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NSERC CREATE: Training Next-Generation Leaders in Underground Science

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SNOLAB

What is NSERC CREATE?

- The Collaborative Research and Training Experience (CREATE) program supports the training and mentoring of teams of highly qualified students and postdoctoral fellows from Canada and abroad through the development of innovative training programs that:
  - encourage collaborative and integrative approaches, and address significant scientific challenges associated with Canada's research priorities;
  - facilitate the transition of new researchers from trainees to productive employees in the Canadian workforce.
- SNOLAB through our relationship with Queen's University is leading a proposal to create an underground science training program with SNOLAB as the mobility site.
- This project aligns with our strategic goal to become an intellectual hub fostering collaboration and connection. If successful, it will become another program under the SuSi umbrella that will bring graduate students to site for extended stays.

Who is involved?

We aim to bring together a team with diverse experiences and expertise from University partners and SNOLAB. Team members are (a) faculty who work on experiments hosted by the laboratory partnered with (b) SNOLAB researchers involved in those experiments who serve as local mentors while students are on-site.

Carleton University: Profs. Mark Boulay and Simon Viel

Queen's University: Profs. Jodi Cooley, Ken Clark, Tony Noble**, and Stephen Sekula

Université de Montréal: Prof. Alan Robinson

University of Alberta: Prof. Carsten Krauss

McGill University: Prof. Thomas Brunner

University of Toronto: Profs. Miriam Diamond, Ziqing Hong, and Pekka Sinervo

SNOLAB: Drs. Erica Caden, Chris Jillings, Christine Krauss, Aleksandra Bialek, Pierre Gorel, Ian Lawson, Szymon Manecki, Andy Kubik, Shaun Hall, Matthew Stukel and Jeter Hall.*

*SNOLAB staff who indicated interest during the iLOI stage

** Collaborators from partner universities

Lectureship Program Details

Topics for immersive specialized short courses taught at SNOLAB:

- **Backgrounds** – types, how to estimate and modeling, material assay, etc

- **Machine Learning and AI**

- **Statistical Analysis** – profile likelihood ratios, optimal gaps, how to estimate and treat systematics, potentially add instruction on common tools such as *RooFit* and *RooStats*.

- **Data** – data acquisition, data quality & cleaning, archiving and preserving, sharing data (open data), how to make data accessible, data visualization

- **Operations of Low Temperature Facilities –** low temperature refrigerators, electronics for cryogenic temperatures, operation of low temperature facilities, extreme computing -- quantum computing and qbits

Mobility Site: SNOLAB Value Added

- Mentoring and vocation-specific training by SNOLAB Research Scientists that would include the development, installation, commissioning, calibration, and operation of world-leading research detectors at SNOLAB.
- Hands-on training in the measurement of extremely faint signals using gamma-ray spectroscopy, ICP-MS, surface alpha counters, and radon assay techniques. -- Combine with backgrounds immersion course.
- Mentoring in project management and engineering techniques required to deliver large or complex projects.
- Development of skills to effectively communicate with project management, engineering, and trades professionals to plan and execute large and/or complex projects.
- Rigorous and effective ES&H systems in an industrial setting through short courses online and in person.

What is needed from you…

- If you are interested in participating as a collaborator, please send me an email. Please also include a short paragraph of your specific interests (mentoring a student on x or assisting with the teaching of y) and your qualifications (why are you suited for the job).
- If you are interested in joining as a co-PI, let me know – especially if your University is not represented by a current co-PI.

Thank you!
Questions?