

THE SCOPE

Doing the LEG Work



WELCOME TO *THE SCOPE*

Scope can be defined as: the range of one's perceptions, thoughts, or actions; the geographical or perceived area covered by a given activity; or, a viewing instrument such as a microscope or telescope. In most modern usages of the word *scope*, there is a unifying theme of examination or investigation.

In this case, *Scope* includes all of these ideas. Research at the Northern Ontario School of Medicine (NOSM) is reflective of the School's mandate to be socially accountable to the diversity of Northern Ontario. As such, studies are being undertaken in a range of subjects including culturally appropriate care for Indigenous peoples, new drug technologies, cancer screening methods, patient rehabilitation, lakewater quality, and so much more. Subjects being studied are as varied as the geographic area of NOSM's wider campus of Northern Ontario and as diverse as the researchers themselves: faculty members in the School's Human, Medical, and Clinical Sciences Divisions, residents, medical students, a broad range of health-professional learners, and collaborators.

Although this publication cannot provide the full scope of exciting research happening across Northern Ontario, we hope it provides a glimpse into some of the work being done with a view of improving the health of Northern Ontarians and beyond.

The Scope Research Newsletter of the Northern Ontario School of Medicine

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WELCOME TO *THE SCOPE*

A Message from Dr. Penny Moody-Corbett Associate Dean of Research



Dr. Penny Moody-Corbett

You may have heard the saying, “The only thing constant in this world is change.” The Research Office at NOSM has certainly proven this statement true over the last few months! I am excited to share some recent research activities and changes in our portfolio with all of you.

In June, NOSM’s Research Office and Indigenous Affairs Unit co-hosted a one-day workshop titled *Pathways to Well-Being* in response to the high rates of youth suicide in Northern and Indigenous communities. The event, held in Thunder Bay, brought together 90 participants, including Indigenous Elders, youth, leadership, community members, and community-based health-care providers to develop an action plan to promote life and life skills within Indigenous communities. Of course, research has an important role to play in supporting this, and we were honoured to be part of such an important workshop in Northern Ontario.

The Research Office is developing a Master’s in Medical Studies (MMS) program. The purpose of creating the MMS program is to provide an avenue for practising physicians to develop the knowledge and skills necessary to be successful clinical researchers. The Master’s program will provide foundational knowledge on skills required to be successful researchers, competitive and successful in acquiring grant funding to support research, and leaders in teaching and

other academic pursuits. This September, we had an External Site Visit from trusted academic colleagues to review the program, which went quite well. Stay tuned as this program progresses!

This summer, Dr. Greg Ross was named NOSM’s Discovery Air Fire Services Chair in Environment and Health Surveillance, a position funded jointly by NOSM, the Northern Ontario Heritage Foundation, and Discovery Air. As Research Chair, Ross and his team will develop remote sensing technology to identify harmful waterborne microbes such as blue-green algae, which can pose a health risk to both people and animals who bathe in or drink contaminated water.

Although much is changing at the Research Office, I personally believe that change is good. The very purpose of research itself is to change the way we think about the world, and challenge knowledge for the better. I hope you enjoy reading this issue of *The Scope*—our first bilingual edition—which highlights some of the many research projects taking place in Northern Ontario that are changing the landscape of health research here in Northern Ontario and beyond.

If you would like more information on research activities here at NOSM, please contact us at research@nosm.ca.

TRIALS AND TRIBULATIONS

NOSM'S PSI VISITING SCHOLAR VISITS THE NORTH TO DISCUSS RESEARCH USING LARGE CLINICAL TRIALS

It was a fascination with trauma and the drastic, often unforeseen effects it can cause that first drew Dr. Mohit Bhandari, Professor of Surgery at McMaster University, Canada Research Chair in Musculoskeletal Trauma and Surgical Outcomes, and NOSM's Physician Services Incorporated (PSI) Visiting Scholar, to orthopedic surgery, a discipline that is focused on healing trauma.

"During medical school, I was interested in understanding areas of medicine that had a global need, which is what attracted me to treating injury," says Bhandari. "Trauma is the leading cause of death for people under the age of 40, and osteoporotic injuries are extremely common in the elderly. With orthopedic surgery, we have the ability to correct a deformity or traumatic injury, and allow people to get back to their regular quality of life."

In addition to his passion for helping patients in the clinic, Bhandari is well known for his global clinical trials, where he works with a network of researchers around the world to answer health questions relating to orthopedic surgery—focusing on topics such as hip fractures, wound care

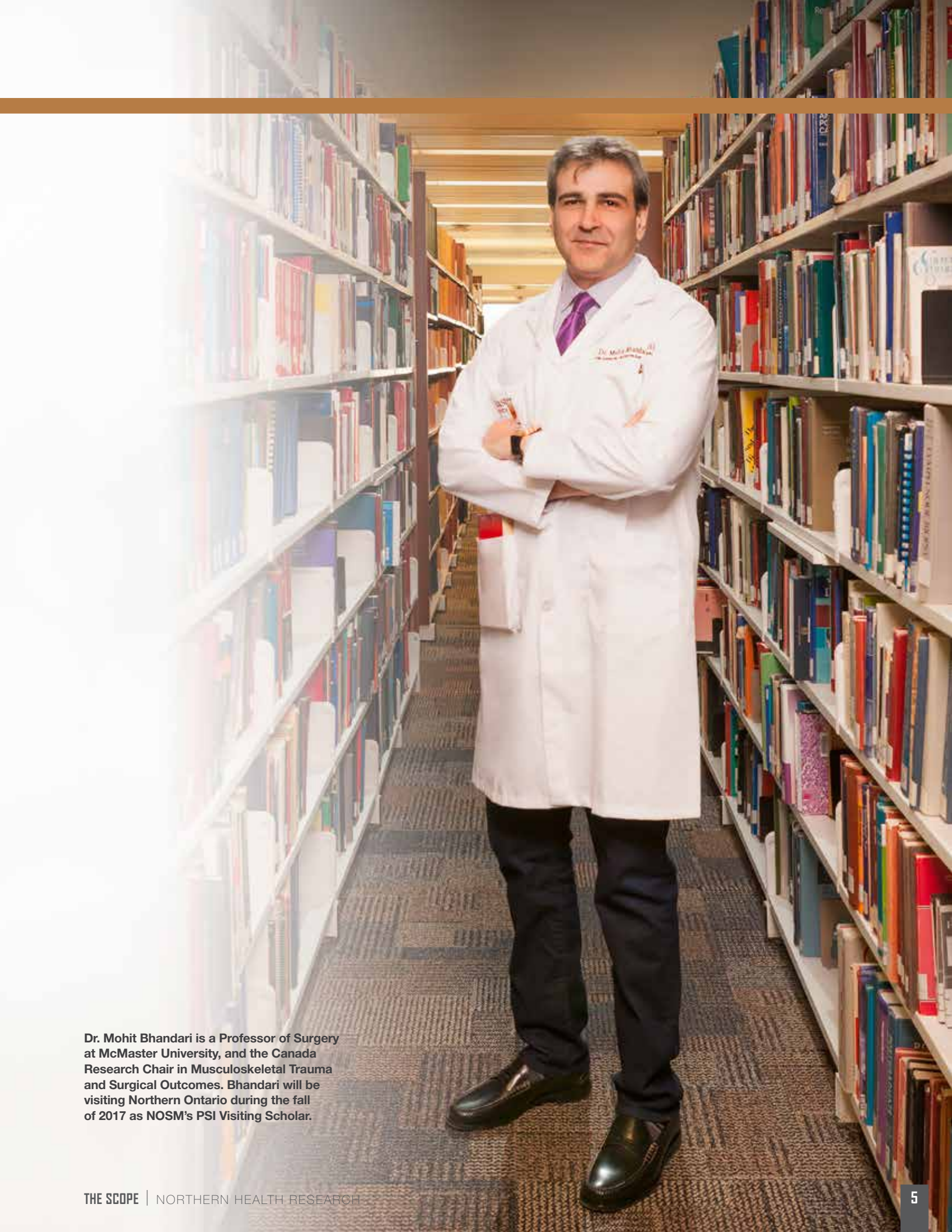
treatment, and injuries caused by domestic violence. The research that he has been involved in has had large sample sizes, ranging from 500 to 40,000 patients around the world.

As NOSM's PSI Visiting Scholar, Bhandari will travel to Northern Ontario in the fall of 2017 to share his expertise regarding large clinical trials with NOSM faculty. Specifically, he will discuss opportunities to collaborate with pre-established projects, and provide guidance to NOSM faculty who might be interested in starting their own large sample research.

"In order to help our patients as best we can, we need to think big, and work together," says Bhandari. "Working together is always better than working in silos. The more opportunities we cultivate for continued collaboration, the more diversity we will get in our networks. This will allow us to conduct research on more diverse groups of patients, which will help us to contribute to patients in the communities where we work, as well as across the country, and around the world."



PSI
FOUNDATION



Dr. Mohit Bhandari is a Professor of Surgery at McMaster University, and the Canada Research Chair in Musculoskeletal Trauma and Surgical Outcomes. Bhandari will be visiting Northern Ontario during the fall of 2017 as NOSM's PSI Visiting Scholar.

IT TAKES A LOT OF NERVE

NEW NOSM FACULTY MEMBER RESEARCHES THE IMMUNE SYSTEM'S ROLE IN MS

According to the Multiple Sclerosis (MS) Society of Canada, our country has the highest rate of MS in the world, with an estimated 100,000 Canadians living with the disease. MS is classified as an autoimmune disease of the central nervous system, which consists of the brain, spinal cord, and optic nerves. With MS, immune cells pass from the bloodstream into the nervous system and attack the myelin sheath, which is a protective coating around the nerves.

Dr. Alain Simard, one of NOSM's newest faculty members, has focused his research on the relationship between the immune system and the brain. Specifically, his research investigates the ways in which our body controls immune cells to prevent excessive inflammation and neurodegenerative diseases, which has led him to research MS quite extensively.

"Unfortunately, there is currently no cure for MS," says Simard. "Some of the drugs available today prevent immune cells from entering the brain, which stops them from attacking the nerves. However, this also means that the medication prevents these immune cells from going elsewhere in the body, which can interfere with the immune system's ability to function properly when the body is exposed to harmful viruses or bacteria."

Located in the brain, the vagus nerve connects to many important organs in the body, such as the heart, digestive system, and lungs. Simard says that stimulating the vagus nerve leads to an anti-inflammatory response in the body, as well as regulation of the immune system. For these reasons, Simard believes that understanding how the vagus nerve affects immune cells could be a key to new treatments for MS, and other immune diseases.

The vagus nerve uses the acetylcholine molecule almost exclusively to send signals to other parts of the body. Simard's research has investigated the use of nicotine in the brain, which binds to the same receptors as acetylcholine, but with longer lasting effects. Simard says that compounds such as nicotine can alter the immune response, which may unlock more answers about diseases like MS.

"What we're learning is that molecules like acetylcholine don't function the same way on immune cells as they do on neurons," says Simard. "The idea is that, if we know which receptor is responsible for anti-inflammatory effects in immune cells, we can develop a drug that only acts on those effects, and avoid the unwanted side-effects of molecules like nicotine. This means we could slow down or possibly stop the progression of MS."

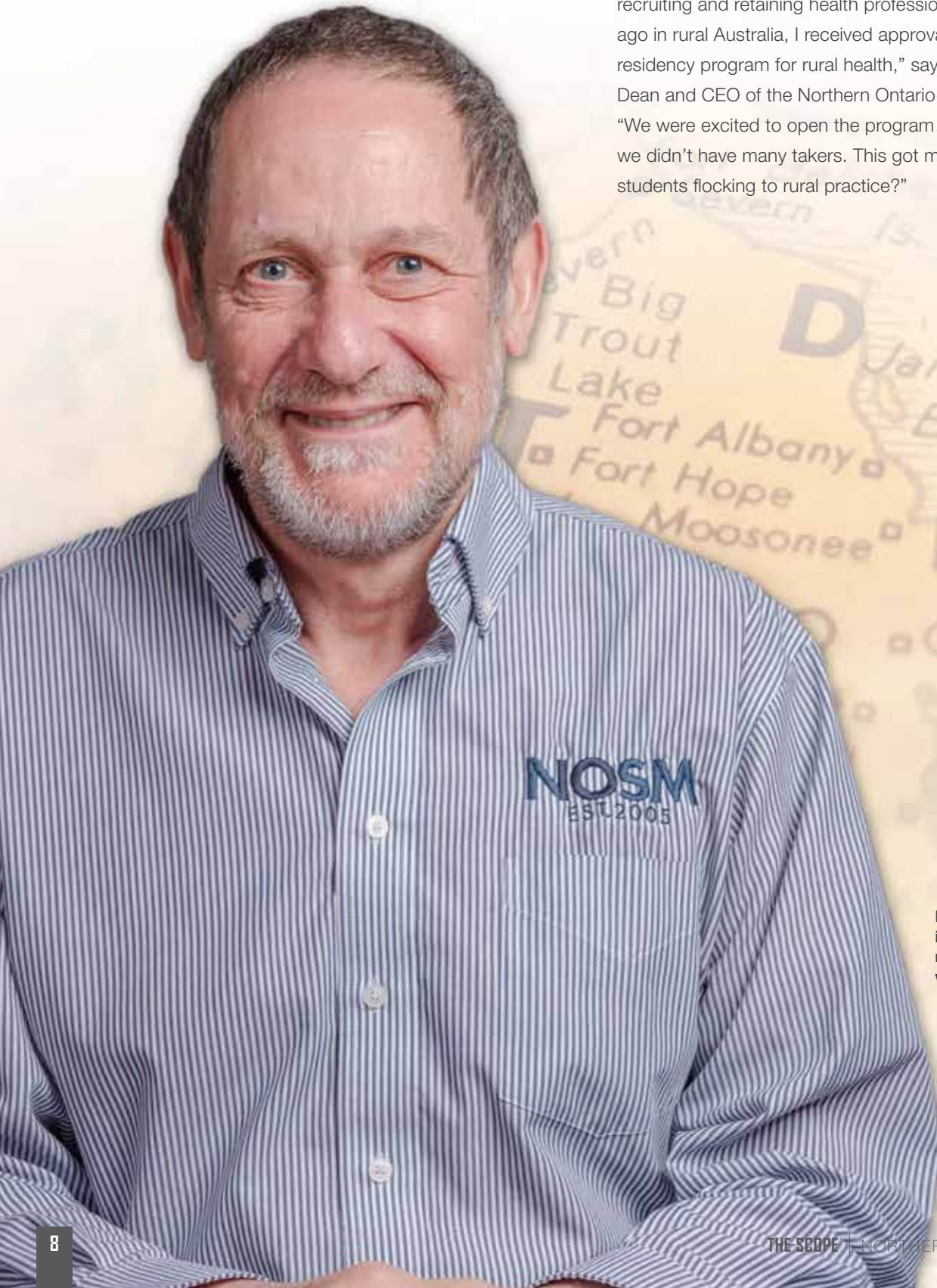


Dr. Alain Simard, Associate Professor of Immunology in the Medical Sciences Division at the Northern Ontario School of Medicine, is one of the School's newest faculty members.

AN EXPERT GENERALIST

NOSM DEAN RESEARCHES RECRUITMENT AND RETENTION STRATEGIES FOR HEALTH PROFESSIONALS IN RURAL AND REMOTE COMMUNITIES

Rural areas around the world have commonly struggled with recruiting and retaining health professionals. “Many years ago in rural Australia, I received approval to create a regional residency program for rural health,” says Dr. Roger Strasser, Dean and CEO of the Northern Ontario School of Medicine. “We were excited to open the program but, to our surprise, we didn’t have many takers. This got me thinking. Why aren’t students flocking to rural practice?”



Dr. Roger Strasser, NOSM Dean, is researching recruitment and retention of the rural and remote workforce.

To better understand the issue, Strasser was involved in the National Rural General Practice Study in Australia in 1997, which involved surveying rural doctors to get a sense of the services they provide, and the factors that lead to recruitment and retention of rural practitioners. Now, 20 years later, Strasser is involved in a follow-up study to assess how much has changed in the rural and remote health workforce in the past two decades. He and his colleagues will be comparing the data with research that has been conducted here in Northern Ontario, and in other regions in the world.

“Part of the importance of this study is to understand the major challenges to addressing the health status of people in rural and remote communities,” says Strasser. “This is very important to the concept of social accountability. Understanding the community needs will help ensure that we can train new graduates with those competencies.”

Medical education research over the last few decades has shown that one of the factors that influences practitioners in deciding to go into rural practice is “the cult of the expert.” Rural health professionals are extended generalists.

When compared to their urban counterparts, they provide a wider range of services and carry a higher level of clinical responsibility in relative professional isolation. However, even the term “generalist” has had a negative connotation in the past.

“Unfortunately, we live in an age of sub-specialization, where the belief is that someone who has a very in-depth knowledge about a very narrow field is somehow superior to someone with a broad knowledge across a wide range of fields,” says Strasser. “We believe this has influenced the lack of health professionals in rural areas. Interestingly, over the last 20 years, there has been a discourse about the importance of generalism in health care. It will be interesting to see how our results now will compare to those of the initial survey back in 1997.”

This study, though it started before NOSM was created, is similar to the tracking study of NOSM graduates being completed by the Centre for Rural and Northern Health Research (CRaNHR). By comparing results, the hope is that this research will continue to shed light on the issues faced by health professionals serving rural and remote communities, in order to further influence recruitment and retention strategies here in Northern Ontario.

GOING TO GREAT PAINS

NOSM RESIDENT INVESTIGATES BEST STRATEGIES FOR OPIOID TREATMENTS

A report published by the Ontario Drug Policy Research Network (ODPRN) is causing some in Northern Ontario to believe that our region is facing an opioid addiction crisis. According to the ODPRN's research, northwestern and northeastern Ontario have the highest rates of opioid-related deaths in the province, and the highest rates of opioid-related emergency department visits. Not only this, but Northern Ontario jurisdictions also have some of the highest rates of opioid prescribing in the province. This may be due to the types of industries in Northern Ontario that may make workers more susceptible to injuries that warrant pain management.

High rates of opioid addiction in Northern Ontario are what led NOSM second-year Family Medicine resident, Dr. Nicole Ranger, to begin a research project looking at factors that affect first-time patients initiating treatment for opioid dependence. The primary strategy to address opioid dependence is methadone maintenance treatment (MMT), wherein a comprehensive treatment plan is prescribed to replace opioid use. Methadone is an opioid agonist, which is a type of drug that mirrors the effects of naturally occurring endorphins in the body, and can replace the effect of opiates by acting on the same receptors in the brain. MMT also involves counselling, case management, and the delivery of other medical and psychosocial services.

Ranger has theories about why rates of opioid-related deaths might be higher in the North. "Unfortunately, treatment services for opioid addiction are not always readily accessible in Northern and rural communities," says Ranger. "Often times, people in rural, remote, or isolated areas in Northern Ontario have difficulty finding the support they need to recover."

In order to improve treatment rates, Ranger is interested in learning about factors that might make available treatments more successful. Specifically, Ranger is researching how the starting dose of methadone affects patient treatment retention.

"Right now, our hypothesis is that there is a greater likelihood of patients being retained in treatments when they have higher



Dr. Nicole Ranger, NOSM alumna and second-year Family Medicine resident, is researching best strategies for opioid treatments.

starting doses of methadone," says Ranger. "We know that the first two weeks are the most critical when starting opioid addiction treatments. If the doses of methadone are insufficient during this time, patients could be more likely to continue use of opioids concurrently while taking methadone, which puts them at a higher risk for increased rates of morbidity and mortality."

To answer this question, Ranger (along with her collaborators Dr. Joe Eibl, NOSM Postdoctoral Fellow and Assistant Professor in Medical Sciences, and Dr. David Marsh, NOSM Deputy Dean and Associate Dean, Community Engagement) is using a provincial database that allows her to look at data from opioid treatment centres across Ontario. Primarily, Ranger will be assessing whether or not the starting dose of methadone influences whether or not first-time patients are retained in treatment, and if so, in what way. The research will look at outcomes for female and male patients, urban and rural patients, and Northern and southern patients.

One of the most important factors that attracted Ranger to this topic of study was the prevalence of opioid treatment across the province. "As a primary care physician, you have a lot of patients who are undertaking opioid addiction treatments," she says. "Clinical practice guidelines exist to support physicians in the initiation of treatment but the dosing strategy is not a standardized process. This research will allow us to examine if current dosing practices impact retention and if so, allow us to potentially adapt clinical practice for starting doses when initiating methadone maintenance treatment. The ultimate goal is to contribute to knowledge that can hopefully support patients in having greater success in opioid addictions treatment."



Dr. Joelle Thorgrimson, NOSM alumna and current Family Medicine resident, is studying *Haemophilus influenzae* Type A with NOSM researchers.

BEARING THE BURDEN

NOSM LEARNER INVESTIGATES HIGHER RATES OF INVASIVE INFECTIONS IN INDIGENOUS PEOPLES

In Kenora, a young patient presented in the emergency room with a fever and a very swollen, sore foot. For reasons that seemed puzzling at first, the patient's condition worsened, causing him to stay in the hospital for a few days. The patient was diagnosed with septic arthritis, a painful infection of the joint. This type of invasive infection is quite rare, and even more rare in children. After some testing, the health-care team discovered the culprit: *Haemophilus influenzae* Type A (Hia).

Though the word "influenza" is in the name, *Haemophilus influenzae* Type A is not "the flu;" it is a bacterial pathogen that can cause serious invasive infections, such as meningitis and pneumonia. A research team—led by NOSM Professor Dr. Marina Ulanova—has identified that severe infections caused by Hia occur at much higher rates among First Nations people compared to the rest of the population in Northern Ontario and around the world. She and her team have been working to identify why that is, and what can be done about it.

Among those collaborating with Ulanova is Dr. Joelle Thorgrimson, NOSM alumna and current Family Medicine resident. Originally from Kenora, Thorgrimson spent the third year of her MD program in her hometown for the eight-month Comprehensive Community Clerkship placement. During this time, she was also awarded a NOSM Dean's Summer Medical Student Research Award, which gave her the opportunity to work with Ulanova on her research.

Thorgrimson's role was to recruit local Indigenous patients into the study, and complete a chart review to assess rates of Hia in Indigenous versus non-Indigenous patients in the Kenora area. Taking a community-based, participatory approach, Thorgrimson worked with the local health access centre to collect the data, and discovered that, as in other communities in Northern Ontario, there was a higher disease burden in Indigenous patients in Kenora.

"Being Métis myself, I am hyperaware of the health disparities between Indigenous and non-Indigenous peoples," says Thorgrimson. "I also think there are many social determinants of health that effect the disease burden in Indigenous communities. I find it challenging that health care isn't equitable in Canada, but I hope that, if properly documented, we can seek government action to change this."

As a result of the research that Ulanova, Thorgrimson, and their team have completed, progress is being made to reduce rates of Hia infections in Indigenous peoples in Northern Ontario and beyond. This summer, Ulanova's team was awarded a grant in the amount of \$423,518 by the Canadian Immunization Research Network (CIRN) to support the development of a new vaccine to prevent invasive *Haemophilus influenzae* Type A disease in Canadian Indigenous communities.


DOING THE LEG WORK

NOSM FACULTY MEMBERS INVESTIGATE THE IMPACT OF LEARNER EVALUATIONS ON LOCAL EDUCATION GROUPS

According to current medical education literature, faculty evaluations do not have as great an impact on teaching practices as people may think. “When faculty get evaluations from their learners, the research says that they quickly review them, and if the comments are generally positive, they do nothing,” says Dr. James Goertzen, NOSM Assistant Dean of Continuing Education and Professional Development (CEPD). “On the flip side, if the evaluations contain some critical responses, the research says that faculty tend to personalize the information, thinking ‘I know who this was,’ and then file it away and move on.”

Goertzen, along with Dr. Clare Cook, CEPD Research Coordinator, and Dr. Penny Moody-Corbett, Associate Dean of Research, have come together to help NOSM’s clinical faculty truly reflect on the feedback they receive from students, and hopefully, refine their skills as clinical teachers. The trio has devised a system to pool evaluations for faculty members who work as part of the same Local Education Group (LEG)—teams of physicians who are teaching and working in the same community, and often, are part of the same area of specialty.





Working collaboratively with Faculty Affairs, CEPD, Undergraduate Medical Education, Postgraduate Education, and Research Portfolios, the trio will prepare individualized workshops for 12 LEGs in Northern Ontario. This will involve collecting consent from each faculty member to access their evaluations, completing a thematic analysis for each LEG, travelling to the community to deliver the workshop, and leading the LEG in reflection and an intention to change. In three to six months, the team will return to each LEG and assess what the group of faculty members is doing differently as a result of the workshop to determine whether or not the exercise has an impact on teaching.

“Most community faculty members are so busy with their clinical work and NOSM education schedule that they rarely have time to step back and reflect on their teaching style and

methods,” says Goertzen. “In an ideal world, we hope that this model will change teaching activities, and improve the education that is being delivered.”

“I think this is an excellent example of a research project that has the potential to have great impact on the quality of clinical education,” says Moody-Corbett. “It’s a very different way of approaching teaching evaluations, allowing for more improvements in how faculty members are teaching learners and working together. I’m looking forward to seeing what impact this project has three and six months down the line, and the potential for being replicated across the North.”

From left to right: Dr. James Goertzen, Assistant Dean of CEPD; Dr. Penny Moody-Corbett, Associate Dean, Research; and, Dr. Clare Cook, CEPD Research Coordinator are working together to help faculty members across the North improve their skills as clinical teachers.

A photograph of Dr. Doug Boreham, a middle-aged man with glasses, wearing a blue polo shirt with a logo. He is sitting at a desk in an office, with a computer monitor and various papers visible in the background.

Dr. Doug Boreham is the Division Head of Medical Sciences and the Bruce Power Chair in Radiation and Health at the Northern Ontario School of Medicine.

AN EASY PILL TO SWALLOW

NOSM DIVISION HEAD CREATES DIETARY SUPPLEMENT THAT PROMOTES HEALTH AND HEALTHY AGING

Living on earth, there's no escaping the effects of ionizing radiation. All organisms on our planet are constantly surrounded by low-dose radiation found in soil, plants, and even coming down from the cosmos. Dr. Doug Boreham, the School's Division Head of Medical Sciences and the Bruce Power Chair in Radiation and Health at NOSM, has spent his career researching the health impacts of radiation. While we are all surrounded by low-dose radiation—which, according to Boreham's research, actually has a health stimulating effect on the body, similar to exercise—there are people who may be exposed to high-dose radiation, which can have a harmful effect on our health.

Illness or tissue damage due to high-doses of radiation can be seen in varying groups of people, such as accident victims as well as cancer patients (who receive radiation treatment to kill cancer cells but may get damage to their normal tissue). Regardless of the reason for the exposure to high-dose radiation, the effects are the same: high-energy photons or charged particles from the radiation cause cell damage, leading to destruction of important atoms and molecules in the body. In an effort to combat the harmful effects of high-dose radiation, Boreham and his colleagues (Drs. David Rollo and Jennifer Lemon from McMaster University) have developed a radioprotectant dietary supplement.

"The supplement consists of 31 different ingredients, all of which are available at the local health food store," says

Boreham. "After taking the supplement, test animals have become extremely resistant to the harmful effects of a large dose of radiation. It's almost as if they had not been radiated, even when subjected to doses that would under normal circumstances cause illness or death."

In addition to protecting us from radiation, results from Boreham's lab suggest that the supplement may positively impact our health in many ways. Boreham says the supplement affects five different pathways that promote a person's health—inflammation, glucose metabolism, mitochondrial function, membrane integrity, and providing antioxidants.

"As we age, our bodies produce free radicals, and those free radicals damage our DNA," says Boreham. "This supplement protects our cells from that DNA damage, which in turn enhances the aging process and helps us live longer and healthier. Not only this, but it improves cognition, and may be used someday to prevent diseases such as Alzheimer's and Parkinson's, or improve negative effects from radiation or chemotherapy on the brain (also known as chemo fog), among other benefits."

Once investors are secured, Boreham and his colleagues are hopeful that the supplement will be available to the public, and can help a wide range of patients in Northern Ontario and beyond.