

SFU Avalanche Research Program

School for Resource and Environmental Management

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Seeking PhD Student for Applied Avalanche Research Project (Fall 2018)

Avalanche risk management in mechanized skiing operations through terrain selection

Background on research program

SFU's Avalanche Research Program (SARP) is led by Dr. Pascal Haegeli, NSERC Industrial Research Chair in Avalanche Risk Management, and is housed in the School for Resource and Environmental Management (www.sfu.ca/rem) at Simon Fraser University in Burnaby BC, Canada. SARP's objective is to conduct applied interdisciplinary research at the interface between the natural and social sciences to advance knowledge and develop evidence-based tools that help backcountry recreationists and avalanche professionals to make informed decisions when preparing for and travelling in avalanche terrain. SARP is supported by and works in close collaboration with stakeholders of the professional and recreational avalanche safety communities in Western Canada. For detailed information on SARP, please visit our website at <http://www.avalancheresearch.ca>.

Project overview

The proposed project is part of a bigger research effort to better understand the risk from avalanches involved in helicopter and snowcat assisted backcountry skiing (known as mechanized backcountry skiing) and how this risk can be managed through terrain selection. Professional mountain guides have tremendous expertise in managing avalanche risk. However, while the steps of the process are well known, guides have difficulties articulating the underlying assessment and decision rules because they are experience-based and have become completely intuitive. This lack of formalization prevents a careful evaluation of existing risk management practices and the development of evidence-based decision aids. Over the last three winters, we have documented avalanche risk management practices at six collaborating mechanized skiing operations by tracking terrain choices of guides. To-date, we have collected high-resolution GPS tracks from more than 30,000 ski runs over a wide variety of avalanche hazard conditions. The **goal of this PhD research project** is to ascertain ski guides' expert knowledge and describe existing risk management practices by exploring this unique dataset using advanced methods from statistics, machine learning and GIS. The extracted rules will be used to develop decision aids that help guides and recreationists make better informed decision when travelling in avalanche terrain.

More information about our current research in this area is available at

<http://www.avalancheresearch.ca/researchareas/terrain-management/>.

Requirements

Required qualifications for this position include:

- Graduate degree in physical geography, earth sciences, geographic information sciences, engineering, statistics or computer science.
- Background in advanced GIS skills
- Background in advanced statistics or machine learning
- Computer programming experience (e.g., R, Python or similar)
- Background or keen interest in applied judgment and decision-making science
- Ability to work collaboratively within a research team
- Excellent writing and communication skills
- Proficient in powder skiing
- Recreational backcountry skiing experience

Additional, **desirable qualifications** include:

- Advanced recreational avalanche safety certification (e.g., Canadian AST2)

Position details and funding

The starting date for this position is **September 1, 2018**.

The successful candidate for this position will work toward his/her Doctoral degree in either Resource and Environmental Management (<http://www.sfu.ca/rem/prospective-students.html>) or Geography (<http://www.sfu.ca/geography/graduate-studies/information-for-applicants.html>) at SFU. Please visit the respective websites for program details and admission requirements.

This project is supported with **three and a half years of full-time funding (CND\$24,000/yr)**. SARP students are expected to work on site during the entire year including the summer months. SARP students have four weeks of annual holidays.

SFU is situated in Burnaby, a community within the greater Vancouver area in the southwest of British Columbia, Canada. Vancouver is a great place to live and work that is well known for its natural beauty, multi-culturalism and high quality of life.

Application details and deadlines

The SFU deadline for fall 2018 graduate program applications is **February 1, 2018**.

See the websites of Resource and Environmental Management (<http://www.sfu.ca/rem/prospective-students.html>) or Geography (<http://www.sfu.ca/geography/graduate-studies/information-for-applicants.html>) for details on the application process.

Students interested in this project are strongly encouraged to contact Dr. Pascal Haegeli (email: pascal_haegeli@sfu.ca or phone: +1 778 872 3579) prior to preparing their formal application package to discuss the nature of his program and details of the research project.

Both Canadian and international students are encouraged to apply.

Simon Fraser University is committed to the principle of equity in employment and offers equal employment opportunities to qualified applicants. To increase the number of women in academic positions, applications from women are particularly encouraged.