Graduate Positions Available

The Department of **Geological Sciences and Geological Engineering (GSGE)** at Queen’s University is looking for a number of PhD and MSc students for fully funded studentships starting September 2020. Qualified students are encouraged to send an expression of interest to the respective prospective advisors listed below, and to visit our Graduate Studies Information Page. **Applications are due by Feb. 1, 2020.**

The GSGE Department at Queen’s University is committed to building **diverse and inclusive** research groups, and students from historically underrepresented groups in Science, Technology, Engineering and Mathematics (STEM) and non-traditional backgrounds are highly encouraged to apply. Students will be supported in pursuing endeavors and engaging in **science outreach** aimed at increasing diversity and visibility of underrepresented groups in STEM fields.

**Tectonochemistry - Dr. Christopher Spencer**

1. Petrogenesis and geochronology of sub-Moho granite dykes in supra-subduction ophiolites. This project will use geologic mapping, isotope geochemistry (O, Hf, Nd, Sr), geochronology (U-Pb, Lu-Hf), quartz in garnet thermobarometry, and elemental geochemistry to investigate the petrogenesis and timing of sub-Moho dykes in the Oman-UAE ophiolite.
2. Constraining secular changes in sedimentary geochemistry across the Archean–Proterozoic boundary. Using detailed sedimentology and triple oxygen isotopes, this project will constrain secular changes in sedimentary successions spanning ~2.6-2.2 Ga in South Africa, southern Ontario, northwest Russia, and northwest Australia.
3. Geodynamics and tectonochemistry of mid-Mesozoic magmatism of the North American Cordillera. The late Jurassic to early Cretaceous plutonism of the North American Cordillera will be investigated using stable isotope geochemistry (O, Li, He) to test geodynamic models.

**Environmental and Aqueous Geochemistry - Dr. Anna Harrison**

1. Gas-driven mineral weathering: probing links between availability of reactive gases (CO2 and O2) and the carbon cycle
2. Water-limited weathering: How does availability of water influence mineral dissolution-precipitation reactions?
3. Capturing carbon: enhancing natural reactions to offset greenhouse gas emissions
4. Non-traditional stable isotopes in weathering and carbonate systems: Fractionation factors, implications, and proxies

Projects on mineral-fluid-gas interactions, contaminant cycling, and related topics can also be developed depending on the interests of the applicant.

**Geo-Environmental Engineering - Dr. Bas Vriens**

1. Budgeting of anthropogenic trace metal releases into surface waters in the Great Lakes/St. Lawrence drainage basin. In collaboration with industry and government partners, we will combine existing environmental monitoring data and geospatial modeling with new, large-scale sampling campaigns and (ultra) trace-level metal analyses. Projects topics range from analytical development, geospatial modeling and environmental impact assessments to elimination mechanisms and recovery options for valuable metal contaminants and can be tailored to student’s interests.
2. Mine waste rock weathering and metal mobilization. Project topics include studying the roles of biogeochemical reactions and mass transport limitations on mine effluent quality, upscaling phenomena as well as specific industry-driven engineering questions from partners in Canada and Peru.

**Microbial Geochemistry/Arctic Landscapes - Dr. Christopher Omelon**

The main goals of this program are to integrate studies of climate, soils, sediments, waters, biota, and permafrost to generate new knowledge of how increasing hydrological activity and warming impacts physical, biogeochemical, and microbial interactions on the terrestrial landscape, which will help to better inform terrestrial ecosystem and climate models. In includes:

1. Determining linkages between vegetation cover and terrestrial hydrological activity through measurements of soil moisture activity, redox conditions, and biogeochemical signatures;
2. Characterizing microbial diversity and microbe-mineral interactions through examination of the spatial and geochemical relationships between microorganisms and their environments;
3. Examining controls on the production and consumption of greenhouse gases through a combination of field gas flux measurements and laboratory experiments.

Summer Arctic fieldwork is a component of some aspects of this program, but not all projects require fieldwork. There will be opportunities for training in laboratories outside the Department for those interested in pursuing interdisciplinary research.