

2018 endMS Summer School Agenda

Environmental & Lifestyle Factors Associated with MS: Bench to Bedside

Location Guide

All plenary sessions, breakfasts and lunches will be held at: The Hospital for Sick Children's Peter Gilgan Centre for Research and Learning (PGCRL) 686 Bay Street, Toronto
Accommodations: Chelsea Hotel , 33 Gerrard Street W, Toronto
Wednesday Dinner: Art Gallery of Ontario (AGO) 317 Dundas Street W, Toronto
University Health Network (UHN), Canadian Blood Services Building 67 College Street, Toronto
University of Toronto (UofT), Medical Sciences Building 1 King's College Circle, Toronto

Monday, June 11th 2018

Meetings for SPRINTers	
1:30 – 5:30 pm	Time for returning/graduating SPRINTers to meet with their team <i>Location: PGCRL</i>
	Dr. Lisa Osborne's Team - Event room 3A
	Prof. Lara Pilutti's Team - Event room 3B
	Dr. Rashmi Kothary's Team - Multimedia room
2:00 – 3:00 pm	Committee meeting with incoming SPRINT mentors <i>Location: PGCRL - Event room 1</i> <i>Lead: Dr. Marcia Finlayson</i> <i>Drs. Lindsay Berrigan, Setareh Ghahari, Craig Moore</i>
3:00 – 3:30 pm	All SPRINT mentors meeting <i>Location: PGCRL - Event room 1</i> <i>Lead: Dr. Marcia Finlayson</i> <i>Drs. Lindsay Berrigan, Setareh Ghahari, Craig Moore, Lisa Osborne, Lara Pilutti, Rashmi Kothary</i>
3:00 – 4:00 pm	Working Break
3:15 – 4:00 pm	Orientation session for incoming SPRINTers <i>Location: PGCRL – Event room 2A</i> <i>Lead: Dr. Christina Wolfson</i> <i>Rhiannon Campden, Thomas Edwards, Negar Farzham-kia, Hanwen Liu, Kedar Mate, Chantel Mayo, Yodit Tesfagiorgis, Angela Wang, Ivy Xiong</i>
4:00 – 5:30 pm	Incoming SPRINTers meet with SPRINT mentors and team <i>Location: PGCRL</i> Dr. Lindsay Berrigan's Team - Event room 1 Dr. Setareh Ghahari's Team - Event room 2A Dr. Craig Moore's Team - Event room 2B

2018 endMS Summer School Begins	
5:45 pm	<i>A volunteer will depart from the Chelsea Hotel lobby at 5:45 pm to guide anyone who wishes to walk over together to the Welcome Dinner.</i>
6:00 – 7:15 pm	endMS Summer School Welcome BEGINS <i>Location: PGCRL Gallery</i> Registration and Welcome Dinner - <i>Lead: Dr. E. Ann Yeh</i>
7:15 – 8:15 pm	Icebreaker Activity <i>Location: PGCRL Auditorium, 2nd floor lobby, event rooms 1 & 2</i>

Tuesday, June 12th 2018	
7:30 – 8:00 am	Breakfast Location: PGCRL Gallery
EVALUATION: Please complete the evaluation forms and hand in at the end of each day's sessions. Thanks!	
8 am–2:45 pm	Plenary Sessions Location: PGCRL Auditorium
8:00 – 8:15 am	Intro to the day - Lead: Dr. E. Ann Yeh
8:15 – 9:15 am	<p>Trials in Progressive MS; Drugs and Outcomes Lead: Dr. Xavier Montalban</p> <p>Treating progressive MS is one of the unmet needs in MS. Mechanisms of progression are not well understood and until very recently there was an absence of treatments for patients with MS. Fortunately we have now one drug approved for primary progressive MS and others have been or are being tested in progressive disease. There is as well an unprecedented international effort on studying progressive MS, the so called Progressive MS Alliance. A review and update will be provided.</p>
9:15 – 10 am	<p>Modeling MS Risk Factors in Mouse Models of this Disease Lead: Dr. Shannon Dunn</p> <p>I plan to discuss some known risk factors for MS (diet, early onset of puberty, female sex) and how we can better understand the underlying biology of how these factors may lead to initiation of autoimmunity through studies in the animal model of MS, experimental autoimmune encephalomyelitis (EAE).</p>
10-10:15 am	Break Location: PGCRL Gallery
10:15 - 11:15 am	<p>Strategic Networking: How to establish and maintain professional contacts throughout one's career Lead: Dr. Helen Miliotis</p> <p>This interactive career development workshop will examine the establishment and maintenance of professional contacts throughout one's career. Meeting different people through networking can seem initially intimidating to young trainees but this workshop will introduce different ways to effectively make meaningful contacts to help achieve one's goals. This session will encourage interactive participation by facilitating reflection in the format of "think-pair-share" activities at different intervals. Best practices will be described to take advantage of networking opportunities such as conferences, receptions, professional associations, informational interviews or online contacts such as LinkedIn. Trainees will be introduced to methods of outlining the information they wish to fulfill in seeking new contacts and reflect upon their impact. In cases where the trainee finds meaningful guidance through a contact, strategies will be discussed on how to transition to a mutually agreed upon mentee-mentor relationship. Finally, the importance of maintaining different professional contacts throughout career transitions will be highlighted. Empowering trainees with the tools to build their professional networks is an important component of their professional development as they move through their career transitions.</p>
11:15 am -12:15 pm	<p>SPRINT Team Presentations – Moderated by Dr. Christina Wolfson *****</p> <p>SPRINT Team Presenters: Dylan Galloway, Elizabeth Gowing SPRINT Mentor: Dr. Rashmi Kothary</p> <p>Inhibitory milieu at the Multiple Sclerosis lesion site</p> <p>Regeneration of myelin, following injury, can occur within the CNS in order to reinstate proper axonal conductance and provide trophic support. Failure to do so renders the axons vulnerable, leading to eventual degeneration and neuronal loss. Thus, it is essential to understand the mechanisms by which remyelination or failure to remyelinate occur, particularly in the context of demyelinating and neurodegenerative disorders.</p> <p>In Multiple Sclerosis, oligodendrocyte progenitor cells (OPCs) migrate to lesion sites to repair</p>

	<p>myelin. However, during disease progression, the ability of OPCs to participate in remyelination diminishes coincident with worsening of the symptoms. The reduction in regenerative capacity is caused by the presence of lesion-associated inhibitory factors, which perturb OPC maturation into myelinating oligodendrocytes (OLs). The identity of several of these inhibitors is known. For example, it is known that myelin debris at the site of damage is inhibitory to the remyelination program. Other factors have been similarly identified.</p> <p>The SPRINT mentees reviewed the literature on lesion-associated inhibitory factors and the challenges to remyelination. This project involved analysis of results from across several disciplines – fundamental pre-clinical studies to knowledge gained from the clinic.</p> <p><i>SPRINT Team Presenters: Ben Ewanchuk, Marjan Gharagozloo, Evelyn Peelen</i> <i>SPRINT Mentor: Prof. Lara Pilutti</i></p> <p>Exploring the role of physical activity and exercise for managing vascular comorbidities in people with multiple sclerosis</p> <p>Vascular comorbidities are prevalent among people with MS and have adverse disease-related consequences. In the general population, physical activity (PA) and exercise training have proven beneficial at all levels of cardiovascular disease risk management. People with MS exhibit particularly low rates of PA; therefore, PA represents a modifiable health behaviour for potentially managing vascular comorbidity risk in MS, and in turn, reducing disease burden. To explore the potential benefit of PA and exercise in the management of vascular comorbid risk factors in people with MS, we performed a scoping review of articles involving relevant vascular comorbidities (obesity, hyperlipidemia, heart disease, hypertension, and diabetes) in people with MS in conjunction with measures of PA, physical fitness, exercise training, or sedentary behaviour.</p> <p><i>SPRINT Team Presenters: Marc Charabati, Sarah Donkers, Megan Kirkland</i> <i>SPRINT Mentor: Dr. Lisa Osborne</i></p> <p>Digging up new approaches in the management of MS</p> <p>MS is currently regarded as an incurable autoimmune-mediated disease. Due to the chronic nature of MS, alternative approaches in therapeutic management are on the rise. Continued advances in our understanding of how the immune system is involved in MS pathophysiology have led to an increased interest in interventions that can modulate immune responses. Helminth Therapy (i.e. inoculation with hookworm or other helminthic parasites) is one such approach – one many view as very alternative, but with promising underlying scientific evidence for immunological involvement. Our project explored Helminth Therapy from the perspective of people living with MS, from the existing literature on basic science rationale and from the current clinical trial landscape.</p>
12:15-1:15 pm	Lunch Location: PGCRG Gallery
1:15–2:00 pm	<p>The gut-brain axis and the role of microbiome in multiple sclerosis <i>Lead: Dr. Lisa Osborne</i></p> <p>Understand the current literature associating intestinal microbial dysbiosis with MS.</p> <p>Background Readings: Interactions between genetic, lifestyle and environmental risk factors for multiple sclerosis https://www.nature.com/articles/nrneurol.2016.187 Interactions between the microbiota, immune and nervous systems in health and disease https://www.nature.com/articles/nn.4476</p>
2:00–2:45 pm	<p>Diet and vitamin D in MS <i>Lead: Dr. Dalia Rotstein</i></p> <ol style="list-style-type: none"> 1. Discuss the evidence for diet as risk factor for developing MS. 2. Discuss the role of diet in potentially modifying MS symptoms and disease activity. 3. Review the evidence for vitamin D deficiency as a risk factor for developing MS and its association with disease course.

	4. Outline directions for future research into the role of diet and vitamin D in MS.
2:45–3:00 pm	Break Location: PGCRL Gallery
3:00–5:20 pm	Workshop Group A & B Location: PGCRL - Event room 2 Clinical Research Workshop Lead: Dr. Anthony Feinstein, Dr. Sarah Morrow, Dr. E. Ann Yeh In this workshop, trainees will run a mock clinical research study. They will have the opportunity to act as either the study coordinator or the participant. The trainees will create a protocol, test the participants according to protocol, and present their results. The objective of this workshop is to use this mock study to explore possible issues that may arise in clinical research.
3:00–3:30 pm	Group C & D travel to workshop
3:30–4:30 pm	Workshop Group C Location: UofT, Medical Sciences Building, Room 7310 Preparing spinal cord and brain tissues for analysis Lead: Dr. Jennifer Gommerman We will learn how to extract and prepare central nervous system (CNS) tissues so that they may be optimally analyzed by immunofluorescence, immunohistochemistry and Flow cytometry (including intracellular cytokine detection).
	Workshop Group D Location: UHN, Canadian Blood Services Building, Room 4-433 Clinical Scoring of EAE and Measuring Myelin-Specific T cell Responses in Mice Lead: Dr. Shannon Dunn We will look at examples of experimental autoimmune encephalomyelitis (EAE) mice and the clinical scoring system used for EAE. We will also look at how to process a spleen to examine the activity of the myelin-reactive T cells during EAE.
4.30–5:20 pm	Group C & D return to PGCRL Pediatric Neuroinflammatory Disorders Lab Tour Lead: Ms. Carmen Yea In this session, we will learn about the daily operations of maintaining a biorepository. This talk will be followed by a brief tour of the Pediatric Neuroinflammatory Disorders lab.
	Free evening

Wednesday, June 13th 2018	
7:30–8:00 am	Breakfast Location: PGCRL Gallery
8 am–2:45 pm	Plenary Sessions Location: PGCRL Auditorium
8:00– 8:15 am	Intro to the day Lead: Dr. E. Ann Yeh
8:15–9:00 am	Pediatric Physical Activity and MS outcomes Lead: Dr. E. Ann Yeh Youth with MS have high levels of disease activity and early disability. In addition, they experience high levels of fatigue and depression. Interventions to reduce disease activity and reduce levels of fatigue and depression are necessary. Studies show that physical activity may have effects on disease activity, depression and fatigue, but that youth with MS have low levels of physical activity. In this talk, I will review outcomes in pediatric MS, with a specific focus on the relationship between lifestyle factors, including physical activity, and outcomes.
9:00–9:45 am	The Neuropsychiatry of MS Lead: Dr. Anthony Feinstein <u>Major Depression</u> - may affect up to 50% of MS patients over the course of their lifetime. It is associated with a poorer quality of life, heightened suicidal intent and additional cognitive

	<p>problems. Major Depression may respond well to cognitive behavior therapy. Pharmacotherapy offers modest benefits offset by concerns over side effects from the medication. Mindfulness-based therapy may also prove effective.</p> <p><u>Pseudobulbar Affect</u> - may affect up to 10% of patients with MS. It is more common in individuals with significant physical disability and longstanding MS. It is characterized by laughter in the absence of subjective happiness or tears in the absence of subjective sadness. The syndrome responds well to a combination of Dextromethorphan and Quinidine.</p> <p><u>Euphoria</u> - should be viewed as a fixed personality change that may occur in a median or 40% of MS patients. It is invariably linked to advanced MS, significant cognitive compromise, a heavy lesion load on brain MRI and atrophy. The syndrome reflects an unrealistic optimism on the part of the patient that they may recover from their multiple sclerosis notwithstanding the severe nature of their disease. Here the greatest burden of care is often carried by family members and caregivers.</p> <p><u>Psychosis</u> - Finally, uncertainty surrounds the question of whether psychosis is increased in individuals with multiple sclerosis. As with Bipolar Affective Disorder, there are no known treatment trials in MS. Antipsychotic medication is the mainstay of treatment. Side effects are often troublesome for patients with multiple sclerosis. It is important for clinicians to detect and treat the behavioral manifestations of multiple sclerosis. Treatment response in the case of pseudobulbar affect is often excellent while good results can be obtained with depression.</p>
9:45–10:15 am	Group Pictures
10:15 -10:30 am	Break Location: PGCRL Gallery
10:30 - 11:15 am	<p>Exercise effects on the brain as measured in mouse models by MRI Lead: Dr. John Sled</p> <p>The brain is a dynamic organ. This is readily apparent in the ways we learn and adapt to our environment. That this dynamism extends to the physical structure of the brain is less appreciated: our life experiences reshape the microscopic structure of the brain, starting in the womb and continuing through adulthood. Mouse models in combination with advanced imaging methods provide a means to explore these relationships by revealing changes in brain structure that occur with specific environmental influences. For this presentation, we will examine the effects that voluntary exercise has on neuroanatomy and cerebral perfusion as assessed in the mouse by MRI. Methods for the detecting subtle morphological changes using MRI will be reviewed and the results of two recent studies of exercise effects in wildtype mice will be presented.</p>
11:15 - 11:45 am	<p>Interview Prep I: General Skills Lead: Mr. Gerry Duraisamy</p> <p>Do's & Don'ts Mock Interviews What to wear? How to prepare? Stages of the Interview - Before, During and After</p>
11:45 am -12:45 pm	Lunch Location: PGCRL Gallery
12:45-1:45 pm	<p>Career Paths Panel Dr. Raquel Betini, Dr. Maheen Ceizar, Dr. Helen Chan, Dr. Jennifer Gommerman, Dr. Ronan Rogers, Dr. E. Ann Yeh</p> <p>The objective of this panel discussion is to allow trainees to explore different career options once they have completed their training. The panel members will be scientists who are working in government, academics, industry, and the not for profit sector. This session will end with an open panel Q&A period.</p>

1:45 – 2:45 pm	<p>Interview Prep II: Specific Skills Dr. Raquel Betini, Dr. Maheen Ceizar, Dr. Helen Chan, Dr. Jennifer Gommerman, Dr. Ronan Rogers, Dr. E. Ann Yeh</p> <p>In an earlier session, we discussed general interview skills that can be applicable to any job interview. However, students often find preparation for specific interviews challenging. In this session, trainees will have the opportunity to learn from people in different career paths about what they look for in candidates applying to their specific area of work.</p>
2:45 – 3:00 pm	Break Location: PGCRL Gallery
3:00 – 5:20 pm	<p>Workshop Group C & D Location: PGCRL Event room 2</p> <p>Clinical Research Workshop Lead: Dr. Anthony Feinstein, Dr. Sarah Morrow, Dr. E. Ann Yeh</p> <p>In this workshop, trainees will run a mock clinical research study. They will have the opportunity to act as either the study coordinator or the participant. The trainees will create a protocol, test the participants according to protocol, and present their results. The objective of this workshop is to use this mock study to explore possible issues that may arise in clinical research.</p>
3:00 – 3:30 pm	Group A & B Travel to workshop
3:30 – 4:30 pm	<p>Workshop Group A Location: UofT, Medical Sciences Building, Room 7310</p> <p>Preparing spinal cord and brain tissues for analysis Lead: Dr. Jennifer Gommerman</p> <p>We will learn how to extract and prepare central nervous system (CNS) tissues so that they may be optimally analyzed by immunofluorescence, immunohistochemistry and Flow cytometry (including intracellular cytokine detection)</p>
	<p>Workshop Group B Location: UHN, Canadian Blood Services Building, Room 4-433</p> <p>Clinical Scoring of EAE and Measuring Myelin-Specific T cell Responses in Mice Lead: Dr. Shannon Dunn</p> <p>We will look at examples of experimental autoimmune encephalomyelitis (EAE) mice and the clinical scoring system used for EAE. We will also look at how to process a spleen to examine the activity of the myelin-reactive T cells during EAE.</p>
4:30 – 5:20 pm	<p>Group A & B return to PGCRL Pediatric Neuroinflammatory Disorders Lab Tour Lead: Ms. Carmen Yea</p> <p>In this session, we will learn about the daily operations of maintaining a biorepository. This talk will be followed by a brief tour of the Pediatric Neuroinflammatory Disorders lab.</p>
5:20 – 6:00 pm	Free time
5:45 pm	<i>A volunteer will depart from the PGCRL 1st floor lobby at 5:45 pm to guide anyone who wishes to walk over together to the AGO.</i>
6:00 – 8:00 pm	Dinner at the Art Gallery of Ontario (AGO) **Cash bar**
8:00 – 9:00 pm	Tour of the AGO

Thursday, June 14th 2018

7:30–8:00 am	Breakfast Location: PGCRL Gallery
8 am–3:15 pm	Plenary Sessions Location: PGCRL Auditorium
8:00–8:15 am	Intro to the day Lead: Dr. E. Ann Yeh
8:15–9:00 am	<p>Physical Activity Interventions for Multiple Sclerosis Lead: Prof. Lara Pilutti</p> <p>There has been a recent evolution in the discovery and promotion of lifestyle-based approaches, such as physical activity and exercise, for managing and treating MS. There is now considerable</p>

	evidence for the safety and benefits of physical activity and exercise for people with MS; however, people with MS report low levels of physical activity participation. Substantial challenges remain regarding the optimal prescription and delivery of physical activity and exercise training interventions for people with MS. This presentation will explore the current evidence for the benefits of physical activity and exercise for people with MS, highlight the key limitations and challenges facing this research area, and explore alternative solutions for physical activity and exercise training interventions.
9:00–9:45 am	The Effects of Smoking on Immunity and Inflammation <i>Lead: Dr. Martin Stämpfli</i> Cigarette smoke is a damaging and proinflammatory agent. In this presentation, we will discuss the effect of cigarette smoke on the immune system and the consequences of compromised immunity to smoking-related diseases. Background Reading: Stämpfli MR, Anderson GP. How cigarette smoke skews immune responses to promote infection, lung disease and cancer. <i>Nat Rev Immunol</i> 2009;9(5):377-384.
9:45 – 10:30 am	Drug Discovery and Development <i>Lead: Dr. Lakshmi Kotra</i> This talk will focus on establishing the context of MS disease, drug target, preclinical drug development, challenges, opportunities, and the holy grail of curing MS. These ideas will be discussed using a novel target with excellent promise in preclinical models.
10:30 -10:45 am	Break <i>Location: PGCRL Gallery</i>
10:45 am -12:15 pm	MS Patient Perspective <i>Lead: Dr. Maheen Ceizar</i> This session will begin with a brief talk by Dr. Shannon Dunn and Mr. Jonathan Allenger. The purpose of this session is to provide trainees the unique perspective of those living with MS.
12:15 –1:30 pm	Lunch <i>Location: PGCRL Auditorium</i>
1:30–2:15 pm	Making new oligodendrocytes: from development to therapy <i>Lead: Dr. Freda Miller</i> This lecture will focus on how the environment regulates the genesis of oligodendrocytes from neural stem cells and oligodendrocyte precursor cells (OPCs) during CNS development, and how that information is being used to develop novel therapeutic strategies for damaged myelin in the injured and degenerating brain.
2:15–3:00 pm	Progressive Multiple Sclerosis--The Importance of Lifestyle Factors in Symptom Management and Optimization of Functional Independence <i>Lead: Dr. Tania Bruno</i> This talk will review impairments, activity limitations and restrictions in social participation common to many persons living with progressive MS of either the primary or secondary type and the impact of various lifestyle factors on wellness in this setting. Topics to be discussed will include various types of exercise, nutrition, energy conservation and pacing, as well as mindfulness-based stress-reduction strategies amongst others. By the end of the session, participants should have a better appreciation for non-pharmacologic strategies to effect positive change in a subset of patients for whom disease modifying medications are often not yet available.
3:00–3:15 pm	Summer School Wrap-Up <i>Lead: Dr. E. Ann Yeh and Dr. Christina Wolfson</i>



THANK YOU!

The success of the 2018 endMS Summer School is the result of the hard work of many committed individuals. A grateful acknowledgement goes out to all of the speakers, facilitators, mentors and trainee volunteers, as well as to the individuals living with MS who so generously agreed to share their time and experiences with us.

We also sincerely thank the following individuals. Without you all, this program would not have been possible.

2018 endMS Summer School Planning Committee:

Dr. E. Ann Yeh (Host), University of Toronto
Dr. Shannon Dunn, Toronto General Research Institute
Dr. Anthony Feinstein, University of Toronto
Dr. Xavier Montalban, St. Michael's Hospital
Dr. Samantha Stephens, The Hospital for Sick Children
Ms. Stephanie Grover, Summer School Co-Coordinator
Ms. Renisha Iruthayanathan, Summer School Co-Coordinator

2018 endMS Education and Training Committee:

Dr. Christina Wolfson (Chair and endMS Program Director), McGill University
Dr. Marcia Finlayson, Queen's University
Dr. Sandra Magalhaes, University of New Brunswick
Dr. Ruth Ann Marrie, University of Manitoba
Dr. Jacqueline Quandt, University of British Columbia
Dr. George Robertson, Dalhousie University
Dr. Penny Smyth, University of Alberta
Dr. E. Ann Yeh (Host), University of Toronto
Ms. Anik Schoenfeldt, endMS National Training Program

2018 Summer School Review Committee:

Dr. E. Ann Yeh (Chair), University of Toronto
Dr. Charity Evans, University of Saskatchewan
Dr. James Marriott, University of Manitoba
Dr. Craig Moore, Memorial University
Dr. Manu Rangachari, Université Laval
Dr. Dessa Sadovnick, University of British Columbia
Dr. Penny Smyth, University of Alberta
Dr. Wee Yong, University of Calgary
Ms. Anik Schoenfeldt, endMS National Training Program

2018 endMS Peer Review Committee:

Dr. George Robertson (Chair), Dalhousie University
Dr. Susan Forwell, University of British Columbia
Dr. Michelle Ploughman, Memorial University
Dr. Christina Wolfson, McGill University
Ms. Anik Schoenfeldt, endMS National Training Program

2018 endMS SPRINT Committee:

Dr. Marcia Finlayson (Chair), Queen's University
Dr. Sarah Morrow, University of Western Ontario
Dr. Jason Plemel, University of Calgary
Dr. Christina Wolfson, McGill University
Ms. Julie Petrin, Queen's University
Ms. Anik Schoenfeldt, endMS National Training Program

2018 endMS Summer School Personnel/Volunteers:

Ms. Tara Berenbaum, The Hospital for Sick Children
Ms. Julia Cerone, endMS Program Assistant
Dr. Giulia Cisbani, MS Society of Canada
Ms. Michelle Eisner, UBC MS Connect Education Program
Ms. Stephanie Grover, 2018 Summer School Co-Coordinator
Ms. Renisha Iruthayanathan, 2018 Summer School Co-Coordinator
Mr. Dennis Lee, University of Toronto
Dr. Trisha Lichtenberger, 2019 Summer School Coordinator
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Ms. Carmen Yea, The Hospital for Sick Children
Ms. Karen Zabowski, Research Institute of the McGill University Health Centre

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