



THE UNIVERSITY OF
WINNIPEG

Master in Environmental & Social Change (MSc, MA, MEnv)

The new Master in Environmental & Social program offered through the [Department of Geography](#) and [Department of Environmental Studies and Sciences](#) at The University of Winnipeg has **14 fully funded positions** for excellent students in the following areas:

Catchment Biogeochemistry (MEnv or MSc)

- Impacts of climate change on carbon and nutrient cycling in boreal forested catchments

Soil Science (MEnv or MSc)

- Selection of amendments to immobilize potentially toxic trace elements released from intermittently flooded agricultural soils
- Soil amendments to reduce phosphorus losses from flooded soils in Manitoba

Environmental Governance (MEnv or MA)

- A First Nation community-university partnership for capacity enhancement in forest land governance
- Climate learning and adaptation for northern development
- Harnessing economic, social and political changes forced by COVID-19 to advance adaptation: Rerouting institutional pathways for improved social-ecological resilience

Forest Ecology (MEnv or MSc)

- Susceptibility of protected black ash stands to potential regulation of spring lake water level, northern Quebec: a biodiversity conservation issue

Planetary Science (MEnv or MSc)

- Searching for biosignatures on Mars
- Exploring the Moon for in-situ resources
- Analysis of returned asteroid samples: insights into prebiotic chemistry
- Oil sands: clays and environmental effects

Climate Science Communication (MA, MEnv, MSc)

- Climate change communications: the science of storytelling
- Indigenous ways of knowing and climate change

[Applications are now open for a Fall 2021 start date.](#)

CATCHMENT BIOGEOCHEMISTRY (1 position)

Research project:

Impacts of climate change on carbon and nutrient cycling in boreal forested catchments

Description of project:

Canada is teeming with lakes, streams and wetlands. Clean, healthy fresh waters support biodiversity and provide extensive health, economic and cultural benefits to Canadian communities. However, rates of climate change in northern boreal regions are among the highest of anywhere on Earth. Rising temperatures, changes to precipitation and declining snow cover will fundamentally alter how water and chemicals move through the environment, and could threaten our valuable aquatic resources.

We invite expressions of interest for a student who will be eligible to enroll in the new [Master in Environmental & Social Change](#) program at The University of Winnipeg (MEnv or MSc) starting September 2021. The successful candidate will work with an interdisciplinary team to explore how rising temperatures, shorter winters and changing precipitation patterns alter watershed carbon cycling in boreal catchments. Depending on the interests and background of the student, the project will involve a combination of field work, lab work, data analysis and/or mathematical modelling.

Qualifications and support:

We seek a hard-working and dedicated colleague with a 4-year Bachelor degree (e.g., Environmental Science, Biology, Ecology, Forestry, Geography, Earth Science). The successful candidate will have a track record of academic excellence and strong English writing skills. The successful candidate will receive a guaranteed minimum of \$16,000/year in funding support for two years, plus support for direct costs of research and conference participation. The incoming team member will also have access to the CFI-funded Water Quality Analysis Lab at UWinnipeg (COVID-19 restrictions permitting).

Serious expressions of interest can be sent to Dr. Nora Casson, Canada Research Chair in Environmental Influences on Water Quality and Associate Professor in the Department of Geography (n.casson@uwinnipeg.ca). Your email must include your 1) updated CV, 2) transcripts (unofficial acceptable at this time), and 3) a brief statement outlining why you want to join our team.

SOIL SCIENCE (2 positions)

Research project #1:

Selection of amendments to immobilize potentially toxic trace elements released from intermittently flooded agricultural soils

Description of project:

Potentially toxic trace elements (PTTEs) are introduced to agricultural soils with inputs such as fertilizers, pesticides, livestock manures and biosolids. PTTEs in soils can then enter food products through plant uptake and contaminate groundwater through leaching. In the northern great plains of North America, including Manitoba, the relatively flat landscape and poorly permeable soils are subject to intermittent flooding, which creates anoxic or reduced (Eh) soil environments. Anoxic conditions may enhance the mobility of PTTEs to plants and water bodies. Amendments can be used to immobilize PTTEs within the soil matrix, with the aim of reducing bioavailability to plants and leaching to groundwater.

We invite expressions of interest for an excellent student who will be eligible to enroll in the new Master in Environmental & Social Change program at The University of Winnipeg (MEnv) starting September 2021. The successful candidate will work with a research team to select green and cost-effective amendment/s that would immobilize PTTEs in alkaline, calcareous, clayey soils and are stable under varying soil moisture regimes.

Qualifications and support:

Applications are called for a hard-working and dedicated colleague with a 4-year Bachelor degree (e.g., Environmental Science, Agriculture, Forestry, Geography, Chemistry, Biology, or a related discipline). The successful candidate will have a track record of academic excellence and strong English writing skills. The successful candidate will receive a guaranteed minimum of \$16,000/year in funding support for two years, plus support for direct costs of research and conference participation.

Expressions of interest can be sent to Dr. Srimathie Indraratne, Instructor and Adjunct Professor in Environmental Studies and Sciences (s.indraratne@uwinnipeg.ca). Your email must include your 1) updated CV, 2) transcripts (unofficial acceptable at this time), 3) a research writing sample, and a brief statement outlining why you want to join this research team.

Research project #2:

Soil amendments to reduce phosphorus losses from flooded soils in Manitoba

For more details see: <http://ion.uwinnipeg.ca/~dkumarag/research.html>

Description of project:

Phosphorus losses from agricultural soils to water bodies has a potential negative impact on the environment through promoting algal blooms in water bodies, a serious water quality challenge facing Lake Winnipeg. In the Canadian Prairies, most lands are poorly drained, thus frequently leading to flooding during the snowmelt period. Prolonged flooding makes the soils anaerobic, a condition that can enhance phosphorus release from soils to overlying floodwater, increasing the risk of phosphorus loss to water bodies. Soil amendments could play a role in reducing phosphorus release from flooded anoxic soils by enhancing phosphorus absorption, and chemical precipitation. This research evaluates the effectiveness of different amendments at varying application rates in reducing phosphorus losses to floodwater, by conducting laboratory and field studies in flood-prone areas of the Red River Basin of Manitoba.

We invite expressions of interest for an excellent student who will be eligible to enroll in the new Master in Environmental & Social Change program at The University of Winnipeg (MEnv or MSc) starting September 2021. The successful candidate will work with an interdisciplinary team to 1) evaluate the effectiveness of different rates of selected soil amendments on the reduction of floodwater phosphorus concentrations under snowmelt flooding in farmer fields 2) discern the relationships between the effectiveness of soil amendments in reducing phosphorus mobilization and soil properties and (3) identify the underlying mechanisms responsible for the decrease in phosphorus mobilization with soil amendments by conducting laboratory studies using advanced analytical techniques.

Qualifications and support:

We seek a hard-working and dedicated colleague with a 4-year Bachelor degree (e.g., Soil Science, Environmental Science, Chemistry, Geography). The successful candidate will have a track record of academic excellence and strong English writing skills. The successful candidate will receive a guaranteed minimum of \$16,000/year in funding support for two years, plus support for direct costs of research and conference participation.

Expressions of interest can be sent to Dr. Darshani Kumaragamage, Professor in Environmental Studies and Sciences (d.kumaragamage@uwinnipeg.ca). Your email must include your 1) updated CV, 2) transcripts (unofficial acceptable at this time), 3) a research writing sample, and a brief statement outlining why you want to join our team.

ENVIRONMENTAL GOVERNANCE (4 positions)

Research project #1:

[A First Nation Community-University Partnership for Capacity Enhancement in Forest Land Governance](#)

Description of project:

Canada's Indigenous forest communities must be able to conserve ecosystems, be adaptive amid forces of economic restructuring, and address conflict to support local wellbeing. Conventional governance and development systems often erode the resilience of forest communities by removing benefits and introducing local disparity and instability. Proven approaches needed to support constructive interactions remain largely undefined and those that exist need to be more widely shared. Supported by a SSHRC Partnership Development Grant and working with Eagle Lake First Nation in northwestern Ontario, our overriding goal is to identify, share, and build on existing models and techniques to support community capacity building through First Nation community and university collaboration.

We invite expressions of interest for one dedicated student who will be eligible to enroll in the [Master of Environmental & Social Change](#) program at The University of Winnipeg (MEnv or MA) starting September 2021. The successful candidate will help 1) examine how First Nations and settler Canadian relations can be reconciled through forest governance models that produce sustainable benefits and support economic, cultural and ecological multi-party priorities; 2) develop First Nation-university capacity building initiatives, benefits, and participation needed to respond to shifting sectoral and societal demands in forest governance, and; 3) mobilize different knowledges among forestry professionals, youth, Elders and university researchers and students.

Qualifications and support:

The successful candidate will have a 4-year Bachelor degree (e.g., Environmental Studies, Environmental Resource Mgt., Forestry, Geography, Indigenous Studies, Policy Studies). Previous experience working with Indigenous communities is a definite asset. The successful candidate will have a track record of academic excellence and strong English writing skills. The successful student will receive a guaranteed minimum of \$16,000/year in funding support for two years, plus support for direct costs of research and conference participation. The incoming team member will join the [Environment & Society Research Group](#) and also have access to the new CFI-funded Environment and Society Collaborative Lab (when we re-open).

Serious inquiries must be sent to Dr. Ryan Bullock, Canada Research Chair in Human-Environment Interactions, Department of Environmental Studies and Sciences (r.bullock@uwinnipeg.ca). Please send your 1) CV, 2) transcripts (unofficial acceptable at this time), 3) a research writing sample, and a brief statement outlining why you want to join our team.

Research project #2:

[Climate Learning and Adaptation for Northern Development](#)

Description of project:

C-LAND is a five-year project (2018-2023) supported by an Insight Grant from the Social Sciences and Humanities Research Council of Canada. C-LAND examines how to improve adaptive capacity in Canada's renewable resource sectors and regions. Specifically, the project uses a comparative case study approach to enable and assess learning about climate change adaptation, gain insights into how the learning occurs, and examine if and how learning enhances adaptive capacity. The project focuses on northern regions and communities in the provincial northlands where forestry and energy are prominent.

Qualifications and support:

We seek **two** excellent students with a 4-year Bachelor degree (e.g., Environmental Studies, Environmental Resource Mgt., Forestry, Geography, Indigenous Studies, Policy Studies). Successful candidates will have a track record of academic excellence and strong English writing skills and be eligible to enroll in the new [Master of Environmental & Social Change](#) program (MEnv or MA) starting September 2021. Students will receive a guaranteed minimum of \$16,000/year in funding support for two years, plus support for direct costs of research and conference participation. The successful candidate will join the [Environment and Society Research Group](#) at The University of Winnipeg, under the supervision of Dr. Ryan Bullock and Dr. Alan Diduck, in collaboration with Dr. Melanie Zurba (Dalhousie). The incoming team member will also have access to the new CFI-funded Environment and Society Collaborative Lab (when we re-open).

Expressions of interest can be sent to Dr. Ryan Bullock, Canada Research Chair in Human-Environment Interactions (r.bullock@uwinnipeg.ca) and Dr. Alan Diduck, Professor and Chair (a.diduck@uwinnipeg.ca), Department of Environmental Studies & Sciences. Please send your 1) CV, 2) transcripts (unofficial acceptable at this time), 3) a research writing sample (e.g. senior level undergraduate thesis or course project report, referred journal article), and a brief statement of interest regarding the proposed research, MESC program, and research team.

Research project #3:

Harnessing economic, social and political changes forced by COVID-19 to advance adaptation:
Rerouting institutional pathways for improved social-ecological resilience

Description of project:

Worldwide, COVID-19 has forced behavioral changes and reconfigured processes and relationships at the core of everyday life. High levels of uncertainty, ongoing conflict, and multiple sudden changes are challenging human knowledge systems, societal norms and values, as well as policies and organizational routines. The global impacts of social-ecological system instability are not evenly distributed, creating diverse challenges but also opportunities. This research will explore actual and forecasted institutional changes created by large-scale disturbance. Attention will be given to how different interest groups coalesce around emerging problems to find solutions that respond to current issues, but also have durability to address future concerns linked to environmental and social change. In particular, we will examine institutional reforms and innovations, policy windows, and reframing initiatives, for example, which shift pathways towards mainstreaming adaptation in environmental resource governance, policy and practice.

Qualifications and support:

The successful candidate will have a 4-year Bachelor degree (e.g., Environmental Studies, Environmental Resource Mgt., Forestry, Geography, Indigenous Studies, Policy Studies or a related field) and a track record of academic excellence and strong English writing skills. The incoming student will receive a guaranteed minimum of \$16,000/year in funding support for two years, plus support for direct costs of research and conference participation. The new team member will join the [Environment & Society Research Group](#) and have access to the new CFI-funded Environment and Society Collaborative Lab (when we re-open).

Serious inquiries must be sent to Dr. Ryan Bullock, Canada Research Chair in Human-Environment Interactions, Department of Environmental Studies and Sciences (r.bullock@uwinnipeg.ca). Please send your 1) CV, 2) transcripts (unofficial acceptable at this time), 3) a research writing sample, and a brief statement outlining why you want to join our team.

FOREST ECOLOGY (1 position)

Research project: Susceptibility of protected black ash stands to potential regulation of spring lake water level, northern Quebec: a biodiversity conservation issue.

Context and problematic: Extremes in spring flooding have become an issue in northern regions of Canada. Recent data suggest that flood frequency and magnitude may have increased in the last decades after a period of relatively low spring water level. For example, the 2019 floods in northeastern Ontario and northwestern Quebec are unprecedented. As a result, the lakeside residents of Lake Duparquet would like the governmental authorities to implement a mitigation strategy including regulation of the lake spring water level. The proposed changes will affect both high and low water levels. At the same time, old, rare and protected stands of black ash trees are growing on the floodplains of Lake Duparquet. These stands, reaching the northern distribution limit of the species, are unique with trees more than 250 year old. Lake Duparquet is also one of the rare unregulated water body in the region. The project aims at defining the potential consequences of a change in hydrological regime (low and high water level) on black ash stands located on the floodplain of Lake Duparquet. Fieldwork will take place in northern Quebec and will involve measuring attributes of black ash stands, looking at indicator vegetation and age structure. It will also involve using remote sensing tools for mapping. Could water level regulation lead to the contraction and slow disappearance of these stands or could they be able to maintain themselves and, if so, under which conditions?

MSc program: We invite expressions of interest from excellent students who will be eligible to enroll in the new [Master in Environmental & Social Change](#) program or the [Master of Science in Bioscience, Technology and Public Policy](#) program at The University of Winnipeg. The student could also enroll in the master's program in ecology at the Université du Québec en Abitibi-Témiscamingue (<https://www.uqat.ca/etudes/irf/maitrise-en-ecologie/>).

Admissibility requirements, qualifications and support: We seek a hard-working and dedicated colleague with a 4-year Bachelor degree (e.g., Environmental Sciences, Biology, Forest Sciences, Geography, or equivalent). The successful candidate will have a track record of academic excellence and strong English writing skills. Ability to speak French is considered an asset. The successful candidate will receive a guaranteed minimum of \$17,500/year in funding support for two years, plus support for direct costs of research and conference participation.

The successful candidate will work within a multidisciplinary team as the project involves multi-aspects associated with the development of a flood mitigation strategy: local governance, environmental law, engineering and ecology. The project involves researchers with complementary expertise: Dr. Jacques Tardif (dendroecologist, University of Winnipeg), Dr. Yves Bergeron (forest ecology, Université du Québec en Abitibi-Témiscamingue), Dr. Mélanie Trudel (hydrological modeling, Université de Sherbrooke), Dr. Stéphane Bernatchez (governance and dam management, Université de Sherbrooke) and Dr. Catherine Choquette (environmental law and governance, Université de Sherbrooke) as well as organizations like OBVAJ and FERLD (<https://ferld.uqat.ca/> [1a1]). This research project is funded, among others, by the Intersectoral Flood Network of Québec (RIISQ).

Serious expressions of interest are to be sent to Dr. Jacques Tardif, former Canada Research Chair in Dendrochronology and Professor in Environmental Studies and Sciences / Biology (j.tardif@uwinnipeg.ca). Your email must include 1) a cover letter describing your research interests and your experience related to the position, 2) an updated CV, 3) your most recent transcripts (unofficial acceptable at this time) and 4) the contact details of 2 references.

PLANETARY SCIENCE (4 positions)

Qualifications and support:

For the planetary science projects below, we seek hard-working and dedicated colleagues with a 4-year Bachelor degree (e.g., Environmental Science, Biology, Chemistry, Geography). The successful candidate will have a track record of academic excellence and strong English writing skills. The successful candidate will receive a guaranteed minimum of \$16,000/year in funding support for two years, plus support for direct costs of research and conference participation. The incoming team member will also have access to the Centre for Terrestrial and Planetary Exploration (C-TAPE) (Covid 19 restrictions permitting).

Serious expressions of interest can be sent to Dr. Edward Cloutis, Director of C-TAPE and Professor in the Department of Geography (e.cloutis@uwinnipeg.ca). Your email must include your 1) updated CV, 2) transcripts (unofficial acceptable at this time), 3) a research writing sample, 4) a brief statement outlining why you want to join our team, and 5) which research project(s) are of most interest to you and why.

Research project #1:

Searching for Biosignatures on Mars

Description of project:

The exploration of Mars by current and future rovers is geared towards looking for signs of life (termed biosignatures). Detection of biosignatures would profoundly affect our understanding of how life arose in the solar system and throughout the universe. This project involves two activities:

- (1) Examining how different scientific instruments on the NASA Perseverance and ESA Rosalind Franklin rovers would be able to detect biosignatures by examining their capabilities to detect and characterize macroscopic terrestrial biosignatures such as stromatolites and microbialites and biologically-mediated carbonates, as well as “bio-essential” minerals such as borates, phosphates, and nitrates. This project will involve a combination of laboratory analysis and field work at terrestrial analogue sites. Later stages will include analysis of observational data from these rovers. This project will also involve interactions and collaborations with the Perseverance and Rosalind Franklin rover science teams and possibly participation in rover operations.
- (2) Determining the spectral reflectance and transmission properties of “bio-essential” minerals (such as borates, nitrates, phosphates, and carbonates). These minerals, if present on Mars, would be indicators of habitable conditions as well as astrobiology. It may be easier to detect them as components of airborne dust. The ESA ExoMars Trace Gas Orbiter (TGO) Mars-orbiting spacecraft is equipped with two spectrometers – NOMAD and ACS – that are capable of such

detections. This project will involve a combination of laboratory spectroscopy of these mineral classes and analysis of observational data from ExoMars TGO to search for the presence of these minerals. This project will also involve interactions and collaborations with the NOMAD and ACS science teams.

Research project #2:

Exploring the Moon for in-situ resources

Description of project:

The Moon has become a target of renewed interest for exploration and long-term human habitation. A large number of commercial and government missions are planned. One area of interest is to determine what resources are available on the Moon that can be exploited to limit the amount of resources that need to be brought to the Moon to support human missions. The University of Winnipeg is involved in a number of lunar mission concepts and future missions. In this project, we will examine how different scientific instruments (such as Raman spectrometers, reflectance spectrometers, thermal emission spectrometers) can be used to detect in situ resources such as water-ice and ilmenite, using lunar and analogue samples.

Research project #3:

Analysis of returned asteroid samples: insights into prebiotic chemistry

Description of project:

The ongoing OSIRIS-REx asteroid sample return mission will return a sample of a carbon-rich asteroid (Bennu) to Earth in late 2023. The University of Winnipeg is a Co-investigator on this mission and will participate in analysis of the returned sample. This sample should provide insights into how carbon-bearing asteroids contributed to the origin of life on the Earth by “seeding” the early Earth with various organic molecules. In preparation for sample return, we will use meteorites and analogues to develop non-destructive analytical techniques that can be applied to these samples while they are held in a controlled environment. This project will involve laboratory work that examines how our various analytical instruments can be modified to work with these samples.

Research project #4:

Oil sands: Clays and environmental effects

Description of project:

Oil sands are a complex mixture of quartz grains, clays, water, and bitumen. The clays can include species termed “swelling clays”, which can negatively impact in-situ bitumen recovery and subsequent waste material remediation. This project will examine how reflectance spectroscopy can be applied to analysis of oil sand bulk samples and drill cores to identify the presence of swelling clays and constrain their abundance and type. It will involve laboratory spectroscopy of oil sand samples and development of spectral analysis tools for this application.

We invite expressions of interest for excellent students who will be eligible to enroll in the new [Master in Environmental & Social Change program](#) at The University of Winnipeg (MEnv or MSc) starting September 2021. The successful candidates will work with an interdisciplinary team to address various science goals associated with each project.

CLIMATE CHANGE SCIENCE COMMUNICATION (2 positions)

Research project #1:

Climate Change Communications: The Science of Storytelling

Climate change is a paramount issue facing our time. For decades, the science has clearly articulated the challenges and the need for action, but traction on environmental and social change has been slow and highly politicized. Increasingly, scholarship indicates we need more effective and evidence-based climate change communications, and we need it now.

If you're interested in this field of study, we invite expressions of interest for eligible students to enroll in the new [Masters of Environmental and Social Change program](#) at The University of Winnipeg (MA, MEnv, MSc) for a September 2021 start date. The successful candidate will join and be supported by the transdisciplinary team at the Prairie Climate Centre (PCC). The PCC developed the Climate Atlas of Canada, which is an interactive tool linking science, storytelling, and opportunities for applied adaptation and planning. The specific focus of this Masters project will link to the Climate Atlas and will consider user-testing, geovisualization and filmmaking techniques, and other topics that can be negotiated.

The ideal candidate will have a 4-year Bachelor Degree (e.g. Environmental Science and Studies, Geography, Psychology, Sociology, Communication Studies or a related discipline), excellent written and verbal communication skills, and experience with filmmaking, photography, website development would be an asset. This position has a guaranteed minimum of \$16,000/year in funding support for two years, plus research supplies, conference, and other eligible expenses.

Expressions of interest can be directed to Dr. Ian Mauro, Executive Director of the Prairie Climate Centre and Associate Professor in the Department of Geography (i.mauro@uwinnipeg.ca). Your email must include: 1) updated CV; 2) transcripts (unofficial accepted at this time); and 3) a 1-page statement outlining your interest in and contribution to the PCC team and this work.

Research project #2:

Indigenous Ways of Knowing and Climate Change

For many Indigenous communities, climate change is viewed as a symptom – not the cause – of a much larger problem, which is related to how Western, industrial, and technologically-focused societies systematically dominate and disrespect the earth and its inhabitants.

Indigenous ways of knowing – rooted in millennia of intergenerational knowledge exchange, observation, and experience – provides an entirely different way of seeing the world, which is based on respect, reciprocity, and relationality for the land, water, and each other.

At the Prairie Climate Centre, we have sought guidance and cultivated trust-based partnerships with Indigenous communities from coast-to-coast-to-coast, and many Indigenous-led projects have emerged that focus on community-based adaptation, readiness, and planning. We are also interested in the intersections between Indigenous and Western sciences and storytelling and our team has co-developed numerous participatory films, which are featured on a platform that we created called the Climate Atlas of Canada. We are continuing to expand this work and are seeking a Masters student interested in this community-based research approach.

The ideal candidate will have a 4-year Bachelor Degree (e.g. Indigenous Studies, Environmental Science and Studies, Geography, Anthropology or a related discipline), excellent written and verbal communication skills, and cultural awareness and experience working with Indigenous communities is considered an important asset. This position has a guaranteed minimum of \$16,000/year in funding support for two years, plus research supplies, conference, and other eligible expenses. This student opportunity will be offered through the new [Masters of Environmental and Social Change program](#) at The University of Winnipeg (MA, MEnv, MSc) for a September 2021 start date.

Expressions of interest can be directed to Dr. Ian Mauro, Executive Director of the Prairie Climate Centre and Associate Professor in the Department of Geography (i.mauro@uwinnipeg.ca). Your email must include: 1) updated CV; 2) transcripts (unofficial accepted at this time); and 3) a 1-page statement outlining your interest in and contribution to the PCC team and this work.