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| **Applications will be accepted from:** [x]  Both MD & non-MD Undergraduates [ ]  MD undergraduate students only [ ]  non-MD undergraduate students only |
| **Project Duration:** [ ]  Suitable for either a 4 or 8 week project (Only Yr 3 MD students are eligible to apply for 4-week projects) [x]  Only suitable for an 8-week project [ ]  Only suitable for a 4-week project  |
| **Additional information for potential student partners:** E.g. desired skills/interests/experience, scheduling restrictions for the project timeline, additional info you want applicants to provide when contacting you about this position, etc.      |

## PROJECT INFORMATION

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| **Project Title:**        Effect of the cryoneurolysis on pain and positioning in patients with wrist and hand contracture. |
| **Hypothesis or Research Question being addressed (400 character limit, ~55 words):**     Contractures refer to a limitation of the maximum passive range of motion (ROM) of a joint due to shortening and changes of periarticular soft tissue structures; including tendons, muscles and ligaments. It may affect up to 61% of nursing home residents with 8.8% having a claw hand. Could percutaneous ultrasound-guided cryoneurolysis effectively reduce pain? |
| **Keywords:** **Provide approximately 5 key words that describe the proposed research project.**     Stroke, osteoarthritis. cryoneurolysis, hemiplegia, ultrasound guided |

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| **Project Attributes and Benefit to the Student**Please review the [online adjudication criteria](http://www.med.ubc.ca/current-learners/summer-student-research-program/adjudication/) carefully prior to completing the next two sections to ensure your application is addressing the adjudication criteria outlined in “Project Attributes and Benefits to the Student”. |
| **A) Background and Summary of Proposed Research. Summarize the proposed project including the rationale for the project, the context within the relevant field of research, the proposed research approach and the expected project outcomes.** *If this is an ongoing project of >8 weeks duration (or 4 weeks for MD 2022 students) clearly distinguish the expected project outcomes at the end of the FoM SSRP funding period from the overall project objectives.* **Please write in lay terms for a non-specialist audience.** **Character Limit: 3050 characters (~430 words)**     Contracture is defined as a limitation of the maximum passive range of motion (ROM) of a joint due to shortening and changes of periarticular soft tissue structures; including tendons, muscles and ligaments. Once a contracture is present they contribute to increased disability, decreased ROM, decreased functional activities of daily living and increased pain. The incidence of contracture after spinal cord injury has been reported to be as high as 66%, including 41% in wrist and hand. It may be present in up to 28% of patients within 3 months after stroke with wrist as the most affected joint. At 6 months, the incidence increases to 50%. Contracture is seen in many neurogenerative and musculoskeletal conditions and is most commonly found in the nursing home population, with a prevalence of 61.2% in older adults in nursing homes in the United States. In Germany, contractures were also seen in 55% of nursing home residents with significant medical and functional consequences. In France, 8.8% of older adults in nursing homes had a claw hand from contracture of wrist or finger flexors (claw hand).      While contracture can be the primary cause of severe pain, the presence of pain and loss of movement significantly contribute to the development of the contracture. Thus, pain management is a crucial part of contracture treatment. There are many guidelines for the the treatment of contracture and associated pain such as botulinum toxin injection, physiotherapy, stretching, positioning and surgery. While surgery has been recommended as the most effective treatment, it requires general anesthesia and in an in-patient setting, which imposes many risks to patients, especially in the frail older population most likely to require contracture management.       Our group are pioneers in the use of cryoneurolysis to manage spasticity and pain due to severe spasticity and contracture. The process first involves isolating the targeted nerves that supply muscles and sensation with ultrasound guidance (US) and e-stimulation (e-stim) This mini-invasive percutaneous procedure is performed using a small cryoprobe. Cryoneurolysis has been used for over fifty years for pain relief from months to years when used for sensory nerves. Cryoneurolysis occurs due to the process of throttling a gas through an orifice from high to low pressure resulting in a rapid expansion of the gas and a drop in temperature. The rapid cooling generates an ice ball or oval between 3.5 and 18 mm that is formed at the tip of the with compressed N2O at temperatures typically at -88° C. The ice causes nerve destruction but the surrounding tissues and blood vessels are spared and the nerve can eventually regenerate      In Canada, one vial of BoNT costs approximately $400. The typical patient can be injected with 400 units four times a year, thus $6400. A one-time treatment with cryoneurolysis would cost approximately $725 and last for up to years.      We prosed cryoneurolysis as a treatment for the pain and loss of function in contracture. |
| **B) Outline the student’s role in the project and describe how they will benefit from their involvement.** This section must address how involvement in this project will help the student gain an understanding of how high quality research is conducted. This includes addressing the opportunities to learn new skills in the context of the relevant learning objectives listed in the [adjudication criteria](http://www.med.ubc.ca/current-learners/summer-student-research-program/adjudication/); their anticipated interactions with other researchers and the available resources that will contribute to a beneficial experience.*Clearly indicate which items will be completed during the FoM SSRP funding period and which (if applicable) will be completed before or after the funding period if the student and supervisor have chosen to also work together outside of the funding period. Project feasibility is considered during the adjudication process; 4-week and 8-week projects will be adjudicated separately, with appropriate consideration given to each.***Character Limit: 3800 characters (~540 words)**        Our research group at Victoria General Hospital is an award-winning group, locally, nationally and internationally. We provide a unique team on Vancouver Island to have a fully supported clinical experience. Our teams work intimately with patients and their caregivers. The student will participate in the clinical assessment of patients, who may be fully active or non-verbal. The student will participate in the assessment of patients with interviews and assessments and measurements, as well as in the treatment with a novel award winning in clinic technique of cryoneurolysis.       Our team has a high success rate in publications, meaning the student will likely be on at least one publication. We are a fun collegial group with physicians, research assistants, physiotherapists and co-op students.          Medical students will learn about neurological and musculoskeletal examinations and participate in the medical assessment including history and physical examination, documentation and longitudinal follow-up. Medical students will learn the clinical assessment tools, and interventions such as point-of-care ultrasound, and diagnostic nerve blocks and cryoneurolysis.       It would be our hope for the student to present their findings at a national or international conference.  |

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| **Please indicate if your project requires the following and indicate their status as appropriate.** This will help clarify the scope of the project for potential student partners. |
| **This project requires ethics approval (human or animal):**[x]  Yes [ ]  NoIf yes please indicate if you:[ ]  Already have approval [x]  Will obtain approval before the SSRP funding period [ ]  Intend for ethics application to be a focus over the funding period\*Please note that as ethics approval can be a lengthy process it is recommended that this be obtained well in advance of the funding period unless the intention is for this activity to form a major part of the FoM SSRP-funded portion of the project.**This project requires access to electronic medical records:**[x]  Yes [ ]  NoIf yes please indicate if you: [ ]  Already have approval [x]  Will obtain approval before the SSRP funding period [ ]  Plan to obtain approval during the SSRP funding period**This project requires operational/institutional approval:**[x]  Yes [ ]  NoIf yes please indicate if you: [ ]  Already have approval [x]  Will obtain approval before the SSRP funding period [ ]  Plan to obtain approval during the SSRP funding period |

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| **Research Location (As applicable, indicate where the project will be conducted.)** |
| City or Region: VictoriaResearch Centre: Island HealthHospital: Victoria GeneralProgram or Unit: Rehabilitation MedicineAdditional information (building, lab etc.):       |
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| **Supervisor’s Information** |
| **Supervisor Last Name:**      Winston | **Supervisor First Name:** Paul |
| **FoM Department/School (Main FoM Appointment):**      Medicine | **UBC FoM Division (if applicable):**      |
| **Preferred contact method (for students)****[ ]** Phone supervisor**[ ]** Email supervisor | **[ ]** Phone alternate contact**[ ]** Email alternate contact |
| **Preferred Phone:**       | **Supervisor Rank (Instructor, Professor etc.):**Clinical Associate Professor |
| **E-mail Address:**  pauljwinston@gmail.com |  |
| **Optional Alternate Contact** (e.g. co-supervisor, research/lab coordinator, assistant etc.) |
| **Contact’s Name:**       | **Contact’s Role:**       |
| **Contact’s Phone Number:**      | **Contact’s E-mail Address:**      |