blood pressure and high levels of stress hormones); however, some people are hyper-sensitive to stress, or even suffer continuous anxiety and the bodily responses to stress in the absence of a real problem. Those problems in stress sensitivity are very common in stress-related disorders like PTSD or depression.”

Inoue explains that the stress response is a very dynamic system and that every time a person or animal experiences a stressful situation, the brain changes itself slightly and tunes its stress sensitivity to better cope the next time they are faced with something similar. This concept, known as neuroplasticity, is the core for understanding how we adapt to stressful environments. And issues with this neuroplasticity are also the basis of stress-related disorders.

The hope is that by better understanding these mechanisms in the brain, his team may eventually be able to identify targets for therapeutics to promote normal stress responses, and eliminate the problematic ones; but that, Inoue says, is still a fair way off.

“I’ve discovered that the more you learn, you also understand that you know so little,” he said. “Once you answer one question, you are then faced with 10 more questions and that endless journey is actually a very interesting intellectual adventure and that’s what I enjoy the most.

“Instead of going into field work, I go new places every time I answer a new question, and lucky for me the brain is full of those fascinating questions.” ■

A CELEBRATION OF DISTINCTION

DURING THE PAST 50 YEARS,
THE 2016 SCHULICH MEDICINE & DENTISTRY
ALUMNI OF DISTINCTION RECIPIENTS
HAVE BEEN OPTIMIZING LIFE-LONG
HEALTH FOR PEOPLE AROUND THE WORLD.
AS THEIR DEDICATION TO DISCOVERY
AND INNOVATIVE CARE CONTINUES,
SO TOO WILL THEIR IMPACT.

By Jennifer Parraga, BA'93



Excellence in Basic
Science Research Award

Dr. Geoffrey Pickering PhD'90

Dr. Geoffrey Pickering is a prolific researcher, gifted teacher and an exceptional mentor. He has enjoyed an outstanding career as a clinician scientist. His research identifies pathways by which muscles contribute to vascular disease, and his laboratory has made advances in the field of smooth muscle cell motility, longevity and interactions with the extracellular matrix. After receiving his medical degree and residency training in internal medicine, Dr. Pickering completed his cardiology residency at Western University in 1988. He began his PhD with the Department of Medical Biophysics in 1987 and completed postdoctoral training in vascular biology at Tufts University School of Medicine.

Today, Dr. Pickering is a professor with the Department of Medicine with cross-appointment to the Departments of Medical Biophysics and Biochemistry at Schulich Medicine & Dentistry, and a cardiologist at London Health Sciences Centre. He is also a scientist and co-director of the Vascular Biology Group at Robarts Research Institute.

Professional Achievement Award
—Medicine

Dr. Jeff Blackmer MD'95

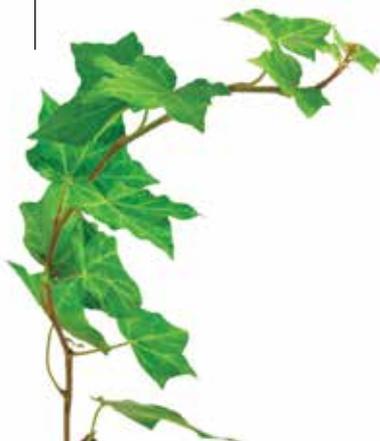
Dr. Jeff Blackmer graduated from Schulich Medicine & Dentistry with his MD and then completed his residency in physical medicine and rehabilitation, as well as a Master of Health Science in Medical Ethics. He is an active member of the medical staff with The Rehabilitation Centre in Ottawa, an associate professor at the University of Ottawa, the executive director with the Office of Ethics, Professionalism and International Affairs, and the vice-president, Medical Professionalism for the Canadian Medical Association.

Recently, Dr. Blackmer became a recognizable figure nationally as he began a journey to engage the Canadian public in a dialogue on the issues of palliative care, advanced care planning and medical assistance in dying. Working with *Maclean's Magazine*, he was the lead architect for a series of town-hall meetings held across the country, which engaged thousands of Canadians on the subject of medical aid in dying. His work has changed the dialogue on that subject in this country forever. Dr. Blackmer was recognized with this award for his wisdom, his tireless work ethic, his expert knowledge, his team leadership, his passion and his keen political awareness.

Community Service Award

Dr. Les Kalman **DDS'99**

Dr. Les Kalman has made a significant contribution to Schulich Medicine & Dentistry and serves as a strong role model for all Schulich Dentistry students. His sincerity for helping low-income patients through the Dental Outreach Community Service (DOCS) program sets a high standard. It was in 2011 when Dr. Kalman took on the leadership of the DOCS program, and since that time he has formalized and implemented a volunteer-based outreach program into a mandatory component of the fourth-year dental curriculum. He also proposed and developed a fourth-year didactic course to supplement the program, established an annual agency meeting to reinforce collaboration, and implemented treatment delivery at the Schulich Dentistry clinic to maximize clinical success. He has established new partnerships all in an effort to strengthen DOCS and reach more community members. Dr. Kalman serves as a caring, conscientious and generous educator who enthusiastically promotes DOCS and its work at every opportunity.



Alumni of Distinction—Dentistry

Dr. Brenda Thomson **BSc'78, DDS'84**

With two Western degrees and many years serving on the Dental Alumni Society, acting in the role as social director for her graduating class, Dr. Brenda Thomson has strong ties to Schulich Medicine & Dentistry. Dr. Thomson has been in private practice in Mississauga since graduating in 1984. In addition to the many hours she has dedicated to her more than 2,600 patients, she has also been involved in her community, serving in a number of roles with the Halton-Peel Dental Association including president, vice president, treasurer, secretary and editor of communications, as well as serving on a variety of committees. During her tenure as President she is credited with dramatically expanding the continuing education program and growing the membership. Dr. Thomson has also served as a member of the Ontario Dental Association (ODA), working with a number of committees and services. And she has served as president of the Women Dentists' Association of Ontario for two terms.

Alumni of Distinction—Dentistry

Dr. Bruce Hill **DDS, MCID'90**

Dr. Bruce Hill is an expert and leader in the field of orthodontics. A graduate from the Graduate Orthodontics Program at Schulich Medicine & Dentistry, Dr. Hill has served as an adjunct professor for more than 20 years and has taught more than 60 graduate orthodontic residents at Schulich Dentistry. He is a dedicated educator and has a great teaching style, making it easy for residents to learn all aspects of clinical orthodontics. He has participated as an examiner on a number of committees and has invited many residents to visit his practice and experience all aspects of a busy orthodontic office first-hand.

With a keen interest in the treatment of special needs children and adults, Dr. Hill began an informal sub-speciality in special needs orthodontics. In 2001, he established a program with the Children's Aid Society of London and Middlesex to treat children and teens pro bono. To date, more than 300 children have received comprehensive treatment from Dr. Hill and his staff.



Young Alumni Award

Dr. Gabriele De Luca MD'06

Graduating from medical school a little more than a decade ago, Dr. Gabriele De Luca has gone on to achieve tremendous success in clinical medicine, scientific research and medical education. While a medical student, Dr. De Luca interrupted his studies to pursue a PhD at Oxford University, with funding from the Clarendon Scholarship, as well as several studentship awards. He completed his neurology residency at the Mayo Clinic, where he served as chief resident. Following his residency, Dr. De Luca returned to Oxford to complete a fellowship supported by the John F. Kurtzke Clinician-Scientist Development Award and was subsequently recruited as a faculty member in the Nuffield Department of Clinical Neurosciences.

As an associate professor, Dr. De Luca has established an internationally recognized group focused on the neuropathology of multiple sclerosis (MS) and neurodegenerative diseases, and he has made several fundamental discoveries about how genes influence clinical outcomes and pathological phenotypes in MS. He was recently appointed the Director of Clinical Neurosciences Undergraduate Education and is actively engaged in providing continuing education to secondary school biology teachers across the UK.

Dean's Distinguished
Lecture Award

Dr. Michael Myers MD'66

Dr. Michael Myers is a specialist in physician health and is known nationally and internationally for his work and support of physician health issues, particularly the stresses on physicians, residents and medical students in the areas of family relationships, marriage and interpersonal interactions at all levels. He has lectured and presented workshops on these topics extensively throughout North America. His publications include seven books and more than 150 articles, chapters and videotapes on topics from marital therapy and reproductive technology to the treatment of medical students and physicians and ethics in medical education and suicide.

Dr. Myers is currently a professor of clinical psychiatry in the Department of Psychiatry and Clinical Behavioral Sciences at SUNY-Downstate Medical Center in Brooklyn, New York. He is a Distinguished Life Fellow of the Canadian and American Psychiatric Associations. In 2008, he was awarded a President's Commendation by the Canadian Psychiatric Association for his pioneering work and advocacy in the field of physician mental health.

“ONCE YOUNG STUDENTS SEE ROLE MODELS THAT SHOW POSTSECONDARY EDUCATION IS A POSSIBILITY, THAT PLANTS THE SEED THAT THEY CAN ALSO ACHIEVE THESE THINGS. HAVING POSITIVE INFLUENCES TO ENCOURAGE AND SUPPORT IS SOMETHING A LOT OF PEOPLE TAKE FOR GRANTED, BUT IT’S SO IMPORTANT FOR CONFIDENCE AND MOTIVATION.”

— DR. JACLYN ERNST, MD’12



THE POWER OF TWO

TWINS, DRs. JENNIFER COULSON AND JACLYN ERNST UNDERSTAND BETTER THAN MOST THE VALUE OF STICKING TOGETHER. THE YOUNG PHYSICIANS ARE SHARING THEIR UNIQUE STORY WITH THE HOPE OF INSPIRING THE NEXT GENERATION OF INDIGENOUS LEARNERS.

By Emily Leighton, MA'13

Only seven minutes separate fraternal twins Drs. Jennifer Coulson, MD'12, and Jaclyn Ernst, MD'12. Seven minutes where one existed in the world and the other did not.

And with their matching dark, expressive eyes and bright smiles, it's easy to see why Jenn and Jackie—as they prefer to be called—consider themselves a package deal.

“We share so much in terms of our personalities and our interests,” said Jenn. The self-described A-type personalities not only share a birthday and a penchant for celebrity news, but also two alma maters and their chosen profession—medicine.

“In elementary school, twins are put into separate classes to encourage each to branch out, to develop individuality,” said Jackie. “And that was the case for us—only we tried going in different directions, but we came back together the second we could.”

And when it comes to their similarities, there is a lifetime of humorous moments. One of their favourites is from interview day at Schulich Medicine, as applicants for the MD program. It was 2008 and both were scheduled to interview on a Saturday afternoon in March. Jackie remembers exiting the interview room to find Jenn seated outside, waiting as the next candidate for the same interview team.

“The interviewers must have thought they were interviewing the same person twice,” said Jenn. “At that point, we'd gone to the same school, worked the same part-time job, and also prepped together for the interview questions.”

“I'm sure we made exactly the same jokes,” added Jackie with a laugh.

Born and raised in Hamilton, Ontario, the pair grew up closely connected to their Indigenous heritage—their mother belongs to the Lower Cayuga Nation and took them for weekly Sunday visits to the close-by Six Nations of Grand River reserve to spend time with family.

It's an identity and way of life the sisters deeply value and respect. “Our culture is something we've always been proud of,” explained Jenn. “We see it as having an extremely positive influence on our education and career choices.”

Those choices led them to the University of Waterloo as undergrads. Jenn completed a degree in kinesiology, while Jackie graduated from biomedical sciences.

Family legacy and a sense of belonging attracted them to the Western University campus for medical school. Their maternal grandmother graduated from Western's teacher's college in the late 80s—a significant achievement for an Indigenous woman at a time of widespread discrimination.

“It was such a proud moment for our family when they found out we were going to Western,” said Jenn. The sisters filled two of three seats Schulich Medicine sets aside for First Nations, Métis or Inuit students in each year of the MD program.

These days, seven minutes isn't the only distinguishing difference between the two 30-year-olds. They are each charting their own course in medicine; independent paths that have brought them to new cities and distinct experiences.

For Jenn, the appeal of family medicine was apparent from the day she entered the School's hallways. Now a practising family physician working in the Cambridge area, she is also a new parent, having given birth to her daughter, Claire, in spring 2016.

Jackie completed her internal medicine residency at Schulich Medicine in 2015 and is currently pursuing a general internal medicine fellowship at the University of Ottawa. She will be returning to Hamilton for a placement in perioperative medicine; an opportunity she hopes will advance her specialty training. “And it will be nice to be closer to family,” she said.

“That means babysitting in her spare time,” Jenn chimed in with a grin.

The natural banter and infectious laughter comes as effortlessly as one would expect from such a remarkable partnership. But a more serious and sincere sense of duty emerges when talk turns to the sisters' aspirations to give back to their community.

“Our Aboriginal community has been so supportive of us and our education, and we want to inspire the next generation to consider a career in medicine,” said Jenn.

During their time at Schulich Medicine, both sisters participated in visits to local high schools to promote postsecondary education to other Indigenous students. And Jackie helped recruit students for the School's Medical Learning in Community Settings (MedLINCS) program with the Chippewas of the Thames First Nation community southwest of London.

It's this type of fulfilling work they intend to continue by sharing their personal and professional experiences. “Once young students see role models that show postsecondary education is a possibility, that plants the seed that they can also achieve these things,” said Jackie. “Having positive influences to encourage and support is something a lot of people take for granted, but it's so important for confidence and motivation.”

And as the twin sisters know well, sticking together is always better (and certainly more fun) than going it alone. ■

TURNING THE PAGE ON SCIENTIFIC CURIOSITY

KATIE MOISSE
TRADED THE LAB
FOR PEN AND PAPER,
BUT SCIENCE REMAINS
HER TRUE CALLING

By Emily Leighton, MA'13

"You shouldn't be here," the stranger yelled to Katie Moisse, PhD'09, as she made her way to a crime scene in the Bronx, a borrowed Nikon DSLR camera hanging around her neck.

The blunt verbal warning hit a nerve. Moisse was a few weeks into her first term at Columbia University's well-respected School of Journalism—a newcomer to New York City and a rookie student reporter. She'd been assigned to cover the daily lives of immigrant populations in the city's boroughs for a class project. This particular day took her into the messy aftermath of a hate crime.

"I thought to myself, what am I doing? What have I gotten myself into?" she said. "Interviewing police officers and distraught families—I was way out of my comfort zone and it showed."

It was certainly a big departure from the science labs and academic circles she'd grown familiar with as a doctoral candidate at Schulich Medicine & Dentistry. In a gutsy move, the newly graduated Moisse had decided to forgo a postdoctoral position in favour of pursuing a Master of Science in Journalism at Columbia.

"I think it was one of the scariest things I've ever done," she said. "But it was a really great experience in the end. And once I moved on to health reporting in second term, talking to scientists or understanding complex papers seemed like a breeze."

As a journalist, science has remained a priority for the adventurous Ontario native, taking her to the newsroom at *ABC News* and the pages of *Scientific American*.

She found that news outlets were eager to hire a trained journalist with scientific expertise. "There's a big appetite for good science journalism," Moisse explained. "I've covered everything from big discoveries to the seemingly less important research stories that really capture what science is and how it comes about."

The science-journalism combination was something she never envisioned as a career until developing a love for writing during her thesis work.

Born and raised in Kitchener-Waterloo, Moisse completed an undergraduate degree in kinesiology at the University of Waterloo. From there, she travelled across the pond to the United Kingdom for a master's degree in neuroscience at King's College London. Moisse returned



“There’s a big appetite for good science journalism, I’ve covered everything from big discoveries to the seemingly less important research stories that really capture what science is and how it comes about.”

—Katie Moisse, PhD’09

to Canada and started her PhD at Schulich Medicine & Dentistry in 2004. Under supervisor and mentor Dr. Michael J. Strong, she investigated a protein associated with amyotrophic lateral sclerosis (ALS).

“I loved every minute of my PhD studies,” she said. “The camaraderie of our lab was incredible. Everyone was working toward a common goal, so we all shared in the frustrations and the breakthroughs.”

The 35-year-old now works in another team environment as a news editor for *Spectrum News*, an online source of news and expert opinion on autism research funded by Simons Foundation Autism Research Initiative (SFARI).

In her editing role, she helps determine what studies to cover and how. Part of the thrill is also being able to share important lessons from the field of neuroscience with researchers focusing on autism and even the public. “We want to bring people reliable and accurate science news,” she said.

Moisse shares an 800-square-foot living space with her husband and two young children in Brooklyn, and finds small apartment living in the Big Apple surprisingly agreeable.

“We love the lifestyle here,” she said. “We thought living in New York would be temporary, but that was seven years ago and now we’ve built a wonderful life with friends and family.”

As for leaving the lab behind, Moisse stays connected through her husband, a researcher at NYU. “My husband will come home from work and we’ll geek out over some science paper,” she explained. “I do miss the instant gratification of looking down a microscope and seeing something exciting happening.”

But ultimately, Moisse prefers the creativity that comes with combining her science and writing interests. “It’s scary to leave the comfort of academia, but I think taking a risk to explore something you love to do is completely worth it,” she said. ■

BROTHERLY LOVE

INSPIRED BY HIS BROTHER, JANSON CHAN CREATED AUTISM TEENAGE PARTNERSHIP, A PROGRAM SUPPORTING YOUTH WITH AUTISM

Jennifer Parraga, BA'93

When Janson Chan, BMSc'13, arrived at Western University to begin his bachelor of medical sciences degree, he brought with him a bag full of childhood memories about his brother Joshua. Three years his junior, Joshua is autistic, and often times has been the victim of bullying and great misunderstanding.

Witnessing some of the incidents directly, and for the love of his brother, Janson was inspired and hopeful he could do something that could help Joshua and other autistic children and adolescents. "My brother is bright, funny, outgoing and generous," said Chan. "I wanted to do something to help him and others with autism."

Chan took advantage of the club system at Western University, and together with his friend Brandon Wildfong, BSc'14, established Autism Awareness at Western. Working with Autism Ontario, the passionate club members set out to make a difference in the community while raising awareness about autism with their peers, on- and off-campus. Now in its fourth year, the club continues to promote the awareness of autism and raise funds to support people and families with autism.

With his Western degree in hand, Chan recently headed back home to Toronto and began his studies in nursing. Determined to continue his volunteer work from Western, Chan applied for and received a \$500 grant from York University to address social determinants of health.

He partnered with Wildfong, once again, and developed partnerships with Autism Ontario, the Registered Nurses' Association of Ontario and the Milliken Park Community Advisory Council to create an eight-week, drop-in program for teens with autism called Autism Teenage Partnership (ATP).

Chan's hope was to create a program that would give teens with autism a chance to participate in a regularly scheduled activity—one they could look forward to and at which they could interact with someone their own age. At the same time, Chan wanted to ensure the program offered parents a respite.

"My brother spent so much of his time interacting with doctors, or with people paid to interact with him.





“MY BROTHER SPENT SO MUCH OF HIS TIME INTERACTING WITH DOCTORS, OR WITH PEOPLE PAID TO INTERACT WITH HIM. THEN HE JOINED A TEEN PROGRAM IN TORONTO AND HE FINALLY HAD PEOPLE HE COULD CONNECT WITH AND HE WAS ABLE TO DEVELOP FRIENDSHIPS. IT MADE ME REALIZE JUST HOW EFFECTIVE A PROGRAM LIKE ATP COULD BE.”

—JANSON CHAN, BMSc'13

Then he joined a teen program in Toronto and he finally had people he could connect with and he was able to develop friendships,” said Chan. “It made me realize just how effective a program like ATP could be.”

It didn't take long for Chan and his partners to see the positive effects of the program. Locations were established in Richmond Hill and Waterloo, additional funding was secured and more than 100 participants registered for the weekly sessions.

News of the program's success spread quickly thanks in part to articles in *Maclean's Magazine* and the *Toronto Star*. And recognition wasn't far behind. Chan was recently awarded the Ontario Medal for Young Volunteers—the highest honour in the province

for young volunteers. While ATP was awarded the 2016 Organization of Character (Not-for-Profit) by the Character Community Foundation of York Region.

Now a public health nurse for York Region, Chan continues to manage the volunteer-run program. He's not fazed or deterred by the long hours required to build upon ATP's success. “I'd call this a passion project,” said Chan. “It comes from my heart and is an action of love.”

Chan's long-term vision is to create a tool kit or franchise manual to help create similar programs for autistic youth across Canada. In doing so, he hopes to help close a gap in services and make a difference in the lives of young people. ■

BEING THE CHANGE

PASSIONATE AND PROUD, DR. KARIN VAN RYSWYK IS HELPING TO LEAD THE WAY ON A RENEWAL FOR SCHULICH DENTISTRY

Jennifer Parraga, BA'93

Stepping off the boat onto the dock at her cottage, Dr. Karin Van Ryswyk, DDS'86, feels immediately refreshed. For a few days she leaves behind her dental practice, teaching responsibilities, Dental Renewal Committee meetings and strategic plan project.

"It's my little piece of heaven," she said, referring to the family cottage in Honey Harbour. For Dr. Van Ryswyk, it's the perfect haven to de-stress and rejuvenate from a schedule that takes her back and forth across the city from her more than 2,400 patients, to the clinic on campus teaching third- and fourth-year students, and to the boardroom table at Schulich Dentistry.

In private practice since 1989, Dr. Van Ryswyk has been a part-time faculty member since graduation, only taking a hiatus from the role when her children were young.

She loves the opportunity to interact with the students, which she describes as a give-and-take relationship. "I have knowledge to pass on," said Dr. Van Ryswyk. "But the students also keep me on my toes with their questions, the techniques they may have learned from other faculty and the newest didactic material."

The arrival of an unexpected email to Dr. Van Ryswyk's inbox in the fall of 2014 changed her involvement with the School forever. "I received a note from the Dean's Office," she said. "The email was an invitation to have a conversation about becoming involved with the Dental Renewal Committee."

The Committee was struck by Dr. Michael J. Strong, dean, and charged with defining and initiating the renewal process, which would guide Schulich Dentistry through its leadership change. It was also charged with ensuring continuity and re-engagement of staff, faculty, students and patients, while overseeing the renewal of the dental school and ensuring accreditation standards are met.

Encouraged by her husband to accept the offer, Dr. Van Ryswyk agreed to join the Committee. "To be honest, I wasn't completely sure what I was signing up for," she said with a laugh. "But I went to the first meeting and started to understand where the Dean wanted to take things. I could really see his vision." That began what has turned into a multi-year commitment, with bi-weekly meetings held throughout the academic year.

It was Dr. Van Ryswyk's belief that change was needed at the School that really inspired her involvement with the Committee. A proud alumna, she wanted to be part of the change. And she knew her past experience as the President of the London & District Dental Society and her involvement with the National Dental Examining Board would help as she navigated through the committee work.

"This is an exciting time to be at the School," said Dr. Van Ryswyk. "There is so much possibility." Her membership on the Dental Renewal Committee has led to leadership of a project team for Dentistry's strategic plan. She is chairing a team comprised of faculty, staff and students, that is focused on clinical dental education. The team's mandate is to re-engineer the clinical education, operational, teaching and practice management processes.

In the end, they want to create a clinic model that will provide students with the best clinical experience and education, as well as provide patients with comprehensive care in a timely manner.

Dr. Van Ryswyk admits the work can be overwhelming at times, but the challenges really pale in comparison to the enthusiastic project team that has no shortage of progressive ideas, and the opportunities that lay ahead. "It's been a stimulating process," she said.

After a long weekend away, Dr. Van Ryswyk returns to the work she loves at her practice. "I love making changes in peoples' lives," she said. "And when a patient turns to me with tears in their eyes thanking me for removing their pain or making them feel better about themselves, I know I'm in the right place doing the right thing."

She's equally passionate about the experiences she is having with her committee and strategic plan work. "I believe we can do this," she said. "We can be one of the best dental schools in North America—it's not going to happen overnight, but it's going to happen."

**"I BELIEVE WE CAN DO THIS.
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AMERICA—IT'S NOT GOING
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BUT IT'S GOING TO HAPPEN."
—DR. KARIN VAN RYSWYK, DDS'86**



"IT TOOK MORE THAN 30 YEARS OF RESEARCH AND ABOUT \$30 MILLION IN FUNDING TO GET FDA APPROVAL. AND IN THE END, KNOWING THAT IT'S BEING SOLD AROUND THE WORLD AND HELPING SO MANY PEOPLE, MAKES ME FEEL GOOD."

—DR. ROBERT HANSEBOUT, MD'60



TRIPLE THREAT

PHYSICIAN, SCIENTIST AND COMMUNITY BUILDER, DR. ROBERT HANSEBOUT HAS DEDICATED HIS CAREER TO CHANGING THE LIVES OF PEOPLE AROUND THE WORLD

Jennifer Parraga, BA'93

"It's a wonderful feeling as a physician-researcher to know I've been able to help so many people," said Dr. Robert Hansebout, MD'60. It's a modest statement from a man who has touched the lives of an estimated 12.5-million people, through his research, surgical practice and leadership roles.

Under the tutelage of beloved faculty members such as Drs. Jack Walters, Andrew Durnford, John Fisher and Angus McLachlin, Dr. Hansebout embarked on his medical education at Schulich Medicine & Dentistry in the late 1950s. After graduation, he trained with Drs. Wilder Penfield and Gilles Bertrand in neurosurgery, perfecting his skills and developing new interests in epilepsy, brain surgery and spinal cord injury.

His career took him to three different universities and he co-discovered and patented Fampridine (Fampyra), a drug used for people with spinal cord injuries and multiple sclerosis, performed more than 4,500 surgeries, served as Chair of Surgery at McMaster University, and was responsible for the founding of the Surgical Outcomes Research Centre at McMaster University.

Dr. Hansebout's major interest was always with helping victims of spinal cord injury. And he developed a means to deeply cool the acutely-injured spinal cord to promote the preservation of feeling and movement.

Of all his accomplishments, Dr. Hansebout remains most proud of the research leading to the discovery of the effectiveness of 4-aminopyridine and the development of Fampyra.

"It took more than 30 years of research and about \$30 million in funding to get FDA approval, and in the end knowing that it's being sold around the world and helping so many people makes me feel good," said Dr. Hansebout.

Dr. Hansebout's research with 4-aminopyridine began in 1990. Extracted from coal tar, the substance was originally used by eastern European farmers as a bird repellent to protect their crops. He and his team believed that they could harness some of the potential of this drug to improve conduction in damaged portions of the nervous system for people with chronic spinal cord injuries. It was later used in pill form.

After perfecting it to medical grade and mixing it with a liquid carrier, they began the testing stage, working with volunteer patients with complete and incomplete spinal cord injuries.

The substance was found to reduce spasticity in patients and give them about 15 to 20 per cent improved motor function in paralyzed extremities in those with incomplete injuries where some function remained after the injury. Continued research showed that the same substance provided patients with multiple sclerosis substantial and statistically significant improvement in walking.

For his pioneering work in spinal cord research, Dr. Hansebout was honoured with the Champion for a Cure Award by the Canadian Spinal Research Organization. "I was dubbed the Father of Fampridine," Dr. Hansebout said with a chuckle.

Retirement has slowed him down, but Dr. Hansebout continues to impact the lives of others through voluntarism. In collaboration with the Public Health Nurses of Hamilton, he helped to create a Think First Hamilton contingent (now incorporated into Parachute Canada). Their mission was to educate public school students about head injuries and how to prevent them.

As a member of Think First Hamilton, Dr. Hansebout became the inaugural Chair of the Canadian Tire Corporation Jumpstart Program, which began in Hamilton. The program provides funding to families who cannot afford to become involved in organized sporting activities.

With more than one-million children supported through Jumpstart, Dr. Hansebout continues to make a difference in the lives of people in Canada. "It's been a tremendous success," he said, recalling his own recent visit to a Canadian Tire store when he was asked by the cashier to make a donation. "She was surprised when I told her that I helped start the program," he added proudly.

Born in Aylmer, Ontario, Dr. Hansebout's parents, neither of which had a formal education beyond grade eight, encouraged him to work hard and to excel. It seems as though this award-winning, internationally renowned neurosurgeon and researcher has done just that. And along the way he has enriched the lives of countless others. ■

A WORLD OF NEW EXPERIENCES

FROM STUDYING ABROAD FOR A YEAR TO ATTENDING CONFERENCES AROUND THE WORLD, INTERNATIONAL OPPORTUNITIES GIVE LEARNERS THE EXPERIENCE AND PERSPECTIVE THEY NEED TO BECOME GLOBAL LEADERS

By Jessica Hurst, BA'14

"It was like nothing I had ever seen before," said Dr. Kelsey Li, DDS'16, as she described the scenery that surrounded her when she arrived in a tiny, rural town in Bến Tre, Vietnam. The walls of the houses and schools were made of cement, and the simple electricity that ran through the town could not even provide light to the residents.

It was the summer of 2014, and Dr. Li and her classmate, Dr. Maxine How, DDS'16, would be spending the next 10 days in the area, providing Vietnamese children with dental services—giving them thorough cleanings, teaching them how to maintain their oral hygiene and performing extractions when necessary.

Dr. Li explained she and How learned about this summer volunteer opportunity through a non-profit organization in Vietnam. The dental students were interested in an international experience in a rural setting to see how dentistry was practised in the most remote areas of the world—not just in London, Ontario where they were training.

"Going into this experience, I was certain I would gain a lot but I didn't realize that it would change my life in the way it did," Dr. Li said. "Having the opportunity to treat young patients who have never seen a dentist before and do not have the same language or cultural background as me was challenging, but it really gave me perspective that I will take into my career as a dentist."



Drs. Kelsey Li and Maxine How spent 10 days in a rural town in Vietnam providing dental services to children without access to regular health care



Children gather to learn more about oral hygiene from Drs. Kelsey Li and Maxine How

“Going into this experience, I was certain I would gain a lot but I didn’t realize that it would change my life in the way it did.”

—Dr. Kelsey Li, DDS’16

Even though Dr. Li and How found out about this international opportunity on their own, most students and trainees at Schulich Medicine & Dentistry find out about opportunities by utilizing the resources available to them through the School’s Internationalization Office and Western International.

That is what Michelle Quaye, BMSc’16, did when she made the decision to participate in an international opportunity during her third year of study. “After taking part in a short exchange to India during high school, I knew I eventually wanted to gain more global experiences,” Quaye said. “I discovered that Western University has one-year exchanges available all over the world, which seemed like an incredible opportunity.”

Quaye was accepted to study at King’s College London in England. She worked with an academic advisor at Schulich Medicine & Dentistry to determine the courses required to stay on track for graduation. The experience required a lot of hard work and planning. However, by staying patient and flexible, Quaye completed all the necessary courses.

“This international experience showed me the importance of being a global citizen and making global connections,” Quaye said. “I now know that in my future career as a physician, I will not just stay in one place. I see the value in exploring opportunities outside of Canada and immersing myself in different cultures.”



Michelle Quaye sharing cultural dishes with her flatmates at King’s College London halls

The opportunity to work with local people in an international setting was really eye-opening. It was so beneficial on a personal and professional level. I'm inspired to seek out more global health opportunities."

—Jessamyn Little, Medicine Class of 2017



Jessamyn Little, far right, in Kenya with other members from the CREATE team

Jessamyn Little, Medicine Class of 2017, had similar goals to Quaye when she began her search for an international experience. She wanted to be able to experience a different culture—she didn't want to skim the surface.

She contacted the Internationalization Office to learn about the summer opportunities available and was put in touch with Dr. Arlene MacDougall, a clinician-researcher in Psychiatry. Little was interested in taking part in Dr. MacDougall's initiative Community REcovery Achieved Through Entrepreneurism (CREATE) in Kenya. She was granted a Global Research Opportunities in Health Award, allowing her to work on the project throughout the summer of 2015.

"The opportunity to work with local people in an international setting was really eye-opening," Little said. "It was so beneficial on a personal and professional level. I'm inspired to seek out more global health opportunities."

Throughout his graduate training, Ayden Scheim, PhD Candidate, a Pierre Elliot Trudeau Foundation Scholar and Vanier Canada Graduate Scholar, has travelled to a number of different countries to attend and present at conferences, including Australia and Malaysia. "When I've travelled to the other side of the world, I've ended up networking and meeting people who have since become collaborators on my research," he explained. "We would have never met if I didn't travel to those places."

The young scholar explained it is easy for PhD candidates in particular to become so focused on their research projects that they never dedicate time to exploring opportunities outside of their lab, or London, Ontario. He explained this can make it difficult to stay motivated about your own work.

"If you aren't taking part in international experiences, you don't have as much of a sense about what other people in your field are doing," he said. "I think it's very important to become a part of the global research community by sharing your research and learning about the research being undertaken all over the world."

Scheim also said he sees a lot of students and trainees holding back from international opportunities because they do not feel they are ready to take part in them. He disagrees.

"I feel like sometimes students and trainees wait to take part in international conferences and other global experiences because they feel they are not ready," he said. "My advice is to take part in these international opportunities as early and often as you can. If you wait, you could be missing out on years of experiences that could truly help you in your personal and professional life." ■



PhD Candidate Ayden Scheim travels regularly around the world to present his research

IMAGINING A NEW WAY

BRIDGET COLMAN'S DONATION OF \$250,000 IS ENRICHING RESEARCH FOCUSED ON USING MAGNETIC RESONANCE IMAGING FOR EARLY DIAGNOSIS OF MULTIPLE SCLEROSIS



Jennifer Parraga, BA'93

Ravi Menon, PhD, hopes that in the next five years his team's research will enable a definitive method to diagnose multiple sclerosis (MS) with the first magnetic resonance imaging (MRI) scan individuals receive.

With Canadian MS rates nine times higher than the world average and rates in Southwestern Ontario two times higher than the rest of the country, this advance has the potential to affect tens of thousands.

Western alumnus Bridget Colman, BA'90, has joined Menon in achieving this goal by making a donation of \$250,000 to support his research.

Originally from Caledon, and now living in New York, Colman has a personal connection to the disease; her sister was diagnosed with MS five years ago.

At the time, Colman had already done her homework on the disease and was involved with MS research at a number of organizations in the United States and Australia. Her sister's illness fuelled her to learn and do more.

It was a crisp fall evening, when Colman received a phone call through Western University's phone program soliciting her

for a gift as part of her 25th reunion. Colman had fond memories of her time at Western and was definitely amenable to giving. She was, however, most interested in the MS research taking place on campus.

After a series of phone calls, Colman came to learn about Menon's work. "I was immediately impressed," said Colman. "Ravi's work filled an area of MS research that I thought was missing in other places. I was really drawn to the quality of his research and I wanted to see it go further."

Working in the Centre for Functional and Metabolic Mapping at the renowned Robarts Research Institute on campus, Menon's research is focused on early diagnosis of MS. He works with imaging tools that would allow diagnosis from the very first MRI.

This means people who have MS could be started on a treatment program almost immediately, rather than having to wait as they do now.

Menon's close relationship with the MS Clinic, which is located next door to the Centre, was not lost on Colman, and it is something she believes strengthens the potential for this research.

Menon agrees. "We are a very tightly knit community," he said. "Our students and coordinators go back and forth to the hospital on a daily basis. And our students go on rounds and see patients. This inspires them to continue with this work, and helps to build sustainability in our research program."

Colman's donation will enhance Menon's project and ensure research results. "I'm so grateful to Bridget for this support," said Menon. "It's enhancing our existing funding and helping us to extend this work by three to five years, and in the end we will have completed this longitudinal study having a full cycle of people go through the process. The international impact of being able to start MS therapies months to years in advance of where we can now halt this terrible disease in its tracks."

For Colman, making the gift just made sense and she encourages others to really consider investing in research. "If you can do it, then do it. If you are able to provide support, then try," she said. "This is an honourable team that is working on a project I haven't seen taking place anywhere else, so why not support it?" she added. ■

TAKING UP THE CHALLENGE

FORMER NHL GREAT AND 2016 HOCKEY HALL OF FAME INDUCTEE ERIC LINDROS, ALONG WITH INTERNATIONALLY RENOWNED RESEARCHER ARTHUR BROWN, ARE INSPIRING A TEAM OF INVESTORS TO TAKE UP THE NHLPA CHALLENGE IN SUPPORT OF CONCUSSION RESEARCH

Jennifer Parraga, BA'93

Sitting in the over-capacity auditorium at the inaugural See the Line Symposium, Eric Lindros felt a sense of hope. It came unexpectedly from Arthur Brown, PhD, Schulich Medicine & Dentistry Professor and internationally renowned researcher based out of Robarts Research Institute. Brown, one of the many speakers at the Symposium, was presenting his latest concussion research findings.

"I was excited to hear about his work," said Lindros. "He was offering a tangible solution that could get people back to proper health following concussion much quicker."

Lindros was then, and continues to be, the Honorary Chair of the See the Line. An annual initiative presented by Schulich Medicine & Dentistry, See the Line raises awareness about concussion prevention and the ongoing clinical and basic science research taking place in labs across the country and the world.

Physicians, researchers and athletes come together to share their work, experiences and hope for the future of care and prevention of concussions with the more than 700 community members who come to campus annually for the unique event.

During that first Symposium, Lindros learned about Brown's research focusing on therapeutic interventions to treat concussion. Brown, along with Greg

Dekaban, PhD, and Dr. Michael J. Strong, is researching strategies that focus on stopping the inflammation that is detrimental to healing; enhancing nerve sprouting that might underpin recovery and preventing the buildup of proteins that may lead to longer term cognitive consequences of concussion.

Their research has the potential to radically change the treatment and ease the devastating effects of concussion.

Lindros was inspired by the hope that Brown's research offered and put together a plan to do more. He partnered with Brown to seek support for the research. And at the 2015 See the Line event, Lindros proudly announced the National Hockey League Players' Association (NHLPA) \$500,000 challenge gift investing in Brown's research.

Through their donation, the NHLPA challenged others to invest an additional \$2.6 million for Brown's research. It didn't take long for several donors to take up the challenge and invest.

Western University alumnus Perry Dellelce, BA'85, was one of the first to get on board. Dellelce admits it was an easy decision. "It's work that's happening at Western," he said. "It's the University I love, and a cause that I believe in."

"Athletes give us such great joy, and as a society, we cheer them on, honour them, and even put them on pedestals," Dellelce added. "So you have to ask yourself, why wouldn't we do this for them and support this research that will ultimately benefit them?"

A former collegiate hockey player and Triple-A coach, Mark Teskey, BA'83, agrees with Dellelce. He believes research presents the best game plan to gain more information about how to prevent brain trauma and how to treat it.

While playing hockey for Western, Teskey had his fair share of injuries, with a few requiring surgical intervention. He feels fortunate to have been treated at the Fowler Kennedy Sport Medicine Clinic that helped him return to play in short order. This personal experience was part of his decision to invest in concussion research.

It's Teskey's hope that one day those suffering from a brain injury can also return to full health as quickly as he did from his own injuries. "I've seen it happen with the knee," he said. "I'm confident we can make significant progress with brain injuries." It's why he chose to take up the challenge and invest in Brown's research.

Business leader, and Western's Be Extraordinary Campaign Chair, Geoff Beattie, LLB'84, was also one of the early investors in the NHLPA Challenge.

Sports and recreation have brought Beattie great joy and happiness throughout his life. And he attributes the development of his leadership skills to his sports involvement. "Sports have played such an important and positive part of my life and I feel a responsibility to do something that will ensure we find the answers for those who get injured," he said.

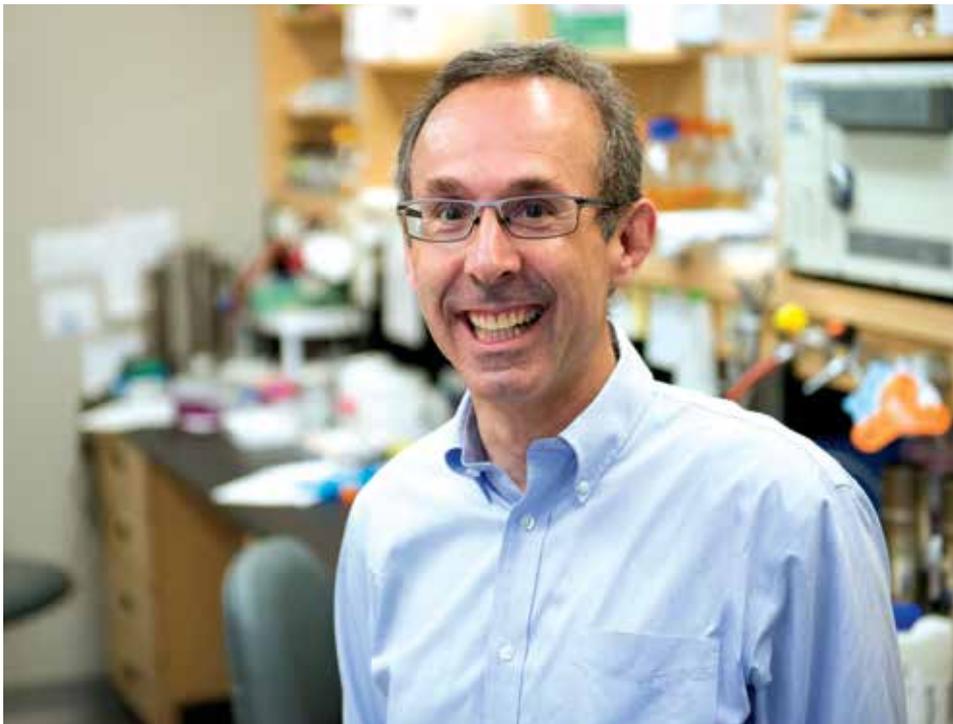
Lindros believes that Brown's research is on the right track, and while it will take a few more years to complete, with the proper funding, it will be successful.

"I hope people begin to learn more about Arthur's work and believe in it as much as I do. One day his blood, sweat and tears will offer the best possible solution to the effects of concussion, whether it's a result of sports or otherwise." ■



A DIFFERENT PERSPECTIVE

DAVID LITCHFIELD SHARES HIS VIEW ON WHY THIS MAY BE ONE OF THE BEST TIMES TO PERFORM AND SUPPORT BIOMEDICAL RESEARCH



A considerable amount of recent media attention has been focused on challenges being faced by the biomedical research community that relate to research funding. While these challenges are not insignificant, this attention has been overshadowing excitement related to the rapid emergence of unimaginable new technologies and an explosion of information that has accompanied these technologies.

Like the communications revolution that has coincided with the development of smartphones and the Internet, dramatic technological advances in the biomedical and life sciences have accelerated the pace of discovery and set the stage for transformative changes in areas such as health care, environmental remediation, as well as food and energy production.

Across the biomedical sciences, technological advances have changed the way research is conducted, revealing important new insights regarding fundamental biological processes and the underlying basis of human disease and, in many instances, making the impossible possible.

One striking example of transformative

technological advances is in the field of genomics.

The Human Genome Project, an international initiative to determine the entire DNA sequence that represents the blueprints for the human race, was completed in 2003 at a cost of nearly \$3 billion and more than a decade of intense effort.

By comparison, an entire human genome can now be sequenced in about a day at a cost of only a few thousand dollars with expectations that both the time and cost of DNA sequencing will continue to decrease.

A natural consequence of this ongoing transformation is that hundreds of thousands of human genome sequences have already been completed with many of these sequences available in publicly accessible databases.

These databases represent a wealth of information and are promoting discovery across the research community—even for researchers without access to the most up-to-date DNA sequencing technologies. Specific mutations associated with individual diseases are now being discovered at unprecedented rates. By enabling the identific-

ation of specific disease causing mutations, advances in genome sequencing have spawned precision medicine, an emerging strategy for the prevention and treatment of disease that is guided by the precise genomic profile of an individual.

Transformative advances of similar magnitude are occurring in fields across the biomedical and life sciences.

The ever-expanding arsenal supporting the biomedical research community now includes robotic instrumentation with exquisite precision, analytical instrumentation with unprecedented sensitivity, microscopes with digital cameras that record the movements of living cells with spectacular resolution, high-performance computers for data analysis or simulations that aid in experimental design, and the know-how to use remarkably precise genome editing strategies to create or correct disease-causing mutations within the genomes of experimental models.

By embracing these unimaginable technologies, there has never been a better time to perform—or support—biomedical research. ■



Celebrating our **ALUMNI**

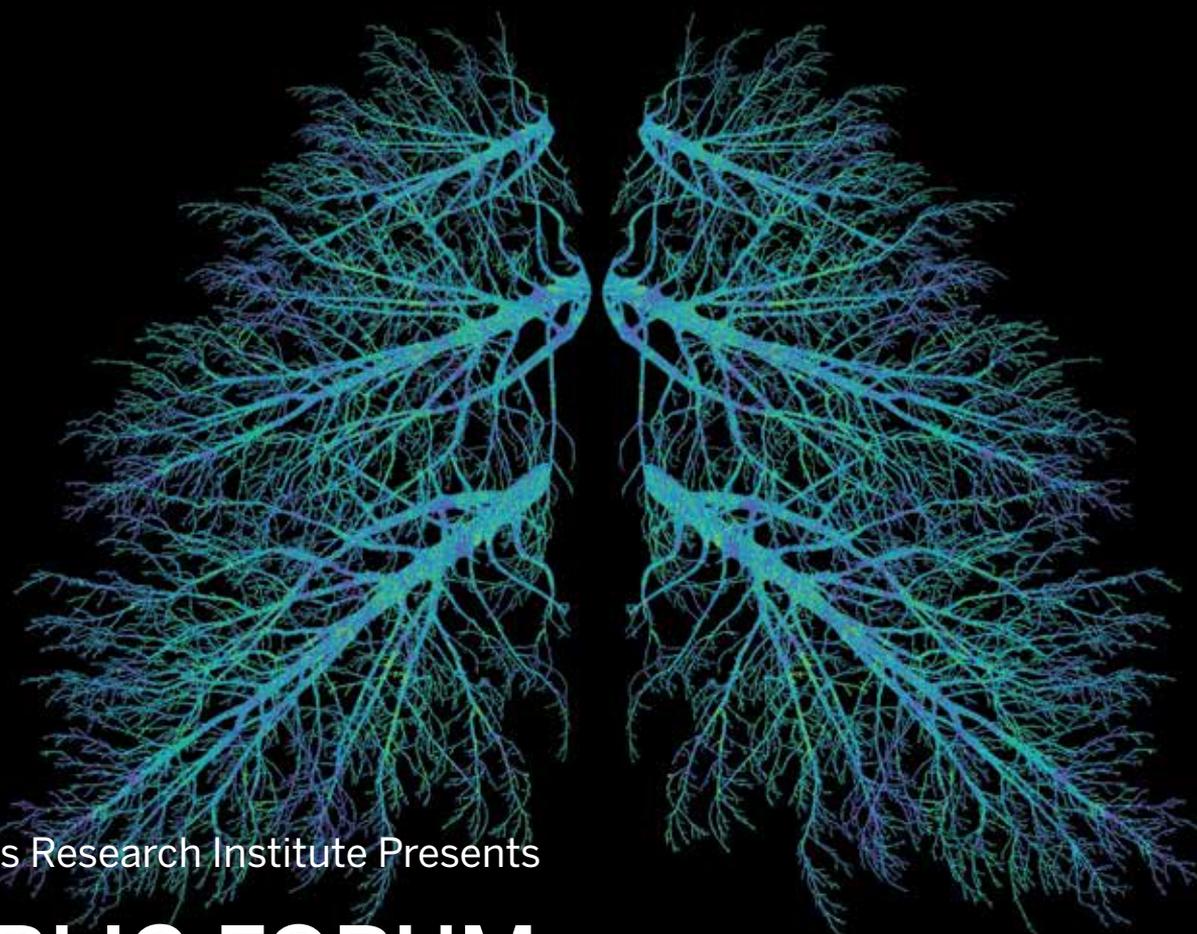
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Recognize the outstanding accomplishments of a peer, classmate or colleague and join us in celebrating the outstanding accomplishments of our alumni.

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