



SPRINT Interdisciplinary Learning Projects and Team Mentored Learning

A goal of the interdisciplinary learning projects is to provide trainees with the unique opportunity to expand their areas of research interest in a structured way under the supervision of a mentor and in collaboration with one or more co-trainees from different disciplines. Knowledge dissemination from the projects include the development and distribution of an information brochure for people living with MS and researchers; an article for publication, preparation of an educational newsletter or presentation for people living with MS, etc.

Based on the information provided in the application, teams of three trainees from different disciplines will be partnered with a SPRINT mentor (established MS researcher) by the National Training Program and SPRINT Committee. The SPRINT mentors will develop and guide the interdisciplinary project. The SPRINT trainee teams will work on the project with their SPRINT mentor during the period between the two endMS Summer Schools. The project should require approximately 8 hours of work per month and will be developed, supervised, and assessed by the SPRINT mentor.

The following are the interdisciplinary learning projects completed by past SPRINTers since 2011.

1. **Demystifying the mechanism of action of a new immunomodulatory therapy.** Understanding the biological basis of fingolimod. A literature review with the goal of preparing an educational presentation for people with MS.
2. **What worsens or improves MS? From blogs to biology.** Examination of what people with MS think causes or worsens their disease and identification of the possible rationale for these beliefs. The outcomes lead to potentially novel and testable questions for future investigations.
3. **Depression and Multiple Sclerosis, A Review.** A comprehensive literature review of depression associated with MS. The review included epidemiology, phenomenology, genetics, immunology, disease modifying drugs, brain imaging, all forms of treatment, differential diagnosis, and relationship to pseudobulbar affect. The major outcome of the project was a publication in Nature Reviews Neurology. (Nat Rev Neurol. 2014;10(9):507)
4. **Pain in MS-A project in translating knowledge from researchers to patients.** A literature review as well as interviews with patients regarding pain in MS with the goal of developing an information packet for a lay audience. The major outcome was a handout on pain, designed for people with MS.
5. **Development of an Interactive Fatigue Education Resource for Persons with MS.** As part of the project, initial feedback was obtained from health care professionals and people with MS. The major outcomes of the project were a. poster presentations at 2013 Consortium of MS Centres conference, the 2014 American Congress of Rehabilitation Medicine 91st Annual Conference, and the 2016 ACTRIMS Forum; b. two publications in Qualitative Health Research (Qual. Health Res. 2018; 28(5):778-788. <https://doi.org/10.1177%2F1049732317753584>) and International Journal of Rehabilitation Research (Int J Rehabil Res. 2018; 41(2): 114-121); c. a successful pilot grant submission through the Foundation of the Consortium of MS Centres.
6. **Biology of sex-based differences in multiple sclerosis incidence and progression.** Reviewing the literature on pregnancy, menstrual cycling, breast-feeding benefits, oral contraceptive use in MS and in rheumatoid arthritis. Major outcome was a publication (Curr Top Behav Neurosci 2015, 26:57)
7. **EAE for Dummies: Bridging the gap between animal and human researchers.** Reviewing the immune-based animal models of multiple sclerosis and then specifically look at some of the new models that are available now. The goal of the project is to write a paper to help bridge the gap in



communication between human and animal MS focused researchers.

8. **Lost in translation: The journey from a transcranial magnetic stimulation laboratory to patient friendly newsletter.** Developing a participant newsletter summarizing neuroimaging and transcranial magnetic stimulation methods being used in an ongoing study on MS.
9. **The Effects of Anti-Oxidant Supplements on Progression of MS: A Systematic Review of Human and Animal Studies for Clinicians and Patients.** A systematic review of the effects of an anti-oxidant diet on MS progression considering both animal and human research. The goal of the project is to develop a pamphlet. The outcomes included an article written by Memorial University on the SPRINT team project meeting held at the University as well as a poster presentation at ACTRIMS-CMSC Meeting in Dallas, Texas, which won the patient information category. Major outcome was a publication in Multiple Sclerosis Journal: <http://msj.sagepub.com/content/21/12/1485.abstract> (Mult Scler J. 2015; 21(12): 1485-1495)
10. **Cholesterol and markers of cholesterol turnover in multiple sclerosis: relationship with disease outcomes.** The goal is to conduct a review of cholesterol, cholesterol intermediates and related metabolic enzymes as potential biomarkers of MS disease progression. Major outcome was a review article published in Multiple Sclerosis and Related Disorders Journal. (Mult Scler Relat Disord. 2016; 5: 53-65. Doi: <https://doi.org/10.1016/j.msard.2015.10.005>)
11. **Upper limb intention tremor in multiple sclerosis: A review of the literature.** To understand the mechanism of intention tremor in MS, a systematic review was conducted. This included the pathophysiology, anatomy, and resulting mechanism underlying this problem. Major outcome has been a review article published in the International Journal of MS Care (Int. J. MS Care. 2018; 20(5): 211-223. doi: 10.7224/1537-2073.2017-024)
12. **The use of corticosteroids in multiple sclerosis.** The goal is to write a review paper on the use of corticosteroids, summarizing the evidence for its clinical use, effects on MRI as well as including basic science evidence regarding mechanism of action in the MS brain.
13. **MS Moves: Bringing Exercise Research Findings into the MS Clinic Developing a practical tool to facilitate knowledge translation processes among health professionals.** Project is focused on a) identifying critical content for inclusion in the health professionals' section of the MS Moves website (MS Moves is a virtual physical activity resource centre for the MS community) and b) developing a database of evidence summaries that present cutting edge physical activity research in a quick to read and easy to understand format.
14. **A scoping review on coping and MS** and identifying gaps in the literature.
15. **A literature review on the relationship between physical activity and fatigue in MS.** The team will look at exercise rehabilitation and explore the differences between MS related fatigue vs. being active. Major outcome has been a review article published in Critical Reviews™ in Physical and Rehabilitation Medicine Journal. (Crit Rev Phys Rehabil Med. 2015; 27(2-4): 259-274. DOI: 10.1615/CritRevPhysRehabilMed.2016017097)
16. **A review paper on the role of neutrophils.** Accumulating evidence suggests that neutrophils contribute to EAE and perhaps some forms or stages of MS. Major outcome has been a review article published in Autoimmunity Reviews. (Autoimmun. Rev. 2017. 16 (3): 294-307.)
17. **A scoping review on MS and the physical, cognitive and emotional concerns of persons living with high level disability.**
18. **A literature review focused on better understanding how the circadian rhythm can affect patient outcomes in MS,** with a focus on pain including studying the effect of circadian rhythms in animal models of MS. Major outcome has been a review article published in the Neuroscience and Behavioural Reviews Journal. (Neurosci Biobehav Rev. 2018; 88: 73-83. doi:



10.1016/j.neubiorev.2018.03.011)

19. **A scoping review of modifiable risk factors in pediatric MS.** Major outcome was a publication in Children (Children. 2018; 5 (11) 146. doi:10.3390/children5110146)
20. **A literature review on lesion-associated inhibitory factors and the challenges to remyelination.**
21. **A literature review of our current understanding of how pre-existing helminth infection or helminth immunotherapy influences disease development or progression.**
22. **An examination of the potential role of physical activity and exercise for managing comorbid health conditions in people with MS.** Major outcome was a publication in Multiple Sclerosis and Related Disorders. (Mult Scler Relat Disord. 2018; 26: 19-32. DOI: 10.1016/j.msard.2018.08.022)
23. **A review of research examining the impact of MS-related cognitive dysfunction on occupational, social, and daily functioning, and quality of life.**
24. **The development of an interactive resource for people with MS to help them improve their communication skills to optimize their interactions with their healthcare providers.**
25. **Exploring different factors that are often considered in choosing the best available drug treatments for MS patients.**

The 2019-2020 SPRINT teams are working on the following projects:

1. A systematic review of the current status of pharmacological and cellular treatments for neuroprotection and myelin repair in MS: animal and patient studies
2. A review of the evidence that mitochondrial dysfunction drives MS disease progression and propose new approaches for the treatment of progressive MS based on the targeting of various aspects of mitochondrial function with natural metabolic activators.
3. A literature review on geographical variations in adherence to disease modifying therapies for MS