

Building Bridges in MS research

We are delighted to present the seventh edition of the endMS National Training Program's *Spotlight on the Future* newsletter.

We first extend a special thank you to Dr. E. Ann Yeh and her amazing team for hosting the 2018 endMS Summer School (*Environmental and Lifestyle Factors Associated with MS: Bench to Bedside*) from June 11th to 14th in Toronto at the Hospital for Sick Children's Peter Gilgan Centre for Research and Learning.

Forty trainees from across Canada participated in plenary sessions, workshops and activities to help bridge the gap between "Bench" (basic science) and "Bedside" (clinical research and care) in MS research. The program also included

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SPOTLIGHT ON THE FUTURE

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career development sessions with opportunities to share tips on strategic networking, interview skills, and opportunities to explore different career paths. A particular highlight was the chance to meet and discuss patient perspectives with people living with MS.

The 2018 Summer School was very successful thanks to the hard work, dedication and enthusiasm of the hosts, the presenters, the volunteers and the attendees. When participants were asked what they liked most about this year's Summer School, the most common responses were: the interdisciplinary nature of the Summer School, the variety of topics and the opportunities to network and to interact with people living with MS.

Our graduating SPRINTers presented the results of their interdisciplinary projects at the Summer School. Congratulations and best wishes to the SPRINTers! Warm thanks to the outgoing mentors who – although very busy with their own research careers and responsibilities – devote many hours to develop trainee projects and to guide the SPRINTers through their time in the program (and beyond!). We are pleased to profile the 2017-2018 SPRINTERS and mentors in this newsletter.

Nine new 2018-2019 SPRINTers were welcomed to the program and met with their SPRINT teams the day prior to the Summer School. See page 8 for a list of the current SPRINTers and mentors.

Beyond the program, the majority of scholars continue to pursue MS research. Take a moment to see what our SPRINT alumni have been up to on page 11. We are so pleased to see the program come full circle as former Summer School participants and SPRINTers hold faculty positions, are now mentoring the next generation of researchers and are part of the training program's governance. We are very proud of the achievements of the SPRINTers and the outcomes of the SPRINT projects.

A huge thank you to the committee members, faculty, presenters, facilitators, panel members, people affected by MS and to the organizers who have generously given of their time to help ensure that the National Training Program continues to move MS research forward by delivering high caliber programs through the endMS Summer School and endMS Scholar Program for Researchers IN Training (SPRINT). The success of the program truly is a tribute to everyone's efforts – it is a national collaboration in itself! Thank you to the MS Society of Canada for providing ongoing financial support to the endMS National Training Program, which allows it to continue. For a sneak peek at what the 2019 Summer School will offer, go to page 9. Stay tuned for more information on the application process coming in December.

To our current SPRINTers and mentors, we wish you an enriching experience and look forward to seeing you in Calgary!

DR. CHRISTINA WOLFSON
DIRECTOR, NATIONAL TRAINING PROGRAM

ANIK SCHOENFELDT
MANAGER, NATIONAL TRAINING PROGRAM



*(Scholar Program for
Researchers IN Training)*

THE 2017-2018 SPRINTERS AND MENTORS

Our SPRINTers:

Marc Charabati
Dr. Sarah Jean Donkers
Benjamin Ewanchuk
Dylan Galloway
Marjan Gharagozloo
Elizabeth Gowing
Megan Kirkland
Dr. Evelyn Peelen

and our mentors:

Dr. Rashmi Kothary
Dr. Lisa Osborne
Dr. Lara Pilutti

MARC CHARABATI

While working towards his undergraduate degree in microbiology and immunology at McGill University, a combination of factors proved to be a turning point in the life of Marc Charabati as an MS researcher.



"I actually knew very little about MS before my last year in undergraduate studies," he recalls. "Everything came together over a period of a few months. I learned a lot about it, first from an elective course and then while writing a big term paper on MS for another course."

"The following summer, I took my first steps in MS research thanks to the MS Society of Canada's summer studentship program, and soon after, I joined the lab of Dr. Alexandre Prat for a graduate degree," says Marc.

As the Montreal native looks back on the journey that has brought him this far, he also admits that he's someone who applies an out-of-the-box approach to, well, just about everything. For example, in his spare time, he not only is a skilled soccer player, but also sings in an amateur choir. And his first job – which he admits was short-lived – was at a call centre in Montreal.

"Even though I was there for a few hours a week, I only lasted for a couple of months," he says. "The one lesson it taught me at the time is that I am really not made for a career in a call centre!"

Next, for Marc, was an interest in biomedical research, which he delved into before entering McGill. It was at this time that he worked on a general and vocational college (CEGEP) biology class project that looked into the impact of classical music on the cognition of mice.

He combined his schooling with a job working in a cancer research laboratory for several months.

Today, Marc is enrolled in the Université de Montréal's doctoral program in neuroscience.

"My current research projects revolve around the blood-brain barrier," he says. "More specifically, my work focuses on exploring the molecular players that drive the migration of harmful immune cells across the blood-brain barrier into the central nervous system during the development and progression of MS. I am very fortunate to work under the supervision of Dr. Prat. His pioneering work and renowned expertise in the field makes him an example to follow."

Marc believes that SPRINT has been an important stepping stone in his overall academic training, citing the program's many benefits as being tremendously helpful on many fronts.

"It not only broadened my knowledge horizon in MS research, but it also allowed me to build long-lasting networks of brilliant mentors, future leaders and great friends," he says. "Their support over the years will be invaluable and will certainly foster innovative and fruitful collaborations. Having the opportunity to sit down and discuss MS-related subjects with MS patients during the summer school has brought my whole research experience and its priorities much more to life. This was a particularly moving and quite motivating initiative organized by the MS Society and the endMS training program."

Marc's long-term goal is to continue the fight against MS by pursuing a career that involves research in neuroimmunology.

"What is particularly intriguing about MS is the fact that it joins two physiological systems that were previously thought to be unrelated," he says. "Working on deciphering this specific relationship between the immune and nervous systems is by itself very stimulating. It will undeniably revolutionize the way we look at and treat MS and other brain diseases."

SARAH JEAN DONKERS

Dr. Sarah Jean Donkers is an assistant professor currently living in Saskatoon who specializes in neurorehabilitation. She is also a member of a research team that is looking into using the internet to offer physiotherapy programs for persons living with MS. When asked what her long-term goal is, Dr. Donkers is very blunt: "To end MS," she says.

In the meantime, her other goal is to make life easier for persons who deal with MS every day, and to "enhance clinical care, quality of life, function and symptom management."



"I want to find a way to preserve or maximize function in the progressive stage of disease," she says. "I want to focus on non-invasive interventions that have a potential neuro-modulation effect, such as physical activity."

Dr. Donkers is definitely not someone who's afraid of challenges. After all, she once worked as an aerialist in a travelling circus – and to relieve stress, it is not uncommon for her colleagues to see her climbing or hanging upside down in her office.

Dr. Donkers was recently appointed to the position of assistant professor at the University of Saskatchewan's College of Medicine. It's also at the University of Saskatchewan that she obtained her PhD after studying in Australia, where she earned her BSc, MPT and MSc.

"I have always been interested in neurology, and worked as a neuro-rehabilitation physiotherapist for almost 10 years," she points out. "I feel that people living with MS have been an underserved population in terms of research and clinical options, compared to other pathologies such as stroke, and I specifically did my PhD in MS in hopes of improving care for people living

with MS. I have a number of clients I worked with clinically for a number of years and I just wanted to be able to do so much more for them than I was able to as they entered the progressive stage of MS."

Her multidisciplinary research team is comprised of researchers, clinicians, as well as representatives from the Saskatchewan health authority, the province's ministry of health, the MS Society and people living with MS, with an eye on creating a Provincial MS Clinical Care Pathway.

Dr. Donkers credits the SPRINT program for inspiring her to work with a collaborative team, such as her research group, and it made her appreciate the essence of a multidisciplinary approach and learning from basic science.

"SPRINT connected me with leaders in MS research through the endMS training network, it connected me with a team of future MS researchers – my fellow Sprinters – and provided insight into the basic science and immunology of MS," she notes.

"I am thankful to Dr. Katherine Knox, the previous director of the Saskatchewan MS Clinic as a mentor and thanks to my PhD supervisor, physiotherapist, neuroscientist rock star Dr. Kristin Musselman as my inspiration for getting into research," she adds. "I am also so very grateful to the MS community in Saskatchewan. I wouldn't be where I am without their support and willingness to participate in my research and collaborate."

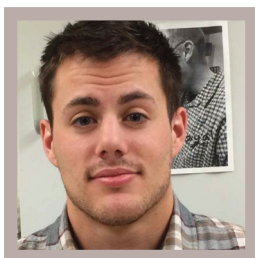
"I always knew I wanted to work in healthcare. I was always curious about how we work, the study of human movement, psychology, physiotherapy, neuroscience," she states.

"My parents' work ethic as farmers taught me everything essential to getting me where I am today. It taught me work ethic, passion, a sense of humour, a desire to give back, the importance of community, value of commitment, staying grounded, and gratitude."

BENJAMIN EWANCHUK

As Benjamin Ewanchuk's path to becoming a physician scientist continues at a fast pace – he's already been selected to join the University of Calgary's Leaders in Medicine program – he can rightfully claim that he worked in the trenches to get where he is. In fact, his first job was working full-time in construction, laying water and sewage pipelines around Calgary during his summer months.

Ben obtained a Bachelor of Science (BSc, Co-op), majoring in biochemistry with a co-op designation from the University of Victoria in 2014, at which time he began his PhD program in biochemistry and molecular biology – at the University of Calgary. He is currently completing his final year of his PhD and plans to defend his thesis in early 2019 prior to starting medical school.



The Red Deer, Alberta native says he developed many interests when he was younger, and enjoyed hands-on work, but felt another calling. "I also enjoy working with my hands in the lab," he points out.

"Through a number of work placements, I gained experience in both industry (as an environmental analyst) and academia. One placement that I particularly enjoyed was working alongside Dr. Robin Yates at the University of Calgary," he recalls, adding that it was during this placement that he was first introduced to MS-related research.

For Ben, the direction he was now taking also had a personal aspect. That's because MS runs in his family, including a cousin with MS.

He participated in SPRINT and attended the endMS Summer Schools in Montreal in 2015, in St. John's two years later, and in Toronto this past summer.

"Easily the best part of these programs has been the direct contact with people living with

MS across Canada," he says. "As a basic scientist, spending all your time in the lab, it can sometimes be easy to forget that our time and effort is meant to serve a purpose for the public. Having these opportunities to put a face to the disease, and see how enthusiastic patients are about our research, certainly helps keep us motivated."

Ben says he developed important MS-research related contacts across Canada, which he believes will improve his career path. "It was also great to get a sense of just how interconnected the MS network across Canada truly is," he adds. "Despite a vast range of disciplines, from immunology to neurology to MRI to rehabilitation medicine, programs like SPRINT help keep us as researchers well apprised of research across each of the MS fields, and the resulting collaborations will hopefully benefit patients down the road."

The SPRINT experience and the interdisciplinary project he worked on allowed Ben to gain an understanding of research related to rehabilitation medicine, specifically, how physical activity and exercise training may be useful for treating vascular comorbidities in people with MS, and supplementing his own understanding of MS at the molecular biology level.

"I would love to eventually settle at an academic centre where I can balance a research program and teaching with my clinical responsibilities," he adds. "Doing a joint MD/PhD degree at the University of Calgary will hopefully put me in a position where a career choice like that starts to become a real possibility."

DYLAN GALLOWAY

One afternoon a few summers ago, while working for a landscaping company in his native Sudbury (Ontario), Dylan Galloway imagined himself as a scientist. Today, as he works inside a lab and examines how molecules influence the processes of inflammation and repair in multiple sclerosis, he's realizing that his dream is being fulfilled.

Dylan received his BSc in behavioural neuroscience from Laurentian University in 2015, and then moved to St. John's to research

neuroimmunology in the context of MS as part of his PhD under the supervision of Dr. Craig Moore of Memorial University. His long-term goal is to become a university professor, researching neuroimmunology and MS at a Canadian institution.

"During those summer months, I imagined myself working outdoors, studying ecology or zoology instead of researching anything related to health sciences, which is what I am doing now," he says. "My first job was physically demanding and often involved working quickly to



complete projects. While it was completely unrelated to doing research, it did teach me the importance of working efficiently to complete projects quickly and with quality, skills that often come in handy when completing many experiments throughout the day."

After completing his bachelor's degree, Dylan became interested in the field of neuroimmunology and how the immune system interacts with the brain. That's why he says Dr. Moore was the perfect fit for him, and why he's excited to embark on his third year of PhD studies at Memorial.

For Dylan, an additional boost to his enthusiasm for neuroimmunology came from SPRINT, which he credits for helping him to learn how to network with his peers and experts in the field of MS research.

"While most of my studies are focused on the immune system, the SPRINT program allowed me to study aspects of MS related to oligodendrocytes, the myelin producing cells in the brain," he says. "I would not have otherwise had the opportunity to study these aspects of the disease, and I believe this knowledge will help me in the future as I continue to pursue MS research."

During the program, Dylan says he got to collaborate with other trainee researchers who were working across Canada, all in different time zones. As research is often a collaborative effort, experience working in a group will no doubt help him in future collaborative projects, he says.

"The main reason I joined the (SPRINT) program was to gain a deeper understanding of MS in hopes that this knowledge would complement and improve my own studies," he says. "Participating in the SPRINT program has increased my intent to pursue MS research, in part because many previous SPRINTers have gone on to become faculty members at various institutions."

In the wake of SPRINT, Dylan says he feels he has gained a better understanding of the research he wants to pursue in the future, and how it relates to the "big picture" in the field of MS research.

It comes as no surprise that in his spare time, Dylan enjoys spending as much time as possible in the great outdoors of Newfoundland, taking in the fresh air. But instead of toiling away on a landscape project, this time he hikes or runs along the many trails that criss-cross the city of St. John's.

MARJAN GHARAGOZLOO

Marjan Gharagozloo was scientifically inclined from an early age, her very first job being as a research assistant at the prestigious Isfahan University of Medical Sciences, known as one of the top-ranked universities in basic and clinical sciences in Iran. Thus it was early on that she came into contact with researchers whose endless curiosity and thirst for knowledge so resembled her own.

In 2006, she was awarded a one-year scholarship from Iran's Ministry of Health and Education to conduct research in Italy at Perugia University's internationally-recognized immunopharmacology labs, directed by Professor Carlo Riccardi, at the department of Clinical and Experimental Medicine.

She then moved back to Iran to continue her research on the immunomodulatory effects of plant natural products and immunotherapy of autoimmune diseases at Isfahan's University of Medical Sciences.

Marjan received her MSc from Shiraz University of Medical Sciences in Iran before moving to Quebec in 2015 where she's presently pursuing

her PhD in neuroimmunology at the University of Sherbrooke. She credits both Dr. Denis Gris, head of the university's neuroimmunology laboratory, and her husband, for being her inspiration in MS research.

Multiple sclerosis became a research focus for Marjan when her husband was diagnosed with the disease in 2007.

"I was deeply touched by the way he suffered from the disease and that inspired me to get involved in MS research," she says.

Marjan transformed her daily proximity to his suffering into a commitment to combatting the disease and jumped at the chance to align her studies specifically to MS, investigating how endogenous regulatory molecules suppress its initiation and progress.



"MS is a part of my life and I feel it every day," says Marjan, adding: "There are so many unknowns about MS that make the research and discoveries so exciting."

Marjan describes the SPRINT program as the catalyst in defining what will become her post-doctoral career in MS research. It was thanks to SPRINT that she received an inter-institutional research transfer to visit Dr. Peter Calabresi's research group at The Johns Hopkins MS Center. Thanks to that experience, she'll be joining Dr. Calabresi's team in 2019.

Recently selected to sit as an endMS trainee representative on the SPRINT Committee for the coming year, Marjan praised SPRINT for introducing her to many others working in MS research, as well as various ancillary fields, with whom she hopes to collaborate in the future, the ultimate objective being to form her own research team.

"I definitely recommend SPRINT to others. SPRINT has so much to offer, experiencing teamwork, having a mentor from another university, learning about MS, and networking."

Marjan earned special recognition in May 2017 from the Canadian Association for Neuroscience (CAN), when she received a travel award given to trainees working in Canada.

She was among 70 neuroscience specialists selected by CAN. Additionally, she was awarded an Educational Travel Grant from the Americas Committee for Treatment and Research in Multiple Sclerosis (ACTRIMS) and the MS Society of Canada to present her research at the 2018 ACTRIMS Forum in San Diego. She was among four researchers selected by the MS Society of Canada.

While recognition for her hard work is always appreciated, Marjan says she believes in keeping things simple.

The mother of twin boys, Marjan's days are indeed full – days, that are fulfilling at every level, whether it's time to work or play.

"My favorite hobby is building Legos with my twin sons," she says. And when the building is done, she adds that travelling with her family, exploring new destinations and meeting new people invigorates her.

ELIZABETH GOWING

Growing up in the small Ontario town of Lindsay, Elizabeth Gowing knew from an early age that she would end up working in health science, and by the time she was in high school, biomedical sciences became her passion.



Elizabeth's motivation to study multiple sclerosis came from her mother, who has battled MS for more than three decades.

"My non-academic motivation and inspiration has always been my mum, who has personally lived with and fought this disease for over 30 years, while refusing to let it define her and hinder her ambitions," says Elizabeth.

"I have also always been moved by the suffering of others and have always wanted to be a part of alleviating distress, therefore, when I was young, I imagined that I would be a medical doctor," she recalls. "I chose to study MS because my mother has lived with MS for my entire life. She has recently been diagnosed with secondary progressive MS (SPMS), which motivates my research even more, as there is clearly much work to be done to prevent the transition from relapsing-remitting MS to SPMS and to provide patients with treatment options during the progressive stage of the disease."

Elizabeth currently lives in Montreal, where she is pursuing her doctorate in neuroscience under the supervision of Dr. Alexandre Prat at the Centre de recherche de l'Université de Montréal (CRCHUM). In 2013, she completed a First Class Honours Bachelor of Science degree in anatomy and cell biology at McGill University.

Her first job as a consultant at an interior decorating store at the age of 14 stimulated her creative side, "and I do believe that I still use an element of creativity, although distinct from my first job, in my research today. My first job primarily taught me skills in time management, team-work, public communication, problem solving, and personal initiative – all of which are relevant to my current work and studies."

As part of her doctorate research, Elizabeth is working on two projects in which she and her team are investigating different mechanisms by which pathogenic T cells infiltrate the central nervous system and cause damage in MS.

"Our goal is to understand more behind the biology of MS lesion formation so that we can prevent this therapeutically and thereby stop the relapsing stage of the disease and also prevent progression," she says.

"Personally," adds Elizabeth, "I have always been inspired and encouraged by the female principal investigators in my field who work diligently each day to try to bring an end to this disease, while also facing a host of other challenges that are associated with being a woman in STEM (Science, Technology, Engineering and Mathematics)."

She credits SPRINT for being hugely influential in introducing her to a network of other MS researchers, peers and principal investigators who are at various stages in their careers and therefore can encourage, relate and give advice about pursuing

a career in MS research. Working on a project with a distinct focus from Elizabeth's personal research interests fostered a sense of research creativity, and inspired her to think broadly about distinct aspects of MS and potential future areas of research.

"I also found that the SPRINT project, through pulling me out of focusing solely on my PhD project, gave me additional perspectives and tools that allowed me to think differently about solving my own research questions, which I believe will be invaluable as I seek to finish my doctorate," she says. "The program has had a profound impact, not only through the challenges it presented and through which I grew, but also through the people I came to know in the process. Without a doubt the skills and connections I gained throughout the program will be invaluable for my career."

Elizabeth says that her long-term goal is to stay in the MS research field, but with a more clinical perspective. "I hope to do so either through attending medical school to pursue a career as a neurologist and research scientist, or through obtaining additional training in clinical research so that I can be involved as a PhD researcher in clinical trials," she says.

MEGAN KIRKLAND



Megan Kirkland's initiation to multiple sclerosis came in the summer of 2013 when she was awarded an endMS summer studentship. Travelling from St. John's, Newfoundland to Vancouver and being immersed in the world of MS research changed the direction of her life forever.

"For the first time I was immersed in clinical encounters, hearing the stories of people living with MS," she says. "It struck me how young many of the participants were, and I knew that I wanted to work towards creating

rehabilitation strategies to improve their physical functioning and long-term quality of life living with this chronic disease."

Today, Megan is completing a joint MD-PhD program at Memorial University in St. John's, and plans to pursue a career as a physician-researcher. She completed her post-secondary training at Memorial University, including a bachelor's degree (honours) in kinesiology and a master's degree in science in medicine (clinical epidemiology).

Megan says SPRINT connected her with other MS researchers across the country and helped her view MS through multiple lenses of research. SPRINT also inspired her to experience how people with different backgrounds could come together to approach a research question from multiple viewpoints and how this diversity enhanced the ability to bring meaningful research results.

Working together with a group of talented people with a common goal struck a chord with Megan, who says her first job was being a summer hockey camp instructor in Newfoundland.

"My first job taught me how to take on a leadership role and to work well in a team environment," she says. "Even then, I imagined I would be a doctor."

After her endMS summer studentship experience in 2013, Megan became involved with the MS Society of Canada's training programs.

"Since then, I have availed of many MS Society opportunities, including conferences and graduate fellowships," she says. "SPRINT was spoken highly of at these events and was recommended to me by my supervisor, who was a previous SPRINT mentor. I felt this program would help me to make further connections within the MS research community and be a valuable learning opportunity."

Megan says her overall objective is to create better measurement tools to detect impairment in the earlier stages of disease progression and to create rehabilitation strategies. Early intervention can keep persons living with MS healthy for as long as possible before walking impairment begins, she says.

"My inspiration and leader has been my supervisor, Dr. Michelle Ploughman, who made MS research exciting and meaningful," she says. "Her guidance helped me to develop research skills and has

motivated me to pursue a career in MS research. Dr. Ploughman always puts people with MS at the forefront of her research, which constantly reminds me why we work so hard every day: to help people who are living with chronic disease."

Megan says she is inspired by the fact that the field of MS rehabilitation research – and the advent of effective treatments – is relatively new compared to other neurological disorders, "and there is so much more work to be done towards finding a cure. In saying that, the field of MS research has had quick and promising progression with more disease modifying therapies, better diagnostic imaging and a better understanding of disease mechanisms."

"It makes it an exciting field to enter knowing our generation of researchers has the potential to make an even greater leap in the knowledge of MS, hopefully to improve the quality of life for those living with the disease and even potentially finding a cure for MS," she says.

Her background in hockey and the SPRINT partnership in particular taught her valuable skills in communication and teamwork, she says. "Our SPRINT team spanned from Vancouver to St. John's, and we had to collaborate long-distance in order to achieve our research goal. SPRINT made me feel a part of the MS research community. This program made me excited to see what the future holds as an MS researcher."

RASHMI KOTHARY

Growing up in Nairobi, Kenya, Dr. Rashmi Kothary recalls being an intensely curious child, who more than a few times enjoyed taking apart objects, such as radios, just to see what was inside. As he grew older, he says research became his leading passion, which led him into the world of physics, biology, biochemistry, embryology and ultimately neuromuscular disorders.

Dr. Kothary is the deputy scientific director and senior scientist at the Ottawa Hospital Research Institute (OHRI). He held the University Health Research Chair in Neuromuscular Disorders and is a professor

at the University of Ottawa. He previously completed a BSc and a PhD at the University of British Columbia and pursued postdoctoral research at the Mount Sinai Hospital Research Institute in Toronto and in Cambridge, England.

Dr. Kothary has some words of advice for all of the SPRINT program trainees who are actively pursuing their journey in MS research: "Develop a thick skin and commit the time that is needed to achieve results."

And for anyone wanting to participate in SPRINT: "I would recommend SPRINT to others but I'd make it clear that a fair amount of dedicated time is required to make it fruitful."

Dr. Kothary says he was quite impressed with this year's group of SPRINTers, adding that he was "encouraged by the intellect and the passion that the young trainees displayed."

"We focused on the inhibitory milieu at the MS lesion site as a primary cause of the challenges in getting repair after myelin damage," he says. "The SPRINTers were asked to perform a literature survey on various factors that influence remyelination in the central nervous system. The goal was to prepare a review for publication."



Dr. Kothary is an active figure at MS public events, such as the annual MS Walk and MS open forums, where he opens his lab to patients and their families. He also strongly encourages the members of his lab to take part in all of these public events. It's also his sense of team work and giving back that is instilled in the minds of the trainees that he takes under his wing.

"I have always believed in the power of mentoring young trainees and this was a wonderful opportunity to give back to the MS Society," he says.

His research has been funded for more than 20 years by agencies such as the Muscular Dystrophy Association, the MS Society of Canada and the Canadian Institute of Health Research.

Dr. Kothary and his research team are identifying key inhibitory factors at MS lesion sites that prevent the full differentiation of oligodendrocytes and halt remyelination in damaged areas of the central nervous system. The Kothary lab is investigating the molecular mechanisms underpinning the inhibitory effect of chondroitin sulphate proteoglycans to oligodendrocyte maturation. In addition, they are assessing the role of microRNAs in the maturation of these cells.

"The findings will have an impact on the development of future therapeutic strategies targeting repair, which is important in the context of MS," says Dr. Kothary.

LISA OSBORNE

Dr. Lisa Osborne once dreamed of becoming the National Hockey League's first female physiotherapist – a dream that came out of her first job as an attendant and trainer at a small gym in her home town of Kamloops, British Columbia.

"But somewhere along the way," she says, "I realized that I was less drawn to working with people and much more intrigued by understanding the cellular mechanisms that maintain health and how interruptions in these programs can lead to disease."

Rather than working in dressing rooms and dealing with injured hockey players, Dr. Osborne began her undergraduate degree in biochemistry and microbiology at the University of Victoria. As part of her co-op program, she spent eight months working in a lab at the Ottawa Health Research Institute under the supervision of Dr. Rashmi Kothary – today a fellow SPRINT mentor.

"He and his lab provided an incredibly supportive and intellectually stimulating environment," she notes. "I fell in love with research and haven't turned back."

After completing her BSc, she embarked on graduate and post-doctoral training at the University of British Columbia (2010) and the University of Pennsylvania (2015). During her training, Dr. Osborne studied host-microbe interactions, with a particular focus on how

the immune system responds to invading pathogens and tolerates the normal microbiota that reside on our skin, gut and other epithelial surfaces. Today, Dr. Osborne is an assistant professor in the Department of Microbiology and Immunology at the University of British Columbia in Vancouver and a Tier 2 Canada Research Chair in Host-Microbiome Interactions.

Dr. Osborne has always been fascinated by the dual nature of the immune system.

"The primary function of this system is to protect the body from foreign invaders – a Dr. Jekyll-like quality – and there are plenty of elegant checkpoints in place that limit the chances the immune system will turn its powerful resources against our own tissues," she says. "But given the right set of conditions, all these protective checkpoints can be overcome resulting in a Mr. Hyde-like autoimmune reaction, such as we see in MS when the immune system targets components of the central nervous system."



"I've always had an intellectual interest in the disease, but a number of years ago a close friend was diagnosed with MS. It's been truly enlightening to see how diagnosis and disease progression affects every aspect of a life – navigating the ever-changing stages of disease, disclosing the reasons for fatigue and clumsiness, and seeing relationships change in response. There's so much on top of dealing with your body betraying you."

Dr. Osborne's SPRINT project grew out of an initiative she worked on during her postdoctoral research, adding: "At the time, I was trying to understand why infections with one kind of microbe, helminthic worms, could impair immune responses to an intestinal viral infection. This has important global health implications, because in areas of the world that helminth worms are endemic, young children are at increased risk of developing severe complications following gastrointestinal viral infection and antiviral vaccines are less effective than they are in North America and Europe."

While investigating the impact of helminthic worms on the immune response, Dr. Osborne learned that there's an online market for purchasing helminths and that people were performing do-it-yourself helminth immunotherapy for MS and a host of other autoimmune and inflammatory diseases.

"This was such a fascinating finding, and I was really interested in the whole experience. Our project looked at the motivation driving people living with MS to start this at-home, do-it-yourself therapy. What we learned could be really useful for communication between clinicians and people living with MS. We also conducted a literature review examining the data that this idea is based on, and learned that we still have a lot of work to do before making any recommendations about this as a potential therapeutic option," she says.

Her long-term goal is to understand how environmental stimuli influence disease outcome and to focus on how the microbiota influences the immune system and autoimmune reactions.

"MS is intriguing because it's such a diverse disease," she says. "There's so little predictive power regarding the severity, progression or response to therapeutic intervention on an individual basis. If we could learn how to make these predictions early on and establish ways to more effectively intervene, I can only imagine how much more supported people living with this disease would feel."

**EVELYN
PEELEN**

It's a long way from the tiny laundromat in the town of Kerkrade in the Netherlands, where Dr. Evelyn Peelen once worked, and the laboratory at the Centre hospitalier de l'Université de Montréal, where she is currently a postdoctoral fellow, conducting research on the effects of a T cell cytokine on the blood-brain-barrier and immune cells.

While 5,628 kilometres separate the two destinations, little has changed in the approach and fascination that Dr. Peelen applies to a task at hand. In fact, she says, it's that summer job folding laundry that

gave her the ambition to expand her horizons.

"My first job in that laundromat taught me to work hard, but it also made me realize that this is not the kind of work that I would like to do in the future," she recalls. "Therefore, I studied and worked hard to be able to have a job that I really like."



And work hard, she did, obtaining a bachelor's degree in chemistry and a master's degree in molecular life sciences at the Radboud University Nijmegen in the Netherlands before completing her PhD in immunology at the University of Maastricht. This was followed by a two-year postdoctoral fellowship position at the Biomedical Research Institute, Hasselt University in Belgium, where she continued to work on T and B cells of MS patients.

Dr. Peelen's decision to focus on MS began during the last year of her master's degree, and that is when she was allowed to choose her own subject for her thesis. This happened at the same time that she was applying for a PhD position that focused on regulatory T cells in MS and the effects of vitamin D on these cells.

"The project raised my interest and I decided to write my thesis on this," says Dr. Peelen. "Reading more about MS made me want to understand this complex disease better, how the immune system is involved and how we can stop and eventually cure the disease. I started my PhD on this subject and since then I have been invested in MS research."

In 2016, she travelled to Toronto to attend the endMS conference, and that's when she first learned about the SPRINT program.

"The people that I talked to were all very enthusiastic about the program," she points out. "I believed that this program would be a fantastic opportunity to learn more about different aspects of MS and to extend my network within the field of MS in Canada within different disciplines."

Two years later, she participated in the SPRINT program, which she praises for a number of reasons. Firstly, "the program reminded me of the importance of interdisciplinary projects and collaboration. It has also shown me that the well-being of persons living with MS can be improved, not only with medications, but with exercise as well."

Secondly, adds Dr. Peelen, because researchers have a tendency to focus on only a small part of the disease, SPRINT is an excellent way to broaden one's horizon.

"It makes you realize that there is more to MS than your own research field," she says. "SPRINT accomplishes this with its summer schools that highlight different research disciplines, and organized sessions providing the opportunity to meet with people living with MS. Also, I was given a project that is completely out of my comfort zone, which is neuroimmunology."

Thirdly, according to Dr. Peelen, SPRINT offers a host of practical things, such as writing a scoping review and manuscripts with other students and a mentor.

"I never had to write a scoping review before," she says. "I learned what a scoping-review was and how to conduct it in a very organized way. Moreover, I knew that physical activity is good for the general population. However, I never realized that cardiovascular co-morbidities could impact MS and that physical activity might also be a good way to improve MS and therefore enhance the overall quality of life. SPRINT taught me a lot!"

**LARA
PILUTTI**

Born in Etobicoke, Ontario, Dr. Lara Pilutti presently resides in Ottawa where she is a professor at the University of Ottawa. Her research is focused on physical exercise as a means to manage the many disabilities experienced by people living with MS. She holds degrees in biology and physical and health education from Queen's University; kinesiology from McMaster University; and she completed a postdoctoral

fellowship at the Exercise Neuroscience Research Lab at the University of Illinois.

Dr. Pilutti's very first job involved providing after-school support for a child afflicted with cerebral palsy, which taught her to admire health-related professions. It was an experience that also confirmed her resolve.

"This was an incredibly unique experience and made an impact on my future education and career path," says Dr. Pilutti. "When I was younger I was drawn to health-related professions, as well as those involving creativity and design."



Her first job also taught her a tremendous amount about the impact of neurological disorders – not just the physical impact, but the mental and social consequence to the affected individual, and the effects on those surrounding them. At that very young age, she also became convinced of the potential for direct, daily interventions to improve health and quality of life.

"Traditionally, there has been limited focus on alternative therapies for managing MS, and this has resulted in considerable patient frustration," she adds. "These concerns have further motivated me to explore the potential of alternative, wellness-based approaches to disease management."

Her initial research was in rehabilitation through exercise of those with spinal cord injuries, but she subsequently adapted what she'd learned for the treatment of persons living with MS with substantial impairments of mobility. Impressed by those with whom she found herself working, she's since focused on developing solutions for all individuals living with MS and comorbid health conditions, especially cardiovascular and metabolic diseases, and specific lifestyle modifications for their management.

Dr. Pilutti has described her experience as a SPRINT mentor as highly rewarding. She's been particularly impressed by the dedication of her trainees, noting that it's helped her become a better mentor by developing her own leadership skills that she's applied to her own research team.

"I was most inspired by the motivation and dedication of the SPRINT trainees that I had the opportunity to work with this year," says Dr. Pilutti. "Their dedication to this project, on top of their other lab responsibilities, was quite remarkable. It was great to see how satisfied the trainees were with the program and the products that they created over the past year," she says. "They were very proud of what they had accomplished together as a team."

"My experience with Summer School and the SPRINT team also reinforced the importance of connections and collaborations between MS researchers and labs across Canada, and the need for interdisciplinary research to develop solutions for managing this disease," she adds.

Dr. Pilutti says she was also struck by how the trainees, who each came forward with different expertise, coordinated their activities, and she particularly enjoyed mentoring trainees for the endMS training program.

"I would certainly recommend being a SPRINT mentor to others," she says. "I really enjoyed the experience and getting to know the trainees, and sharing knowledge with them about a new area of research. It was great to see them take on this challenge, create a plan, and execute it successfully."

"The long-term goal of my research program is to optimize the accessibility of wellness-based approaches, such as physical activity and exercise, for people with severe MS to maximize health- and disease-related benefits," she says. "I hope that we can develop activity-based solutions to improve the lives of people living with MS, and those affected around them."

Dr. Pilutti practices what she preaches, remaining physically active with her family. She enjoys outdoor time and regularly runs along Ottawa's beautiful Rideau Canal.

2018-2019 SPRINTers

Rhiannon Campden	<i>University of Calgary</i>
Thomas Edwards	<i>University of Ottawa</i>
Negar Farzam-kia	<i>Centre de Recherche du CHUM</i>
Hanwen Liu	<i>University of British Columbia</i>
Kedar Mate	<i>McGill University</i>
Chantel Mayo	<i>University of Victoria</i>
Yodit Tesfagiorgis	<i>Western University</i>
Angela Wang	<i>University of Toronto</i>
Ivy Xiong	<i>McMaster University</i>

2018-2019 Mentors

Dr. Lindsay Berrigan	<i>St. Francis Xavier University</i>
Dr. Setareh Ghahari	<i>Queen's University</i>
Dr. Craig Moore	<i>Memorial University of Newfoundland</i>

2018-2019 endMS Education and Training Committee Membership

Dr. Christina Wolfson (Chair)	<i>Director, endMS National Training Program</i> <i>McGill University</i>
Dr. Marcia Finlayson	<i>Chair of the endMS SPRINT Committee</i> <i>Queen's University</i>
Dr. Sandra Magalhaes	<i>SPRINT Alumni</i> <i>University of New Brunswick</i>
Dr. Ruth Ann Marrie	<i>University of Manitoba</i>
Dr. George S. Robertson	<i>Chair of the endMS Peer Review Committee</i> <i>Dalhousie University</i>
Dr. Jacqueline Quandt	<i>University of British Columbia</i>
Dr. Penelope Smyth	<i>University of Alberta</i>
Anik Schoenfeldt	<i>Manager, endMS National Training Program</i> <i>Research Institute -</i> <i>McGill University Health Centre</i>

2019 endMS Summer School Collaborators

Dr. V. Wee Yong	<i>2019 endMS Summer School Host</i> <i>University of Calgary</i>
Dr. Trisha Lichtenberger	<i>2019 endMS Summer School Coordinator</i> <i>University of Calgary</i>

Message from the Host of the **2019** endMS Summer School



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When: May 26-29, 2019

Where: University of Calgary,
Calgary, Alberta

—
Applications: Call for applications
will be announced in December

3 Ps OF MS: **PAIN**, **PROTECTION**, AND **REPAIR**

The Alberta MS Network is excited to host the 2019 endMS Summer School in Calgary, Alberta and will strive to showcase Alberta's diverse MS research expertise. This educational program will integrate innovative cutting edge basic and clinical research with a focus on fundamental knowledge and laboratory research, as well as translational activities that bring innovations to those living with MS. We hope to guide you from bench to bedside and back through the exploration of topics related to neuropathic **Pain**, neuro**P**rotection and re**P**air. Sessions will emphasize work that is needed to examine these more complicated targets of MS research, and also address disease progression.

Over the course of the summer school, trainees with diverse backgrounds will have ample networking opportunities to build connections between peers and guest speakers. Participants will experience a balanced program with exciting lectures, hands-on workshops, career development sessions and research engagement sessions.



"Being a new incoming SPRINTer I can only say I am excited to get the opportunity to learn about a field in MS that I currently don't have much expertise in. My group members are great and my mentor was very informative so this all in all should be an amazing experience!"

- 2018-2019 ENDMS SPRINT PARTICIPANT

2018 ENDMS SUMMER SCHOOL

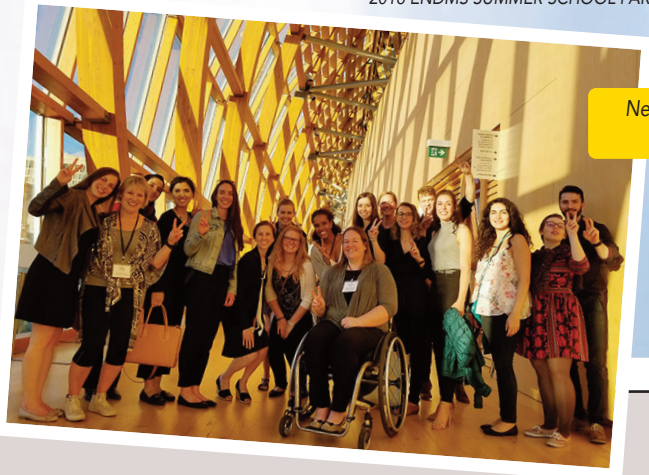
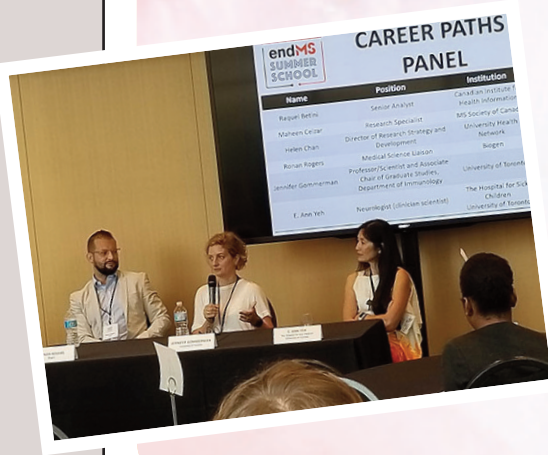


Hands-on workshop



"I like the environment that allowed networking and to meet with MS patients. Being a student in fundamental research, it is sometimes hard to relate back to MS patients, but after this week I have even more energy to pursue my research to help patients."

- 2018 ENDMS SUMMER SCHOOL PARTICIPANT



Networking Event

ALUMNI UPDATES

Dr. Nadine Akbar is continuing her postdoctoral fellowship at Queen's University in the School of Rehabilitation Therapy. Her research focuses on fatigue and cognition in MS. Dr. Akbar recently gave birth to a baby boy (Theo Frederic) in July 2018.

Dr. Vladimir Bamm is teaching at Wilfrid Laurier University and at the University of Guelph and recently joined the G. Magnotta Lyme Disease Research Lab at the University of Guelph. His research focuses on understanding the factors that lead to the persistence of symptoms in treated Lyme disease patients. Also, as co-founder and director of the Vovida Biotechnology and Diagnostic Solutions Inc., Dr. Bamm participates in the development of a diagnostic platform that allows quick, specific and inexpensive detection of different microbial or viral pathogens in human fluids or tissues.

Dr. Jenea Bin is currently a postdoctoral fellow in Professor David Lyons' laboratory at the University of Edinburgh. Her research focuses on understanding the cues that regulate myelination throughout life and following demyelination.

Dr. Karissa Canning-Bott began working last January at LMC Healthcare, Canada's largest multidisciplinary specialist care provider in diabetes & endocrinology, as the patient experience and special projects coordinator.

Dr. Miguel De Avila recently transferred to Apotex Inc as a technical specialist in the Supply Chain Management Department. His role is to support sourcing decisions from North American and European suppliers of active ingredients and excipients for their products.

Elisea De Somma is continuing her doctoral studies in clinical developmental psychology at York University. Her research focuses on cognitive functioning in paediatric onset multiple sclerosis.

Dr. Charity Evans is an associate professor of pharmacy at the University of Saskatchewan. Most recently, she became part of a multi-province team that was awarded CIHR funding to study the long-term safety and effectiveness of the disease-modifying therapies (PI: Helen Tremlett). She was also recently appointed the Director of the provincial medication information service (medSask).

Dr. Afolasade Fakolade successfully defended her PhD in Rehabilitation Sciences at Queen's University on November 7th, 2017. She is currently a postdoctoral fellow working with Dr. Lara Pilutti at the University of Ottawa. Her project involves developing and pilot testing "physical activity together" a dyadic telerehabilitation intervention for people with moderate to severe MS and their family caregivers. She was recently awarded a post-doctoral fellowship award from the MS Society of Canada. Dr. Fakolade is also a volunteer member of the Programs and Services Committee, MS Society Ottawa Chapter.

Max Fiander is entering his 3rd year of medical school at Dalhousie University. He is interested in specializing in neurology and is staying involved in MS research in his spare time by working at the Dalhousie Multiple Sclerosis Research Unit with Dr. Natalie Parks.

Brietta Gerrard completed her M.Sc. in neuroscience at the University of Lethbridge in 2014. Soon after, she began working for the MS Society of Canada, Lethbridge and District Chapter as the Event and Volunteer Engagement Coordinator. Her thesis work was recently published in Neuroscience. In September 2017, Brietta began working as an Awards Advisor in the Scholarships and Student Finance Office at the University of Lethbridge. Brietta is still involved with the MS community, taking part in events such as the MS Walk and Team Lethbridge Waterton Cycle for MS.

Dr. Yohannes Haile continues to work as a scientific evaluator at Health Canada.

Dr. Heather Hanwell is completing a Masters of Public Health in Epidemiology at the Dalla Lana School of Public Health while also working towards a Certificate in Advanced Training in Qualitative Health Research Methodology from the Centre for Critical Qualitative Health Research. Dr. Hanwell is also involved in teaching and research in the Faculty of Dentistry at the University of Toronto.

Rajiv Jain is finishing his PhD in Microbiology and Immunology at the University of Western Ontario and is expecting to graduate in the fall of 2018.

Dr. Kaarina Kowalec is currently in Stockholm, Sweden pursuing postdoctoral training with Professor Patrick Sullivan at the Karolinska Institute and has been awarded a CIHR Banting Fellowship and the European Commission Marie Skłodowska-Curie Actions Fellowship, to investigate the epidemiology and genomics of treatment-resistance in psychiatric disorders. Dr. Kowalec remains active in MS research including two recent first-author publications in Nature Genetics (<https://goo.gl/4JTNPt>) and Neurology (<https://goo.gl/4tPznN>).

Dr. Hyunwoo Lee has begun a postdoctoral fellowship with Prof. Robin Hsiung at the University of British Columbia. His research will focus on neuroimaging of dementia.

Dr. Sandra Magalhaes is completing her postdoctoral fellowship at the University of New Brunswick, where she is studying the environmental epidemiology of MS. Her PhD research led to the creation of the Pediatric MS Tool-Kit, a measurement and harmonization framework to study environmental risk factors in pediatric populations, and her work was recently published open-access in the Multiple Sclerosis Journal (<https://doi.org/10.1177/1352458518783345>).

Dr. J. Keiko McCreary was recently hired by the University of Lethbridge as the Research Ethics and Compliance Officer for the Office of Research and Innovation Services. She continues her involvement in MS as a member of the Board of Directors for the MS Society of Canada, Lethbridge & District Chapter. This summer, she organized and rode in a 90 km cycling fundraising event, where funds raised will support MS research. Additionally, she got married in November!

Dr. Sandra Meyers is now an assistant professor at the University of California, San Diego, where she is a medical physicist at the Moores Cancer Center. While she misses being involved in the MS community, she is happy to be making a clinical impact in the treatment of cancer with radiation. She is also expecting twins in October!

Dr. Craig Moore is an assistant professor at Memorial University of Newfoundland. He also undertook a role as a SPRINT mentor for 2018-2019 and is enjoying working with new SPRINTers on their project.

Sarah Neil is working as a Genetic Counsellor in Medical Genetics at BC Women's Hospital in Vancouver.

Julie Petrin is entering the 4th year of her PhD, at Queen's University under the supervision of Dr. Marcia Finlayson. Her research aims to investigate access to healthcare for managing MS from the perspectives of Canadians with this condition. This fall, Julie will be launching an online survey for people living with MS, asking about their experiences and needs with regards to accessing care for their MS management.

Dr. Jason Plemel finished his postdoctoral fellowship at the University of Calgary with Drs. Wee Yong and Peter Stys and started his own lab at the University of Alberta June 1, 2018. As an assistant professor he hopes to train the next generation of MS researchers to find new ways to improve remyelination and diminish immune mediated injury.

Dr. James Rogers is currently completing the MD portion of his MD/PhD degree at the University of Calgary Cumming School of Medicine. He completed and defended the PhD portion of his training under the supervision of Dr. Wee Yong in July of 2016. Dr. Rogers states that the SPRINT program was a great opportunity for increased exposure to clinical aspects of research which he plans to incorporate into future research endeavours as a clinician-scientist upon completion of his training in Calgary.

Dr. Erin Stephenson successfully defended her PhD June 1, 2018 and is currently in medical school at the University of Calgary. She is expected to graduate with her MD/PhD in 2021.

Dr. Jordan Warford completed his PhD in 2017 and is celebrating the completion of his first year of employment with AGADA Biosciences, a contract research organization focused on rare neuromuscular diseases. He is working towards building a neuroscience program for the company and remains actively involved in MS research both from the bench and community. He was the MS Bike Ambassador for the Atlantic provinces this year and has been actively involved in numerous MS outreach activities. Dr. Warford plans to continue to incorporate MS research into the portfolio of AGADA and staying active in local MS outreach work.



For Summer School and/or SPRINT application and program guidelines, please visit our website at www.msociety.ca/trainingprogram.

If you are interested in becoming a SPRINT mentor or would like more information on the program, please contact:

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anik.schoenfeldt@mail.mcgill.ca

or

Dr. Christina Wolfson, Program Director
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christina.wolfson@mcgill.ca

The endMS Research and Training Network is a nationwide initiative formed to accelerate discovery in the field of multiple sclerosis in Canada. Through innovative training and funding programs, the endMS Network aims to attract, train and retain MS researchers and increase opportunities to conduct MS research in Canada.

The endMS National Training Program is an initiative of the endMS Network. It is led by Dr. Christina Wolfson and funded by the MS Society of Canada through the MS Scientific Research Foundation.

