

# Environment Graduate Student Conference

Conference Program — September 22nd 2022

Hosted by the [Environment Graduate Student Association](#)



UNIVERSITY OF  
**WATERLOO**



FACULTY OF ENVIRONMENT

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# Welcome!

Welcome to the 2022 Environment Graduate Student Conference, hosted by the [Environment Graduate Student Association](#). You can use this document as your guide to this year's conference. Before we begin, we would like to make some important acknowledgements.

## Territorial Acknowledgement

This year's conference will be held in the Haldimand Tract, the land granted to the Six Nations, that includes six miles on both sides of the Grand River. This is the traditional territory of the Neutral, the Anishinaabeg and the Haudenosaunee peoples who have had a continual and enduring presence here for thousands of years. We ask that all of our attendees and presenters pay mindful respect to these and other Indigenous stewards of the lands and waters in the region that includes present-day Waterloo, and to the Indigenous peoples across Turtle Island. You can visit the [Office of Indigenous Relations website](#) to learn more about the territory that the University is situated on.

## Funding Acknowledgement

We would like to acknowledge that this conference was funded in part by the [Waterloo Environment Students Endowment Fund \(WESEF\)](#) and [Graduate Studies Endowment Fund \(GSEF\)](#). We thank both the WESEF and GSEF Board for their continued support of Environment Graduate Students and EGSA.

## Setting Expectations: Collegiality and Respect

As with any scholarly or professional event, the EGSA expects that everyone attending this year's conference will do so in order to create a collegial, respectful, and generally warm environment for presenters, attendees, volunteers, and university staff and faculty. This conference is a place where everyone is invited to contribute. Thoughtful questions and comments are welcome. Especially during the speaker and poster sessions, we encourage you to support your colleagues, whether by saying "Well done," "Can you tell me more about...?" or sharing resources, such as "Here is an article you might like."

## COVID-19

The EGSA will be following the guidance and measures set out by the University for the duration of the conference. Please visit the UW [COVID-19 webpage](#) for the latest information. In general, **if you are sick, stay away to protect others**. Likewise, we

welcome presenters and attendees to wear a tight-fitting, well-constructed mask if you feel it is the right choice for you at any time during the conference.

## Contact us

If you have questions about the conference you can reach us at [egsa@uwaterloo.ca](mailto:egsa@uwaterloo.ca).

## Conference Schedule

Time	Activity	Room
9:30am - 10:30am	Collect Name-Tags, Meet and Greet, Setup Posters	EV1 Courtyard (EV1-250)
10:30am - 10:45am	Opening Remarks and Welcome	EV1-221
10:45am - 12:00pm	<a href="#">Plenary Panel Session</a>	EV1-221
12:15pm - 1:15pm	Themed Paper Session: <ul style="list-style-type: none"> <li>• <a href="#">Community Planning</a></li> </ul>	EV1-353
1:30pm - 2:15pm	Pizza Lunch / Networking/ <a href="#">Poster Viewing</a>	EV1 Courtyard (EV1-250)
2:30pm - 3:30pm	Themed Paper Session: <ul style="list-style-type: none"> <li>• <a href="#">Ecology &amp; Carbon</a></li> </ul>	EV1-353
3:45pm - 4:45pm	Themed Paper Session: <ul style="list-style-type: none"> <li>• <a href="#">Geomatics: GIS and Remote Sensing</a></li> </ul>	EV2-2022
5:00pm - 5:15pm	Final Remarks and Thanks	EV1-221
5:15 - 5:30pm	Networking / Transition to <a href="#">Pub Crawl</a>	EV1 Courtyard (EV1-250)

## Pub Crawl Information

### 7:30pm

- **Meet at** [Waterloo Public Square](#)
- As a group, we'll walk to our first location
  - **First location: Prohibition**
- Depending on the group size and preferences we may stay at Prohibition for 1.5 hours
  - From **Prohibition** (around **9pm**) we'll either go to **Huether's Hotel** or **Ethel's Lounge**, dependant on vibe
- **Potential Locations** (dependent on group size, preferences, and the vibe check)
  - **Abe Erb** (Vibe: sit-down brewery, indoor only)
  - **White Rabbit** (Vibe: louder atmosphere, indoor only)
  - **Beer Town** (Vibe: sit down bar/food, outdoor option)
  - **Jane Bond** (Vibe: sit down bar, has outdoor and indoor sitting, food)
  - **Erb and Culture** (Vibe: only dance)
  - **The Drink** (Vibe: only dance)
  - **Pub on King** (Vibe: dance optional)

## Plenary Panel Session

**Time:** 10:45am - 12:00pm

**Meeting Room:** EV1-221 (EV1-courtyard backroom)

All conference attendees are welcome to participate in our plenary session featuring outstanding PhD researchers in the Faculty of Environment.

**Below are the topics for this session:**

- **Waves of Wisdom:** What strategies can be employed to encourage collective action or collaboration within research?
- **Charting the Unknown: Exploring New Frontiers in Environmental Research:** How can young researchers navigate uncharted waters and contribute to cutting-edge knowledge in the field?

### Panelists

#### ***Isabel Jorgensen, PhD Student in Social and Ecological Sustainability (SERS)***

Isabel Jorgensen is a doctoral candidate in the School of Environment, Resources and Sustainability at the University of Waterloo. She is conducting a transdisciplinary research on the impact of rural-to-urban water transfers and development transitions on terminal lake systems, with an in-depth focus on the Salton Sea in Southern California. Her research addresses the puzzle in the collective action scholarship about why large groups fail to work together to prevent environmental collapse, even when the consequences should motivate them to do so, and how inequalities prevent collective action. Isabel holds a MSc in Water Science, Policy and Management from The University of Oxford (UK) and B.A (Hons) in Environmental Science from Trinity College Dublin (Ireland). She has written, published various publications, received multiple awards for her leading roles in environmental groups and has an extensive track record of leadership, notably she is the current chair of the Society of Water Institute Graduate Students (SWIGS).

#### ***Kaylia Little, PhD Student in School Of Environment, Enterprise And Development (SEED)***

Kaylia Little is a doctoral candidate in the School of Environment, Enterprise and Development (SEED) and previously completed her Master in Development Practice. Her current research focuses on energy transitions in the Arctic, specifically investigating how Nunavummiut understand the territory's past and present energy system. Kaylia has worked as a researcher and policy analyst in both provincial and territorial policy spaces across Canada. Her doctoral research has been supported by the Energy Council of Canada, the Social Sciences and Humanities Research Council of Canada, Global Affairs Canada, and most recently she has received an Ontario Graduate Scholarship.

***Nathanael Bergbusch, PhD Student in Social and Ecological Sustainability (SERS)***

Nathanael Bergbusch (he/him) is a doctoral candidate in the School of Environment, Resources and Sustainability at the University of Waterloo. His current research focuses on making environmental impact assessment and watershed planning more inclusive of regional ecosystems and communities. This interest stems from his master's research, which explored the cumulative impacts of wastewater, agriculture, and climate on the water quality of prairie freshwater systems and implications for people downstream. Nathanael is currently the University of Waterloo representative for the Canadian Rivers Institute and previously served as the president of the Environment Graduate Student Association at the University of Waterloo. He has also worked extensively with Amnesty International Canada and is passionate about human rights and environmental justice.

***Elisha Ochieng Okoth, PhD Student in Social and Ecological Sustainability (SERS)***

Elisha Ochieng Okoth (he/him), originally from Nairobi, Kenya, is a Ph.D. candidate in the School of Environment Resource and Sustainability researches Sustainable Water Solutions and Renewable Energy Technologies for Water Treatment and Supply. His primary focus is on enhancing water access and transparency in Sub-Saharan Africa using Geospatial Analysis. Elisha's academic journey includes a Master's Degree in Environmental Science from Tongji University, China, where he investigated water quality and algae removal technologies. He also has valuable professional experience in water management and is an active member of the Organization of African Academic Doctors (OAAD). Elisha enjoys community service and sports in his free time.

## Poster Sessions

**Time:** 1:30-2:15 pm during networking lunch.

Posters will be available for viewing in the **Environment 1 Courtyard (EV1-250)**. Below, you can find a list of posters available for viewing on the day of the conference.

<b>Jeffrey Welch</b>	<b>MSc, GEM</b>	<b>Poster</b>
<p><b>Tundra Snow Density Estimates from Satellite Passive Microwave Remote Sensing and Automatic Weather Station Measurements</b></p> <p><i>This research proposes a novel method to monitor bulk snow density on scales not previously observable. Traditional methods for estimating snow density estimates are limited to manual measurements, and as such, are not easily scalable in terms of time or space. Instead, automatic weather station measurements are used to parameterize a two-layer snowpack model to facilitate passive microwave retrievals of snow density over large areas.</i></p>		
<b>Oluwabamise Afolabi</b>	<b>PhD, GEM</b>	<b>Poster</b>
<p><b>Carbon cycle feedbacks of temperate forested wetlands under a changing climate</b></p> <p><i>Forested wetlands (swamps) support carbon (C) storage in their biomass and in some cases they also accumulate C in the form of peat. Carbon storage and other C cycling processes in swamps rely on unique hydro-climatic conditions that may be altered under climate change (CC). In particular, the C stored in forested wetlands across Southern Ontario (SON) are susceptible to CC impacts that may contribute a positive climate feedback. To understand the C dynamics of temperate forested wetlands under CC, this study assessed the response of swamp C flux to future climate conditions at a forested wetland in SON</i></p>		
<b>Zeinab Akhavanhamzeh</b>	<b>PhD, GEM</b>	<b>Poster</b>
<p><b>Soil State Monitoring during Fall 2022 and Winter 2023 at an Experimental Site in Ontario, Canada to Support L- and Ku-band SAR Observations of Snow from the CryoSAR Airborne System</b></p> <p><i>During the 2022-2023 winter season, field measurements were taken to monitor the variations in the soil moisture and freeze-thaw state of the near-surface soil under both snow-free and snowcovered conditions. Measurements of soil moisture and temperature parameters were conducted across six stations to track the soil freeze-thaw oscillations over these field sites. Each station was equipped with two Steven's Hydra Probe soil sensors (installed vertically), capable of measuring the soil moisture, temperature, permittivity, and electrical conductivity parameters from the top 0-5.7 cm of soil. The Hydra Probe uses the potential of the radio wave (50 MHz) reflected back from the soil to calculate soil's dielectric permittivity. The magnitude of the complex dielectric permittivity is subject to fluctuations of moisture and salt present in the soil. Additional multiple i-button temperature loggers were installed to measure the temperature at different depths. Airborne CryoSAR observations of the field site were conducted using a multi-frequency fully polarimetric Synthetic Aperture Radar (SAR) system operating at Ku- (13.5 GHz) and L-band (1.3 GHz) with the aim of characterizing the freeze-thaw state of the underlying soil more comprehensively for research into snow mass estimation. This paper describes the variations in soil moisture status at the</i></p>		



*six soil stations during the winter (in solid and liquid format) and the response from the Ku- and L-band SAR observations. This work is being conducted to support the Terrestrial Snow Mass Mission in planning at Environment and Climate Change Canada and the Canadian Space Agency*

<b>Stephanie Cruz Maysonet</b>	<b>PhD, SERS</b>	<b>Poster</b>
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**A scoping review of landscape performance evidence for ecological parks**  
*Ecological parks are a type of urban park where landscape design incorporates scientific ecological knowledge to jointly pursue benefits for nature and people and advance sustainability goals. Aiming to determine the state of knowledge on the success of these parks, the present scoping review examined performance evidence for 67 ecological parks in six countries. Evidence was quantified for 37 benefit categories across environmental, social, and economic performance dimensions. This presentation will highlight common and uncommon benefits and emerging research targets.*

<b>OrganizeUW (Katie Pita)</b>	<b>PhD, SERS</b>	<b>Poster</b>
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**OrganizeUW - TAs and RAs are ready for our union!**  
*The University of Waterloo is the last large university in Canada with no union for student workers like TAs and RAs. So we are forming one. By forming our union, we'll be able to use our collective power to win fair pay, employment security, transparent hiring processes and more, as well as provide community and support for each other. OrganizeUW is a student-run campaign for student workers. Our presentation will give a brief overview of how the campaign is progressing, how to find more information about OrganizeUW, and how each TA and RA can play an important role in forming our union together.*

## Themed Paper Sessions

Each session block **may** contain a mix of **regular full length paper sessions** OR **lightning talks** (time-frames described below).

**SERS Paper Presentations:** 20-25 Minutes (15-20 minute presentation, 5 minutes Q&A)

**Paper Presentations:** 15 Minutes (10 minute presentation, 5 minutes Q&A)

**Lightning Talks:** 5 Minutes (3 minute presentation, 2 minute Q&A)

### Community Planning

**Time:** 12:15pm - 1:15pm

**Meeting Room:** EV1-353

**Session Chair:** Connor McRae-Pharo ([cmcraepharo@uwaterloo.ca](mailto:cmcraepharo@uwaterloo.ca))

<b>Adam Skyoles</b>	<b>PhD, PLAN</b>	<b>Oral Presentation</b>
<p><b>The Assessment of Natural Features in the Residential Development Planning Process</b>  <i>The goal of the study is to understand how natural features, like trees and wetlands, are considered in residential development applications, particularly with respect to climate change and stormwater management. We also hope to understand how new tools to promote consideration of natural features could be designed to fit into the process in a way where they will get widely used by stakeholders. Through interviews with professionals in residential development, this research will help inform the creation of tools that could help make green infrastructure more appealing to developers and help municipalities reach their climate change goals.</i></p>		
<b>Tara Chen</b>	<b>PhD, GEM</b>	<b>Lightning Talk</b>
<p><b>Everything &amp; Everywhere is Public Health</b>  <i>This presentation is an invitation to think about geography from a public health lens. Health geography recognizes the importance of context, setting, and spatial scale from global to local. The application of geographical information, perspectives, and methods to the study of health, disease and health care is a field of interdisciplinary research that is compelling to the evolving nature of health care delivery. An overview of social prescribing, a public health concept will be highlighted through the geography lens.</i></p>		
<b>Alexa Bennett</b>	<b>PhD, GEM</b>	<b>Lightning Talk</b>
<p><b>Exploring the impact of climate shocks on access to WASH services: Implications for maternal and reproductive health in sub-Saharan Africa</b>  <i>Extreme weather events that are prompted or exacerbated by climate change, worsen inequities in access to water, sanitation, and hygiene (WASH) services by threatening the availability and quality of such services and compromising the safety of women and girls. If climate adaptation strategies are to be gender-responsive, the mechanisms by which women are uniquely affected by climate shocks must be explored. This research proposes to investigate how climate-related disruptions to WASH services impact health and wellbeing across the female reproductive life course.</i></p>		

Alex Petric	PhD, PLAN	Oral Presentation
<p><b>Housing, social capital, and complexity: A mixed-method research program</b></p> <p><i>Where we live strongly impacts our social lives, including who we know and how well we know them. Ongoing processes of urbanization will in turn shape our experiences in our neighbourhoods and communities. In particular, past research has found that residential density can impact one's social capital (assets that one can access through one's social connections), though the relationship's direction is unclear. Following introductory content, I will share my proposed dissertation research program to apply a complexity lens to the study of how residential density and built-form aspects impact individual and community social capital in Waterloo Region.</i></p>		

## Ecology & Carbon

**Time:** 2:30pm - 3:30pm

**Meeting Room:** EV1-353

**Session Chair:** Ariana Mansingh ([ariana.mansingh@uwaterloo.ca](mailto:ariana.mansingh@uwaterloo.ca))

<b>Tim Alamenciak</b>	<b>PhD, SERS</b>	<b>Oral Presentation</b>
<p><b>Volunteer Engagement in Ecological Restoration</b>  <i>The motivation and organization of volunteers is a key factor in engaging people in ecological restoration. My research examines volunteer motivations, project organization and restoration as a convivial community tool. The results of a systematic literature map, survey and qualitative case study will be reported.</i></p>		
<b>Kate Pita</b>	<b>PhD, SERS</b>	<b>Oral Presentation</b>
<p><b>Historical values and ecosystem services of woodland and mixed-use landscape in southeast England</b>  <i>Traditional land management practices, such as woodland coppicing, represent one way to combat the impacts of climate change. Historical practices such as these are long-standing for over a thousand years and have therefore withstood significant climate variation. In this presentation, I will provide an overview of my research into the historical and present-day benefits, or “ecosystem services,” that coppicing provides as a land management strategy, and outline how it can continue to provide those benefits under future climate change scenarios.</i></p>		
<b>Nazia Tabassum</b>	<b>PhD, GEM</b>	<b>Lightning Talk</b>
<p><b>Seismic lines and their effect on peatland carbon cycling</b>  <i>Peatlands in Canada store significant carbon in their soil and vegetation, while also emitting methane and absorbing carbon dioxide. Linear disturbances like seismic lines can lead to diverse responses in these ecosystems. My research examines how different features of seismic lines affect vegetation and carbon sequestration in these peatlands.</i></p>		
<b>Maryam Bayatvarkeshi</b>	<b>PhD, GEM</b>	<b>Oral Presentation</b>
<p><b>Environmental controls on actual ET in a peatland altered by a seismic line</b>  <i>Seismic lines are long clearings across the landscape created during geophysical exploration activities. The implications of these anthropogenic disturbances have been studied in several investigations; however, information on evapotranspiration and effective parameters for its estimation is largely absent. This study focuses on the relationship between evapotranspiration and environmental factors on the seismic line and an adjacent wooded peatland near the town of Conklin, Alberta. For this purpose, actual evapotranspiration (ET<sub>a</sub>) was measured by weighing lysimeters, and weather variables were collected from the meteorological stations from May to August 2022. The correlation between ET<sub>a</sub>, weather variables, soil temperature (T<sub>s</sub>), and groundwater table (GWT) was conducted by the Pearson correlation coefficient. The findings indicated that there is a significant correlation between ET<sub>a</sub> and T<sub>s</sub>; however, a nonsignificant relationship between ET<sub>a</sub> and GWT was observed. Among weather variables, net radiation had a significant impact on ET<sub>a</sub> compared to other parameters. Overall, more variation in ET<sub>a</sub> was explained by environmental factors on the seismic line than that in the undisturbed wooded peatland.</i></p>		

## Geomatics: GIS and Remote Sensing

**Time:** 3:45pm - 4:45pm

**Meeting Room:** EV2-2022

**Session Chair:** Sukhdip Kharoud ([sskharoud@uwaterloo.ca](mailto:sskharoud@uwaterloo.ca)) & Amerald Fang ([axlfang@uwaterloo.ca](mailto:axlfang@uwaterloo.ca))

<b>Katie Pita (Organize UW)</b>	<b>PhD, GEM</b>	<b>Lightning Talk</b>
<p><b>OrganizeUW - TAs and RAs are ready for our union!</b>  <i>The University of Waterloo is the last large university in Canada with no union for student workers like TAs and RAs. So we are forming one. By forming our union, we'll be able to use our collective power to win fair pay, employment security, transparent hiring processes and more, as well as provide community and support for each other. OrganizeUW is a student-run campaign for student workers. Our presentation will give a brief overview of how the campaign is progressing, how to find more information about OrganizeUW, and how each TA and RA can play an important role in forming our union together.</i></p>		
<b>Tyler Herrington</b>	<b>PhD, GEM</b>	<b>Oral Presentation</b>
<p><b>Bias Correction of ERA5-Land Soil Temperatures over the Arctic</b>  <i>Reanalysis products provide spatially homogeneous coverage for a variety of climate variables in regions where observational data are limited. However, soil temperature estimates in many reanalysis products are biased cold by 2-7K across the Arctic. Here we explore the utility of mean bias subtraction, multiple linear regression and random forest regression to bias-correct soil temperatures from ERA5-Land, using information about the thermodynamic state of the land surface, air temperature, and remotely sensed data regarding snow cover and vegetation.</i></p>		
<b>Danielle Halle</b>	<b>PhD, GEM</b>	<b>Oral Presentation</b>
<p><b>Glacier melt mapping with SAR remote sensing and machine learning</b>  <i>In this study satellite imagery from synthetic aperture radar (SAR) from Sentinel-1 was used to analyze and monitor surface glacier ice melt duration and extent over Devon Ice Cap, Nunavut in the Canadian Arctic Archipelago during eight melt seasons from 2015 to 2023. The results of this study leverage hundreds of SAR data accessible from Google Earth Engine and uses machine learning to reconstruct the glacier melt record at a high temporal and spatial resolution. The resulting maps show localized impacts of increasing air temperature on the ice cap and demonstrate the large interannual variability of melt extent on Devon Ice Cap. This is important for assessing the impacts on the firn layer and the ability for the ice cap to buffer any additional losses to the glacier system for future melt seasons. In addition, nine shallow firn cores and ground penetrating radar surveys were extracted from Devon Ice Cap in the Spring of 2021, 2022 and 2023 and were compared against the SAR melt record as validation. The results of this fieldwork and SAR glacial melt mapping are presented here and are preliminary results for a wider assessment of the entire CAA and its historical melt record from SAR imagery.</i></p>		
<b>Akash Senthilkumaran</b>	<b>Masters, GEM</b>	<b>Oral Presentation</b>
<p><b>How does the Gundar River Basin breathe?</b>  <i>Evapotranspiration (ET) is the sum of transpiration from plants and evaporation from the land. ET plays a key role in agriculture, where determining the agricultural water demand is pivotal for resource allocation to ensure a successful harvest. In this study, we focus on the Gundar River Basin (GRB), one of the major river basins of Tamil Nadu, India, with a total drainage area of 5690 sq. km. Since point</i></p>		

*measurements of ET are laborious and time-consuming, satellite imagery is used to predict ET in this study. Hence, the Surface Energy Balance Algorithm for Land (SEBAL) is employed for the basin-wide estimation of ET. SEBAL primarily utilizes satellite data and is founded on the idea that all energy exchanges on the Earth's surface are driven by incoming net solar radiation. Along with the satellite input, SEBAL preferably requires meteorological data from weather stations to predict ET. However, the drawback of station data is that it provides a point measurement and is not available across the spatial domain. Therefore, for this study, GLDAS (Global Land Data Assimilation System) data with a 3-hour temporal and 0.25' spatial resolution is used. The study strives to improve the accuracy of the data by carrying out a correction procedure based on the station data and using the method of interpolation to cover the spatial domain. Apart from quantifying ET from different land forms, the study aims to analyze ET from prosopis juliflora, a widely prevalent invasive plant species to enhance the understanding of the land cover dynamics in the region.*