



Project title	Molecular barcoding and microfluidic cell capture systems for nanopore-based RNA sequencing		
Level(s)	<input checked="" type="checkbox"/> MSc	<input checked="" type="checkbox"/> PhD	<input checked="" type="checkbox"/> Postdoctorate
Principal investigator(s)	Martin Smith		
Project duration	24+ months		
Start date	September 2022 (flexible)		

Date of posting: 2022-05-20

Research environment

The [Sainte-Justine University Hospital \(CHUSJ\) Research Centre](#) in Montreal, Canada is a world leader in medical research and management of pediatric patients suffering from immune diseases and cancers. CHUSJ is also responsible for the diagnosis and treatment of nearly 65% of pediatric tumors in Quebec. Our institution is the only one in Quebec to perform all types of solid organ transplants and the only center accredited to perform bone marrow transplants in pediatrics. A community over 1,200 people strong—including more than 210 researchers, 110 clinicians and more than 450 graduate students and post-doctoral fellows—collaborate with CHUSJ clinical staff to pioneer and translate innovative biomedical discoveries into clinical practice across 6 research axes.

Immune diseases and cancers are among the most severe pathologies affecting patients treated at CHUSJ. The [Cancer and Immune Disease Axis](#) has strategically prioritized research on hematological malignancies, functional genomics, mechanisms of immune diseases, cellular and gene therapies. Innovative strategies across bioinformatics, cellular and molecular biology are applied to research questions premised on these health issues.

The Smith Laboratory

The [Smith Laboratory](#) is affiliated with the University of Montreal's [Biochemistry and Molecular Medicine Department](#) in the Faculty of Medicine. We study the human genome and complex diseases through the development and application of methods that exploit the latest genomic and bioinformatics technologies. We are interested, amongst other, in the role of long non-coding RNAs (lncRNAs) in normal development and disease etiology. Much of our research involves the use of real-time single-molecule sequencing, a technology that has enormous potential in molecular medicine and improving our understanding of fundamental biological processes. We manage 3rd generation sequencers (Oxford Nanopore PromethION, GridION, MinION mk1C), an OpenTrons automation robot, molecular biology equipment, and dedicated informatics facilities to facilitate discoveries in disease etiology and genome biology.

Project Description

We are recruiting a curious and resourceful individual to join our collaborative multidisciplinary research environment. The incumbent will lead an innovative research project on single-cell and single-molecule real-time nanopore sequencing. This project, supported by an NFRF Exploration



grant, will involve the development of a combinatorial molecular barcode multiplexing strategy coupled with an open-source microfluidics protocol.

The incumbent will have the opportunity to learn and integrate unique technologies (e.g. nanopore sequencing, liquid handling robot, microfluidic chips), develop innovative methodologies at the frontier of biomedical research and establish the foundations of his/her own research program in a modern, multicultural research environment, while benefiting from an established collaborative network and state-of-the-art technological infrastructure.

Training and skills

The incumbent should have academic (BSc or MSc) or equivalent experience in biomedical engineering, biomedical sciences, biochemistry, molecular biology or genomics. Experience in a biomedical laboratory and a basic knowledge of programming would qualify the ideal candidate.

Essential Skills & Experience

- Curiosity and experimental resourcefulness
- Demonstrated communication, writing, organizational and documentation skills
- Demonstrated time management skills and ability to multitask
- Intermediate computer skills (basic programming/UNIX environment)

Optional Skills & Experience

- Single-cell sequencing technologies;
- Nanopore sequencing;
- Familiarity with liquid handling robots;
- Familiarity with microfluidics;
- Familiarity with Python;

Application submission

Applicants should send the required documents by June 30, 2022 to Martin Smith via email at martin.smith@umontreal.ca.

Please provide:

- ✓ Curriculum vitae ✓ Academic transcripts ✓ Cover letter

The Smith Laboratory
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Equity, diversity and inclusion

The masculine gender is used without discrimination and for the sole purpose to facilitate reading. The CHU Sainte-Justine subscribes to the principle of equal access to opportunities and invites women, members of visible and ethnic minorities, persons with disabilities and Indigenous people to apply. We would appreciate it if you could inform us of any disabilities that would require technical and physical accommodation adapted to your situation during the selection process. Please be assured that we will treat this information as confidential.



Studies at the CHU Sainte-Justine Research Center

Pursue your [graduate or postdoctoral studies](#) at the **CHU Sainte-Justine Research Center**, and be one of the 500 students, fellows and interns involved in accelerating the development of knowledge in the field of maternal, child and adolescent health, whether in basic or clinical research. Under the supervision of prominent scientists, especially in leukemia, rare pediatric diseases, genetics, perinatology, obesity, neuropsychology and cognition, scoliosis and rehabilitation, you will have the opportunity to work with multidisciplinary scientific teams and collaborators from all over the world.

About the CHU Sainte-Justine Research Center

CHU Sainte-Justine Research Center is a leading mother-child research institution affiliated with Université de Montréal. It brings together more than 200 research investigators, including over 90 clinician-scientists, as well as 500 graduate and postgraduate students focused on finding innovative prevention means, faster and less invasive treatments, as well as personalized approaches to medicine. The Center is part of CHU Sainte-Justine, which is the largest mother-child center in Canada and the second most important pediatric center in North America. More on research.chusj.org

