



Sentinel North: Ph.D. project in optics-photonics

Fiber optic sensors for soil monitoring

This research project concerns the development of optical fiber sensors to monitor physical and mechanical properties of the permafrost in Northern Québec and Canada. The goal is to develop autonomous systems allowing localized and distributed measurements along infrastructures. The collected data will result in a more adequate assessment of the state of the infrastructures by providing a real time continuous monitoring of several parameters. This information will be useful to predictive models, helping to manage protection and maintenance of infrastructure.

This project will consist of designing new optical fiber sensors to gather information on strain, displacements, temperature, and pressure in soils under road and airport infrastructures. In collaboration with other researchers in the team, the Ph. D. candidate will design fibers optimized for simultaneous detection of the parameters of interest. The needed Data processing software will also have to be developed. The fiber sensor system will be assembled and tested in the laboratory before field trial outdoors in Quebec City area. A ruggedized version, with electronic control and data acquisition, will be developed subsequently by collaborators to the project in order to test the system in the North.

We are looking for a PhD student interested to acquire expertise in the design of specialty optical fibers and their application as sensors. This is a multi-disciplinary research project between the Department of Electrical and computer engineering (Prof. Sophie LaRochelle, Canada research chair in Advanced photonic technologies for communications), the Department of Physics, engineering physics, and optics (Prof. Younès Messaddeq, Canada excellence research chair in Photonic innovation) as well as the Department of Civil engineering. In addition to excellent academic records at Bachelor and Master's degree level, the PhD candidate should show genuine interest in science, exhibit leadership and demonstrate excellent oral and written communication skills. Please send your curriculum vitae, academic records, statement of interest and the name of three references to:



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