

## CO-OP Undergraduate STUDENT – Rare EVENT

### Search - Shielding Simulation

SNOLAB Research Division

### About Us

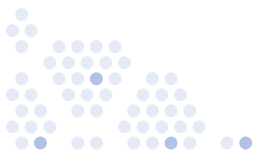
SNOLAB is an international facility for world-class underground physics research and has an expanding programme in astroparticle physics and underground science. Located in an air-conditioned clean room 2 km underground in the Vale Creighton Mine near Sudbury Ontario, with a suite of surface facilities and laboratories, SNOLAB is currently preparing for the next generation of experiments focusing on neutrino studies and the search for galactic dark matter.

### The Position

Searches for rare nuclear processes, such as neutrinoless double beta-decay and the interactions of WIMP dark matter, are motivating experiments with ever-decreasing levels of radioactive backgrounds.

There are various methods to reduce or mitigate each of these sources. These mainly include the selection of very radio-pure materials to build the experiment and the detectors, detector technologies able to discriminate signal to background events and the choice of deep underground sites to locate the experiments. The depth of the laboratory provides a first protection from radioactive background: neutron and muon fluxes from cosmic rays are reduced by a few orders of magnitude by the rock overburden which filters them out. Furthermore, experiments use active and passive shielding schemes to moderate the environmental natural radioactivity. Usually, the flux of gamma-rays is attenuated by a lead shielding, whereas the radiogenic neutrons coming from the rock and materials close to the detectors by a polyethylene shielding material. In addition, active muon veto surrounding the experimental set-up will help tagging the residual muons that can interact in the lead shielding and then producing neutrons.

The student will actively contribute to the efforts to understand and limit the background via MonteCarlo simulations with GEANT4 to estimate radioactive background event rates from the main shielding scheme and via an intensive material and screening assay program. The student will help expanding the ongoing effort in the GEANT4 simulations in terms of neutron and gamma to better understand and estimate the radioactive background budget of the experimental apparatus.



📍 Creighton Mine #9, 1039 Regional Road 24, Lively, ON P3Y1N2

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## Criteria

### Education:

Applications from any undergraduate levels are accepted.

Must be 18 years or older, registered in post-secondary studies at an accredited institution or apprenticeship program, recent graduate (having graduated in the last 3-6 months) or individual returning to full-time or part-time studies in the next academic term.

### Experience:

A student with strong computer science and database system skills (SQL and MongoDB) would be a good fit for this project. Python and C++ skills are a good asset, as python scripts are used to interface the database.

### Salary Range:

Salary will be determined by education and qualifications. These positions are subject to availability of funding. To meet operational needs, shift work may be required.

### To Apply:

Applications must be submitted to [silvia.scorza@snolab.ca](mailto:silvia.scorza@snolab.ca). Interested students should include a cover letter and resume.

For more details on this specific project, please contact Dr. Silvia Scorza via email [silvia.scorza@snolab.ca](mailto:silvia.scorza@snolab.ca)

### Closing Date

**Deadline to Apply: June 1**

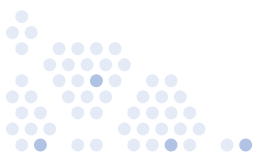
The posting will remain open until the position is filled. SNOLAB thanks all applicants for their interest, however, only those students considered for an interview will be contacted.

SNOLAB is committed to equity in employment and encourage applications from all qualified applicants, including women, Indigenous persons, members of visible minorities and persons with disabilities. In accordance with Canadian immigration requirements, priority will be given to Canadian citizens and permanent residents.

SNOLAB will provide support in its recruitment processes to applicants with disabilities, including accommodation that takes into account an applicant's accessibility needs.

Further information about SNOLAB may be found at [www.snolab.ca](http://www.snolab.ca)

**Posting Date: May 19, 2021**



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