

Northern Water Futures Postdoctoral fellowship: Scaling the ecohydrological implications of land cover change in northern ecosystems

Climate warming related changes to northern catchments (e.g., permafrost thaw, vegetation composition and structure, land cover change, wildfire, and snow conditions) affect quantity and quality of downstream waters through complex interactions among biological and physical processes. Across the Northern Water Futures (NWF; www.northernwaterfutures.ca) study domain, sophisticated land cover change detection analysis suggests two major modes of landcover transformation: boreal forest loss and shrub encroachment on the arctic tundra. Cross-observatory dendrochronological studies have attributed variable relationships between tree growth and climate to the interaction between changing climate and thawing permafrost. Changes in land cover and ecosystem function alter evapotranspiration and land surface energy balance. Through this postdoctoral position, we will build on these advances with the goal of understanding how changes in permafrost and vegetation structure alter ecosystem water budget.

As part of NWF, common instrumentation has been deployed and measurements conducted across research sites spanning the mainland Northwest Territories (NWT). These include eddy covariance towers, piezometer nests to characterize vertical soil moisture distribution, thermal dissipation sensors, and high frequency dendrometers. These research sites have also been the focus of intensive airborne data collection during NASA Arctic-Boreal Vulnerability Experiment (ABoVE) airborne campaigns (<https://above.nasa.gov>). The resulting data provides NWF researchers with a unique opportunity to develop an integrative understanding of the ecohydrological function of different ecosystems across the NWT, and how ecosystem composition, structure and function may be affected by ongoing climate warming and land cover change. We invite applications for a 2-year Postdoctoral Fellow interested in coupling remote sensing data products with this extensive suite of measurements to support the upscaling of our growing understanding of the ecohydrological implications of climate warming induced land cover changes.

Potential activities:

- Evaluation of existing NASA ABoVE remote sensing products to support the scaling of our extensive network of field observations throughout mainland NWT.
- Development of products demonstrating evaporative fluxes supporting an intercomparison between field sites
- Coupling of ABoVE remote sensing products with ground measurements to evaluate how warm season observations may inform understanding of cold season processes.

The candidate will be advised by Dr. Aaron Berg (University of Guelph) and will work closely with an advisory group including Drs. Oliver Sonnentag (Université de Montréal), Jenn Baltzer, Philip Marsh (both at Wilfrid Laurier University), Chris Spence, and Chris Derksen (both at Environment and Climate Change Canada).

The ideal candidate should have a PhD in a relevant discipline (e.g. geography, environmental science, engineering, physics, atmospheric science) and experience in the application of remote

sensing products to addressing environmental issues. Proficiency with geomatics tools for data analysis and visualization is required. Experience in northern environments is an asset.

Remuneration:

A salary of \$55,000 per year including benefits, plus a stipend of \$2,000/year to cover direct research expenses.

How to Apply:

Please submit:

- (i) a cover letter highlighting relevant experience and your interest in the position;
- (ii) a curriculum vitae;
- (iii) names and contact information for two referees.

Email inquiries or application materials to Aaron Berg (aberg@uoguelph.ca) with the subject line "NWF PDF Application". We will begin reviewing applications on December 15th, 2020. We anticipate an April 1, 2021 start date but there is flexibility in this. International and remote candidates will be considered.

Equity, Diversity and Inclusion

The impact of leaves (e.g. parental leave, extended leaves due to illness, etc.) will be carefully considered when reviewing candidates' eligibility and record of research achievement. Candidates are encouraged to explain in their cover letter how career interruptions may have impacted them. At the University of Guelph, fostering a [culture of inclusion](#) is an institutional imperative. The University invites and encourages applications from all qualified individuals, and welcomes applications from candidates who identify as Indigenous, racialized, having disabilities, and from persons of any sexual identities and gender identities.