Oral Paper Presentations

Multidisciplinary Perspectives on Coastal Research and Management

Chair: Dr. Phillipe Wernette (University of Windsor)
Time: 8:30-10:00am
Location: QC 506

Assessing Barrier Island Resiliency through Multi-Scale Topographic Anisotropy Distribution Patterns

Jacob Lehner, Phillipe A. Wernette, Michael P. Bishop, and Christopher Houser (University of Windsor)

The resiliency of a barrier island, its ability to return to form and ecological function after storms, is of key scientific importance with further climate change and sea level rise. Response depends on relative height of the storm surge and the dunes, both heavily influenced by anthropogenic activities. Barrier island morphology and the anisotropic nature of barrier islands highlights the complexities of topographic evolution. Understanding this evolution is critical for assessing how barrier islands respond and recover through time. The purpose of this research is to assess the scale-dependent distribution patterns of topographic anisotropy to characterize changes in process regime influences (i.e., wind dominated, wave dominated, current dominated) and barrier island resiliency. The method presented is an evaluation of the scale-dependence of topographic relief and symmetry for multi-temporal LiDAR-derived DEMs of Padre Island National Seashore. We do not assume topographic symmetry in computing directional dependence of the minimum relief. We generate false-color composite images of anisotropy parameters to examine scale-dependent relief, terrain orientation and symmetry patterns for multiple years. Results demonstrate that beaches, washover channels, foredunes, and back barrier regions exhibit unique distribution patterns of terrain orientation and symmetry. Multitemporal patterns of anisotropy parameters reveal variations in the spatial and temporal complexity of barrier island evolution. Consequently, it is possible to identify and map barrier island locations that are stable, recovering, or failing to recover. Objective spatial delineation of these areas can potentially be used to assess the polygenetic evolution of barrier island topography, thereby providing scientists with a better understanding of how coastal process regimes influence barrier island resiliency.

Spatial and Temporal Variation in Drownings on the Great Lakes: 2010-2016

Brent Vlodarchyk (University of Windsor)

Drownings on the Great Lakes are increasingly recognized as a public health issue in both Canada and the United States. Rip currents and other surf hazards are difficult to predict in both time and space, resulting in few beach users being able understand how to identify and avoid the hazard. This study examines the spatial and temporal variation of drownings on the Great lakes between 2010 and 2016. A total of 349 drownings have occurred on the Great Lakes between 2010 and 2016, with the majority of drownings on Lake Michigan in 2012 and 2016. In this study, I examine the specific weather patterns at the time of drowning events and in the hours leading up to each drowning, in addition to

the demographics of the victim. These variables are examined with the purpose of identifying common factors among drowning events that can be used to improve rip and surf forecasts. Specifically, GIS (Geographic Information System) is used to show the spatial and temporal variation in the drownings, as well to serve as an important database for future research. Preliminary evidence suggests that water temperatures, wind speed and direction are important predictors of whether particular user groups (based on age, gender and location) are at risk of drowning. Results of this study will be used to determine the conditions that increase the risk of drowning in the Great Lakes, which will in turn serve as a basis for the development of an improved warning system and intervention strategies to reduce the number of drownings.

Slap you in the face: A study of rip current warning dissemination methods

Alexandra Scaman (University of Windsor)

Rip currents are seaward directed currents that can pull individuals offshore, even experienced swimmers can drown under the right conditions. The frequency of rip current fatalities in the Great Lakes suggest there is a disconnection between the delivery of safety messages or warnings, and individual processing of that information. People notice, accept and respond to warnings in unique ways based on a combination of factors including age, genders, and their self-rated swimming ability. More study needs to be conducted on the effect these factors have in how individuals interpret these messages and as a result; their likeliness to be caught in a rip current. The purpose of this paper is to increase rip current safety and awareness for beach goers in the most efficient way possible.

No Speak, No Hear, No See: Improving Warning Systems for Rip Currents on the Great Lakes

Hannah Burdett (University of Windsor)

A rip current is a natural hazard that has received little attention within the Great Lakes. Without proper education and warning systems, unsuspecting beach users may enter the surf zone and place themselves in a dangerous situation. Understanding the danger that rip currents pose on the Great Lakes as well as where and when rip currents tend to develop is critical for limiting drownings and rescues. The purpose of this study is to determine whether existing warning systems in the United States and Canada provide an effective forecast. Specifically, an analysis was completed on the currently established rip current warning system presented by the National Weather Service and Environment Canada. The analysis focused on the amount of information that was provided to the public, the geographic extent of the warnings and whether the warnings were heeded by beach users. A survey, that was developed by University of Windsor student researchers, was completed by the public to determine how many people have seen a rip current warning before going to a beach on the Great Lakes, and how well they comprehended the warning. Respondents were also asked about their understanding of the warning systems and questioned about their knowledge of how to avoid or escape the hazard. GIS was also used to determine if there was a spatial correlation between drowning locations in the Great Lakes and the warnings provided by the National Weather Service and Environment Canada. Preliminary results suggest that the warning systems used in the United States and Canada lacks in both efficiency and effectiveness. Specifically, it is argued that the National Weather Service rip current warning system is not easily accessible to the public and provides inconsistent information in both space and time. Results will be used to improve the rip warning

system used for the Great Lakes so that it is easily accessible as well as easy to comprehend. The aim of this study is to reduce the number of deaths that occur each year in the Great Lakes.

Management of Environmental Degradation Related to Marine Tourism in the Canadian Arctic: Toward the Development of Guidelines

Pierre-Louis Têtu (University of Ottawa)

Since 1995, the melting of sea ice in the Arctic spawn speculations on the capacity of Canada to ensure sovereignty in the North. The significant reduction in average Sea-Ice extent in the Canadian Arctic Archipelago since the mid-2000's has resulted in nearly 75% growth in marine activity in the region; the number of pleasure craft and cruise ships more than quadrupled and doubled since 2007. Elsewhere in the Arctic, the rapid growth of marine tourism activities prompted actors to set up a management process of environmental degradations; it is notably the case in Svalbard, Antarctica and Franz Josef Land in the Russian Arctic. In the Canadian part, the absence of such visitor guidelines and the clear lack of academic work on the degradation of highly shore visited sites have been repeatedly emphasized by researchers in the Polar Tourism Field. Based on previous GIS-analyzes, this paper aims to identify the most visited shore locations in Canada Arctic since 1990 by both cruise ship and pleasure craft and to determine the state of degradation of these sites, if any. Through a presentation of the methodologies of initiatives developed elsewhere in the Arctic, this presentation also aims to highlight the methods and technologies we use in our SSHRC-funded project to assess the risk degradation, as well as the alternative technologies to assess a site despite all the constraints in the North, their strengths and weaknesses. We will be discussing the development of conservation areas in the Canadian Arctic and the geopolitical transcripts.

Management Implications of Hurricane Harvey for Padre Island National Seashore

Phillipe Wernette, Chris Houser (University of Windsor), and Andrew Evans (Texas A&M University)

Hurricane Harvey caused widespread damage and destruction to coastal resources and communities when it impacted the Texas coast on 25 August. Strong wind, waves, and storm surge substantially eroded the beach and dunes, causing significant scarps and berms. This paper presents an assessment of the geomorphological changes caused by Hurricane Harvey at Padre Island National Seashore (PAIS), Texas. LiDAR surveys in the years preceding Harvey serve as a baseline for erosion/deposition by the hurricane. Post-storm geomorphology was assessed through oblique photographs, shore-normal survey-grade GNSS surveys, and a high-resolution (1.5 cm ground sample resolution) UAS survey encompassing a 14-km stretch of the beach and dunes. Results demonstrate that the beach and dune system sustained substantial erosion as a result of Hurricane Harvey. In addition to geomorphic change on the open-marine coast, backbarrier geomorphology sustained substantial erosion and damage to park resources/facilities. The post-hurricane surveys in this paper will serve as valuable baselines to assess how the island recovers short- and long-term. The patterns of recovery are being used by the National Park Service staff to balance long-term island trajectories with shorter-term societal and political pressures.

Remote Sensing of Forest Ecosystems

Chair: Dr. Karin van Ewijk (Queen's University)
Time: 8:30am-10:00am
Location: JDUC 352

Improving predictions of aboveground forest carbon accumulation rates in Southeastern Ontario forest

Marczak, P. Scott, N., and Treitz, P. (Queen's University)

Globally, forests represent the largest terrestrial carbon sink, two percent of which are found in Ontario. Rates of forest carbon accumulation (FCA) in Canada have traditionally been quantified using recurring in situ plot measurements while future stores have been predicted using growth and-yield models. These models are not spatially or temporally continuous and do not account for climate variability. In this study two remote-sensing based methods, LiDAR (Light detection and ranging) and FAPAR (Fraction of absorbed photosynthetically active radiation), are being investigated to forecast aboveground mixedwood FCA. This research aims to answer the question: can predictive models based on remotely-sensed estimates of forest properties be used as an effective substitute to traditional growth-and-yield models for predicting spatially explicit aboveground FCA? Preliminary analyses examined FCA and changes using recurring plot measurement data in a growth-and-yield model. The use of LiDAR to predict stem diameter distribution was also examined as a means to initialize the growth-and-yield model. In addition, a FAPAR-initialized light-use efficiency predictive model was developed to predict FCA. It is hypothesized that due to the level of detail required, remotely-sensed methods will likely provide more accurate spatial and temporal estimates of carbon storage over large areas as they capture spatial variability in factors altering FCA that may be overlooked in a ground-based sampling system. It is anticipated that the results will provide insight into new methods that can be applied regionally to quantify and forecast FCA changes in Ontario, information that can be used for sustainable forest management and carbon accounting.

Identifying songbird habitat from forest structure using LiDAR

Rachel Wasson and Paul Treitz (Queen's University)

Three-dimensional data can be collected using light detection and ranging (LiDAR) technology and used to generate a dense point
cloud capable of modelling forest structure. These data provide a unique opportunity to examine forest structure in the context of habitat suitability for forest-dwelling songbirds.Furthermore, this type of habitat suitability analysis is particularly well suited to species that occupy unique spaces in structurally complex and diverse sites (e.g. Cerulean Warbler, which prefers nesting in the upper canopy of taller deciduous trees). Thus, it is anticipated that LiDAR-derived structural variables can be used to map and predict suitable forest-dwelling bird species habitat.This presentation will provide an overview of the application of LiDAR-derived variables in relation to bird habitat, as well as discuss an ongoing project at the Queen's University Biological Station. This project combines aerial LiDAR data, field measurements collected at forest inventory plots and audio surveys to study songbird habitat for species of conservation interest.

Species-specific Diameter Distribution Modeling using a Hybrid ABA-ITC Approach in a Complex Forest Ecosystem

Karin van Ewijk (Queen's University), Eva Lindberg (Swedish University of Agricultural Sciences), Paul Treitz (Queen's University), and Murray Woods (Ontario Ministry of Natural Resources and Forestry)

Recent advances in airborne laser scanning (ALS) technology include the development of multispectral ALS systems, which not only collect higher density ALS returns but, more importantly, intensity information from the green (532 nm), NIR (1064 nm) and SWIR (1550 nm) regions of the electromagnetic spectrum. By utilizing structural and intensity information derived from these data, it potentially allows for the prediction of enhanced Forest Resource Inventory (eFRI) attributes, such as diameter distributions, at the tree species level. Diameter distribution is an important attribute for the assessment of the growing stock, management regime or timber assortment at the forest stand and forest level. The goal of this research is to model species-specific diameter distributions using a hybrid area-based approach (ABA) and individual tree crown (ITC) approach. The ITC serves as a bottom-up strategy, i.e., identifying individual trees and their species, and the ABA is top-down, i.e., imposing conditions and constraints to the ITC approach. The study is conducted in a temperate mature mixedwood forest in Ontario, using multispectral ALS data that was acquired in July 2016. In terms of ITC, previous studies in the boreal forest in Sweden have shown that the delineation of individual trees in the upper canopy layer and the canopy layers below can be achieved using a two-step ITC approach, and that tree species identification is feasible from multispectral ALS. Studies in Ontario have shown that ALS-based ABAs provide robust predictions of diameter distributions, eFRI attributes, and tree species composition. The combination of these approaches will be tested in the Petawawa Research Forest.

Direct classification of LiDAR point clouds for modeling land cover

Danielle Beaulne, Georgia Fotopoulos, Stephen Lougheed (Queen's University)

Classification of landscape features (e.g. land cover types) using light detection and ranging (LiDAR) data is typically performed after transforming the 3-dimensional point cloud into a raster image. Our study quantifies the accuracy of classifying LiDAR data pre- and post-rasterization when used to generate land cover classification models. The effects of using pixel- or object-based image analysis are also investigated. Airborne LiDAR data were collected over the Queen's University Biological Station properties at a resolution of 1pt/m2 in June, 2016. Areas of open water, wetlands, forest, fields, roads and inundated forests were identified. Accurate classification of land cover is essential for landscape genetics studies, which correlate environmental variables such as land cover and topography with the genetic structuring of populations. In this study, we quantify genetic diversity of Pseudacris crucifer, a small woodland frog dependent on wetlands for breeding in the spring, but inhabiting adjacent woodlands throughout the remainder of the year. Models of Pseudacris crucifer's dispersal from natal ponds to breeding ponds in successive years requires accurate land cover classification, as it is hypothesized that landscape features may modulate the direction and distance of individual dispersal. Land cover models derived from the point cloud and from a rasterized representation were used to generate landscape resistance models, which quantify landscape cover that facilitates or impedes movement. We assess the impact of modeling options on the accuracy of land

cover models and on the similarity between landscape resistance models, and make recommendations for other studies that wish to employ such approaches.

Public Health & Medical Geographies

Chair: Breah Talan (Queen's University)
Time: 8:30-10:00am
Location: JDUC 351

Immigration and Chronic Inflammatory Diseases: Examining Understandings of Health among 1st and 2nd Generation South Asian Populations

J.D. Ferrari, K. Wilson, V. Kuuire, and J. Carlos (University of Toronto Mississauga)

Global migration of human populations is occurring at an unprecedented rate throughout the world, yet we do not fully understand how migration impacts health and disease development. Specifically, the effect of human migration patterns on the rate of chronic inflammatory disease (CID) development is not well understood. Research has shown that children of South Asian migrants born and living in Canada and other 'Western' countries have a significant yet unexplained increase in the risk of developing a CID, especially Type 1 Diabetes, Multiple Sclerosis, and Inflammatory Bowel Disease. While the South Asian community represents a significant and growing population in the Greater Toronto Area (GTA), totaling approximately 700,000 individuals, understandings of health beliefs and healthcare needs within this community are still not well understood. The purpose of this research is to address this important health issue by examining understandings of chronic inflammatory conditions (CIDs), experiences with the diagnosis of CIDs, access to health care services, and perceived risk factors for CIDs. In-depth interviews were conducted with a total of 12 affected second-generation South Asian 'children' and 9 first-generation South Asian parents of affected 'children'. Interviews suggest most parents have no knowledge or awareness of CID's prior to their child's diagnosis. Most 'children' reported the internet as their primary source of information for CIDs while parents identified healthcare providers as their primary source. All parents indicated that the process of diagnosis was difficult and had a large impact on their lives. Interestingly, in terms of perceived risk factors for developing a CID, both parents and 'children' reported a change in diet as a main risk factor for developing a chronic inflammatory disease, whereas children reported differences in diet and physical activity. Our findings suggest at risk South Asian immigrants in the GTA do not have a strong understanding of CIDs. Further research is required to support these findings; however, it is evident that culturally appropriate healthcare and accessible healthcare education would certainly benefit this growing population in the GTA.

Exploring the determinants of population wellbeing in Ghana

Joseph Kangmennaang and Susan Elliott (University of Waterloo)

We live in a world faced by unprecedented change. In the face of such intense and rapid change, it is difficult to fathom how we might define and monitor related impacts on the wellbeing of population(s). This is especially the case in low to middle income countries that lack holistic national wellbeing measures but are the most impacted. As part of larger project that aims to develop a Global

Index of Wellbeing (GLOWING), this study examines the factors associated with wellbeing in Ghana. Informed by the Eco-social and Capabilities frameworks, we collected survey data (n =1,036) from three regions in Ghana to assess population wellbeing across several domains. Using structural equation modelling, we show the relative contribution of factors to wellbeing and explore the pathways between domains and wellbeing. The results show that improved wellbeing was strongly associated with living standards (job security, water security), sense of community, healthy living and leisure. For instance, Ghanaians with secured jobs (OR=3.02, $p \leq 0.01$) were more likely to report improved wellbeing compared to those with poor job security. The results also show the determinants of national wellbeing are multi-dimensional, extends beyond income to include other equally important factors. Wellbeing measures that capture social, cultural and geographically relevant indicators are urgently needed to measure what matters and ensure that public policy addresses what matters most.

"It is different for everyone and everyplace": people, place and the rise of chronic disease in Ghana

George A. Atiim and Susan Elliott (University of Waterloo)

Globally, we face an epidemic of chronic diseases. Heart disease, cancers, diabetes, chronic respiratory diseases continue to rise in most parts of the world. By 2030, deaths from chronic diseases are projected to rise with the largest expected increase in the Africa region. Increasing life expectancy, globalization, economic growth, and urbanization are contributing to lifestyle behaviours such as consumption of unhealthy diets, alcohol and tobacco use important risk factors for developing chronic diseases. Yet, important geographical differences exist in the way NCDs develop, shape livelihoods/experiences and the ways public health respond to these emerging issues. Drawing on data from twenty (20) health level stakeholders, this study describes how compositional and contextual factors in Ghana, a lower middle income country, create vulnerabilities that increase the risk for chronic diseases. The results reveal that while hypertension, stroke and diabetes are the dominant reported chronic conditions across health facilities among adults, lymphomas-cancer, leukemia and retinoblastoma-cancer are most common in childhood. Results also highlight disparities in chronic disease incidence and risk across socio-demographic characteristics (e.g. age, sex, education, income) and geographic location (e.g. rural-urban, intra-urban differences). Intraregional outcomes are related to a plethora of cultural (e.g. differential dietary practices, traditions), and environmental factors (e.g. access to facilities, migration, weather variability) that interact to produce disease risk. The results highlight the need for context-specific understanding of health risks in order develop appropriate interventions to address the growing epidemic of chronic disease in developing countries.

A geographic investigation of wait times for MRI services in Ontario

Breah Talan (Queen's University)

Diagnostic imaging plays a crucial role in frontline healthcare, providing the information some physicians need to make a diagnosis and determine the course of treatment for their patients. However, wait times for access to this service continue to be long, often far exceeding stated benchmarks. The issue of lengthy wait times in Canada is both socially and politically charged, particularly because "waiting lists" are typically viewed as a proxy of access to medical care. The

topic is widely reported in mainstream media and has been targeted by both federal and provincial governments. While many scholars have looked to provide solutions for reducing these wait times, less attention has been given to the geographic variance in wait times and the factors that might contribute to these inequities. Using data collected by the Ministry of Health and Long-Term Care, this paper seeks to determine how wait times for MRI services are distributed throughout Ontario. The average time between when an MRI was ordered and when it was completed was analyzed on a monthly basis for diagnostic scans that occurred between January 2014 and December 2016. Facilities were classified based on hospital type and organized according to the Public Health Unit region they were located in, which allowed for a spatial understanding of the highest and lowest wait times for MRI services in Ontario. These results will be used to inform future research that examines the sociodemographic characteristics of these health regions and explores the influence that waiting can have on patient experience.

Exploring the Health of University Undergraduate Students in Relation to Housing Accommodations

Mangroo, S., Barakat-Haddad, C., Nonoyama, M., Sanchez, O. (University of Ontario Institute of Technology)

This research examines the links between type of housing and health of university undergraduate students (n=213) at the University of Ontario Institute of Technology (UOIT). Housing was classified into three categories of housing accommodations: at home with their families, on-campus residences, and off-campus housing.Guided by the Population Health Framework, a self-administered health questionnaire was developed for the purpose of this research. The research objectives include: 1) to assess the environmental and personal lifestyle exposures of UOIT undergraduate students, in relation to the three different types of housing accommodations; 2) to assess the general health of UOIT undergraduate students, with a focus on respiratory, gastrointestinal, and dermatological health; and 3) to examine predictors of related health outcomes. The health questionnaire collected data related to the students' physical environments, social environments, genetic endowment, individual and behavioral responses, health and function, and health care. Analysis included undertaking multivariate analysis to examine predictors of health outcomes. Results indicate that most participants live at home with their families. The prevalence of the studied symptomsare as follows: fair or poor self-rated health (10.8%), respiratory related illness (35.7%), nausea and vomiting (37.6%), and skin irritations (42.3%). Students living at home reported higher stress levels compared to those living in an on-campus residence building. While the type of housing accommodation did not emerge as a significant predictor of any of the health outcomes, results suggest that other housing-related factors such as age of housing may be significant predictors of respiratory health.

A space-time analysis of breast cancer in Middlesex County, Ontario in 2003-2013

Jenny Tjhin and Dr. Isaac Luginaah (Western University)

Breast cancer is prevalent in Canada and the incidence rate increases steadily every year. Even though many studies have been done to find association between its prevalence and different risk factors, there is still no identified specific cause for the disease. An attempt to analyze the area geographically within a timeframe may help to identify potential environmental factors that increase breast cancer

risk. Middlesex County in Ontario is chosen in collaboration with Middlesex Health Unit to target knowledge mobilization and policy analysis. The study data is comprised of breast cancer cases between 2003 and 2013 within the county to measure disease prevalence. Not only Moran's Index is used to detect spatial autocorrelation in finding areas with higher than expected prevalence, some basic raster GIS methods are utilized to find persistent breast cancer clusters. Moreover, the data is statistically tested using Kulldorff's space-time scan statistics method. The locations of clusters may be used for further investigations of potential local environmental influences.

Agriculture & Food in Rural Africa

Chair: Dr. Logan Cochrane (Carleton University)
Time: 8:30am-10:00am
Location: QC 505

Contested Food Security Agendas in Mozambique? The African Green Revolution and Food Sovereignty Movement

Dr. Helena Shilomboleni (University of Waterloo)

Critical food scholars and actors often perpetuate a binary between the African Green Revolution and the food sovereignty movement, emphasizing that their food security agendas are incongruent. The tensions surrounding these agrarian models stem from their divergent ontological underpinnings and from unequal power relations. This article critically reflects upon these debates in southern Africa, drawing on insights from fieldwork conducted by the author in Mozambique in 2014 and 2015. The study examined the activities of two organizations: the Alliance for a Green Revolution in Africa (AGRA) implements the former model and the National Union of Mozambican Peasants (UNAC) supports the latter. Whereas the literature frequently presents the African Green Revolution and the food sovereignty movement in oppositional frames, the author finds that farmers in Mozambique utilize some of the tools that the models offer in complementary, rather than competing ways. This contradictory outcome presents three important political economy implications. The first is that competing power relations that characterize the two agrarian models at the broader international level can sometimes manifest themselves differently on the ground. The second effect points to significant struggles to operationalize food sovereignty in southern Africa. The third relates to social differentiation for various social groups in the region's rapidly changing agrarian sector.

The good husband: Demystifying gendered responsibilities in farming for subsistence vs. commercial purposes in northern Ghana

Siera Vercillo (Western University)

Influenced largely by gendered norms, roles and responsibilities, the gender and agriculture discourse specifies that men usually farm for cash and women farm for subsistence. This study empirically assesses the above understanding in one district of Northern Region, Ghana using qualitative methods. Findings suggest that men's sense of masculinity is strongly linked to their desire to produce enough food to feed their family, and more women farm for income generation than men. This is significant because it explains why men's farming is prioritized as their farms are perceived to provide for the

whole family, whereas women's farming is perceived to be for individual income generation. These findings also imply that in this context, agriculture policy and practice that focuses on women to reduce hunger may miss men's primary responsibility to produce enough food to feed their families. Moreover, policy and practice that only reaches men for commercial production may contradict their primary subsistence responsibilities and women's important contributions.

Knowledge Coproduction and the Assessment of Food Security

Dr. Logan Cochrane (Carleton University)

The amount of information available about food security has increased significantly since the 1970s. The available data is essential for understanding the scale, challenges and trends, but it provides limited insight into what the most effective long-term, systematic responses to strengthen food security should be. The Stages of Food Security methodology outlined in this presentation does not seek to replace existing approaches to assess food security. Rather, this methodology acts to complement existing data by enhancing contextualized and locally-specific information so that specific policies and programs can be developed or enhanced accordingly. In particular, this presentation will highlight the important geographic differences – within and between communities in rural areas - for researching and analyzing food security using knowledge coproduction approaches. The findings are drawn from a pilot implementation of the Stages of Food Security methodology in rural, southern Ethiopia.

Beyond the economics: examining the health impacts of Large Scale Land Acquisitions on local populations in Coastal Tanzania

Kilian Nasung Atuoye and Isaac Luginaah (Western University)

Large Scale Land Acquisition (LSLA) has been on the ascendancy in developing countries in the last two decades, largely fuelled by a global drive for food, energy, and land investment. Despite difficulties with data, the Land Matrix estimates that 1,336 land deals involving a land size of 49,045,200 hectares were concluded globally as of March 2017. About half of these deals occurred in South-East Asia and East Africa, and Tanzania alone witnessed 58 land deals covering a total land size of 2,194,975 hectares. The debate on the impact of LSLA on local populations has largely been about livelihoods (including food security), with few studies on social order. This study examined the health impact of LSLA by analyzing data collected on local populations (n=1,516) in Coastal Tanzania in 2016 using environmental dispossession as a theoretical guide. Findings from multivariate ordinal logistic regression indicate that individuals who had experienced activities of LSLA were more likely to report poor health due to abuse of their natural environment compared to those who had not (OR=1.75, $p \leq 0.001$). Other factors such as household wealth, age and gender were significantly associated with perception of poor health due to abuse of the natural environment. This study amplifies the need to focus attention on health in LSLA discourse and policy making in Tanzania and similar context.

Scaling for Sale? Gendered Dimensions of growing and consuming nutrient-rich crops: The case of orange sweet potato in Misungwi, Tanzania

Sheila Rao (Carleton University)

A variety of development actors promote the expansion of production, consumption and sales of biofortified orange sweet potato (OSP) across Sub-Saharan Africa. OSP is described as a solution to vitamin A deficiency and malnutrition in children, while also presenting opportunities for women through income-generation. Tanzanian policies reflect this priority of scaling production and emphasize the marketable value of crops, anticipating that nutrient-rich, raw and processed and packaged foods could earn higher prices in urban markets. Such promotional efforts overlook gendered conditions of labour and time investments, access to certain assets, and whether changes to sweet potato production benefits or hinders women who grow it. This paper examines the ways in which women farmers navigate their roles in OFSP production and sales in Tanzania since the crop's introduction ten years ago. Although sweet potato is widely regarded as a 'women's crop', women's control over, and contributions to the production of economically and nutritionally important crops is underemphasized in these promotions; underlying inequality is rarely challenged by the network of actors that drive them. Drawing from ethnographic fieldwork conducted over 9 months in 2015 and 2016, I examine the unintended benefits and challenges of OSP promotion on farmers engaged in production. Working with a farmer group in Mwasonga, Tanzania, I compare women's actual experiences with production, sales and consumption to several development actor strategies that further large-scale supply and demand expansion of OSP in Tanzania and the region. My data shows that OSP promotion activities exclude certain farmers, while selectively featuring others based on individual farmers' access to economic, social and environmental assets. Through a gendered lens (Cornwall, 1996), I apply the contested-agronomy framework (Andersson and Sumberg, 2016) to reveal the non-scalable aspects of large-scale promotion of nutrient-rich crops.

Indigenous Geographies

Co-Chairs: Vanessa Sloan-Morgan (Queen's University), Marc Calebretta (Queen's University), Jon Aarsen (Queen's University)
Time: 8:30-10:00am
Location: QC 504

Reconnecting to Asi Keyi: Evaluating a collaborative attempt to heal colonial conservation practices

Roberta Nakoochee (University of Guelph)

National Parks, in Canada and elsewhere, have come under criticism for their role in the historic and ongoing displacement of Indigenous peoples from their traditional territories. In 1943, what is now Kluane National Park and Reserve was designated a game sanctuary and the Southern Tutchone people were barred from entering their traditional hunting, trapping and fishing grounds, resulting in longstanding conflict with Parks Canada and an erosion of traditional land practices. One attempt to reconcile this was Healing Broken Connections, a project aimed at reintegrating First Nations people with their land within the park and finding a way to include their traditional knowledge in park management and decision making. While highly regarded, there has been no analysis of how well the project met its objectives or what its impact was. The purpose of this study is to understand the meaning of reconnection to land from a local First Nation perspective and the degree to which

Healing Broken Connections fulfilled that understanding. I conducted participant observation and semi-structured interviews with project organizers, former participants, and community members of the Champagne and Aishihik First Nations and Kluane First Nation during the spring and summer of 2017. These interviews and observations, alongside discourse analysis, point to emerging themes involving a renewed relationship between Parks Canada and both First Nation communities, strategies for collaborating more effectively with community members to improve ecological integrity, and challenges in integrating Indigenous Knowledge systems in established natural resource management systems.

"Ancient Spirit, Modern Mind": Documenting the Role of Worldview in Huu-ay-aht First Nations' Journey to Modern Treaty Through Community-Based Archival Research

Marc Calabretta, Heather Castleden (Queen's University), and Huu-ay-aht First Nations

Since 1993, The British Columbia Treaty Commission (BCTC) has facilitated over 65 modern treaty negotiations between First Nations, the Province of British Columbia, and Government of Canada. Only thee treaties have been successfully negotiated in that time. Huuay-aht First Nations is one of five Nuu-chah-nulth First Nations to reach stage six—the final stage—of the modern treaty process: implementation. The Maa-nulth Treaty came into effect on April 1st, 2011, and since then, The Indian Act has been supplanted by Huu-ahts' own governance structure, laws, and constitution. Our research takes a community-based archival research approach to tracing Huu-ay-aht First Nations' journey to the Maa-nulth treaty. We ask the question: given the unsuccessful history of the BCTC process, how did Huu-ay-aht First Nations successfully negotiate a treaty that 90% of the Nation voted in favour of? In recalling the 18-year negotiation process, we explain our findings, which emphasize the significance of a Nuu-chah-nulth worldview in shaping and driving the treaty negotiation process. We focus specifically on the sacred principles of Hišuk c̓awak (everything is one, connected), ʔiisaak (respect with caring), and ʔuuʔałuk (caring for present and future generations), and the role they played throughout treaty negotiations. We offer these findings along recommendations to the BCTC, Provincial, and Federal government to improve the treaty process. These findings also offer insights into the treaty process for Indigenous Peoples who are, or are considering, participating in treaty negotiations.

Sharing Huu-ay-aht First Nations citizens' experiences of the implementation of the Maa-nulth Treaty through photovoice

Jon Aarssen (Queen's University), Ayanna Clappis, Becki Nookemis (Huu-ay-aht First Nations), Vanessa Sloan Morgan, Heather Castleden (Queen's University), and Huu-ay-aht First Nations

On April 1, 2011, Huu-ay-aht First Nations implemented the Maa-nulth Treaty—a modern treaty negotiated between five Nuu-chah-nulth First Nations whose traditional territories span the west coast of Vancouver Island, British Columbia (BC), the Province of BC, and the Federal government. Modern treaty implementation involves replacing the Indian Act with each Maa-nulth Nations own laws and Constitution, creates new relationships between all Maa-nulth Treaty signatories, and First Nations governments and their citizens. In this presentation, we share preliminary results from a photovoice project conducted in partnership with Huu-ay-aht First Nations as part of a comprehensive case study of the Maa-nulth Treaty. During the summer of 2017, over 20 Huu-ay-aht citizens living in

the village of Anacla, as well as Port Alberni, Nanaimo, and Vancouver, BC, shared their experiences with the implementation of the Maa-nulth Treaty. Preliminary results reveal differences across the four locales, including the need for accessible Huu-ay-aht cultural services outside of Nuu-chah-nulth territories and location specific barriers to available and affordable housing. Similarities also exist across many citizens' experiences, which are directly embedded in desires to return to Huu-ay-aht First Nations homelands and for the Treaty to provide tools for Huu-ay-aht citizens to create healthier futures. We conclude by sharing challenges we encountered with the photovoice method.

What do we learn about where? Place in BC's new curriculum

Christopher Lamb (Queen's University)

Colonization takes place, and settler colonialism remains. For settlers, comfortably living in such places is predicated on oblivion to past and ongoing dispossessions, as is settler colonialism on deeply rooted ignorance about land, place, and its histories. The colonial understandings of and attitudes to place that persist in current structures of law, commerce, and land management have also informed education in settler societies like Canada. Education expresses and integrates the perspectives and values of a society and reforms or develops already existing ways of knowing and being. While education in Canada has been dominated by settler-colonial knowledge and values and has perpetuated ignorance about place, it is also integral to transforming social relations and has a key role to play if decolonization is to take place. The newly redesigned K-12 curriculum in British Columbia represents a significant departure from the old, particularly in emphasizing local context, recommending that education should respect the places where students live and learn and that the curriculum should be taught "from within the school and its surrounding community." This paper examines the new curriculum's approach to teaching about place and relational geographies. Drawing on critical Indigenous and Place scholarship I analyze the curriculum's treatment of the colonization of places, Indigenous and settler relations, and understandings of place.

Barriers to Health Care Access as a Form of Denial: Indigenous People's Experiences of Government-Led Health Care in Prince George, Canada

Sarah Nelson and Kathi Wilson (University of Toronto Mississauga)

Approximately 56 per cent of Indigenous peoples in Canada live in urban areas, reflecting a general trend towards urbanization being experienced by Indigenous peoples around the world. In spite of higher availability of health care services in cities, Indigenous people report significant barriers to health care access. This qualitative study undertaken in partnership with the Prince George Native Friendship Centre in Prince George, Canada, examines the barriers to government-run health care access for Indigenous people in light of the ways in which broader structures of colonialism influence Indigenous peoples in their everyday lives. The three most frequently reported barriers to health care access on the part of health care providers and Indigenous clients of health care services in this study are: substandard quality of care; long wait times; and rules and restrictions on care. These barriers, some of which are common complaints among the general population in Canada, are interpreted by Indigenous clients in unique ways that frame them as a form of denial of care. Through the lenses of cultural safety and ethical space – frameworks developed by international Indigenous scholars in efforts to better understand and operationalize relationships between Indigenous and non-Indigenous

individuals and societies in the context of settler colonialism – this study offers an understanding of these barriers in light of the specific ways that colonialism intrudes into Indigenous clients' everyday lives.

Taking Back Time: Organizing to Support Slow Scholarship, Supportive Mentorship, and Mental Wellness

Co-Chairs: Laurence Simard-Gagnon (Queen's University) and Sarah Speight (University of the Fraser Valley)
Time: 8:30-10:00am
Location: JDUC John Orr

This CWAG-organized discussion session focuses on the dynamics of gender, time, care, and mental wellness within academic environments. Informed by the work of Parizeau et al. 2016 and Mountz et al. 2015, the purpose of this session is to provide space for a conversation focused on the challenges associated with slowing down, taking time with our work, and taking care of ourselves within the academy. This session will function as a check-in, to discuss experiences and challenges with slowing down, as well as successes, reflections, and positive outcomes. We will discuss supportive mentorship, and participants will share methods that have been successful in encouraging slow scholarship in colleagues, graduate students, and undergraduate students.

The session will begin with a few short (5-10 minutes) interventions, after which the floor will be open for general and/or small group discussion. Come ready to share and learn from each other! This discussion-based special session will feature organizers Laurence Simard-Gagnon (Queen's University) and Sarah Speight (University of the Fraser Valley), as well as Dr. Beverley Mullings (Queen's University).

Environment & Development Geographies

Chair: Sandra McCubbin (Queen's University)
Time: 10:15-11:45
Location: JDUC John Orr Room

Exploring the Spectrum of Social Protection Arrangements in the Context of Extreme Weather Events—The Case of Tropical Storm Erika in Dominica

Esther Lambert (University of Toronto)

Although the usefulness of integrating the fields of social protection(SP), climate change adaptation (CCA) and disaster risk reduction (DRR) has been embraced as conceptually sound, more work is needed to better assess the impact of SP programmes and socially-conscious climate disaster programmes on livelihood resilience. More specifically, the role of informal SP systems or networks and support systems amongst family and friends has been largely overlooked within the SP/CCA/DRR discourse. To begin this conversation, however, the full range of informal social protection instruments for use in DRR for CCA needs to be acknowledged within the current SP/CCA/DRR integration discourse. Most of the scholarly work on the role of SP programmes in the

context of climate shocks are centered around formal SP and heavily focused on rural communities in South Asia and Sub-Saharan Africa, leaving much room for investigation into Caribbean Small Island Developing States (SIDS) like Dominica, whose residents suffered devastating impacts from Tropical Storm Erika in 2015. This paper identifies a wide range of social protection arrangements at work for a sample of 191 households in 4 Dominican communities severely impacted. While formal social protection played a significant role, effective, longterm recovery depends on a thoughtful coordination of formal and informal social protection arrangement (pre, during, post storm), strengthening existing social networks and trust relations and, an avoidance of duplicated efforts.

Conceptualizations of Development: A Case Study of WE Schools

Julianne Hirvi and Roberta Hawkins (University of Guelph)

Development responsibility and authority over the development narrative has shifted away from the public sector and towards privately owned organisations. One of Canada's most prominent private development organizations is WE Charity. This organization aims to empower North American youth to become "change-makers" by giving them the tools to make a difference in the world. One avenue through which WE Charity works is the WE Schools program, where high school students are taught life skills and encouraged to participate in local and global fundraising campaigns. WE Schools is often the initial point of contact for youth in Canada as they begin to engage with concepts of global citizenship and as such it requires critical evaluation in terms of how 'development' is portrayed through WE Schools and how youth are transformed into "change-makers" through the program. This paper examines the structure, aim, and purpose of the WE Schools program with particular attention paid to the ways development 'problems' and 'solutions' are identified and promoted. This study is based on an in-depth discourse analysis of the promotional materials found on WE Charity's website, including videos, images, webpages, and guidebooks. Emerging themes include: skill-building, the power to make a difference, and the tension between WE and the individual. Ultimately, this research highlights the need to further analyze these initial points of contact in order to cultivate ways to ensure that youth emerge with critical, self-reflective views of development.

Corporate Social Responsibility and Sustainable Community Development: a Case Study of Anglogold Ashanti, Adieyie and Teberebie, Ghana

Priscilla Toloo Apronti and Allison Goebel (Queen's University)

Corporate Social Responsibility (CSR) initiatives have become widespread in the extractive industry. CSR opponents and proponents hold conflicting positions on the conceptualisation, importance and ability of CSR to effectively address the negative ramification of the extractive industry and promote development in resource rich communities. Proponents of CSR hold that corporations can create shared wealth and promote long-term sustainable development. On the other hand, CSR opponents state that CSR is a greenwashing mechanism intended to guarantee corporations the social license to operate (SLO), and to allow continuation of usual business practices. This study sought to empirically investigate whether a global dominance of CSR has distorted or silenced ongoing knowledge of and protest against the negative externalities of the mining industry in Ghana. The study further assessed stakeholders' perception of CSR as contributing to long term development. The study employed an ethnographic approach using key informant interviews and community surveys to examine the social

interaction between relevant state institutions, AngloGold Ashanti (AGA) and Adieyie and Teberebie communities. By using the environmental justice (EJ) framework to critically analyse the impacts of the mining industry, it was revealed that Adieyie and Teberebie bear disproportionately high levels of the cost of the operation of the activities of AGA while benefiting minimally despite ongoing CSR initiatives. Key informants who viewed CSR as a greenwashing mechanism held that current CSR initiatives cannot contribute to long-term community development but more important is corporation's compliance to the rules and regulations that govern the industry. Other key informants were of the view that for sustainable development to occur, current CSR initiatives must be aligned to national and community development agendas and create shared value. The study proposes a comprehensive assessment of the impacts of resource extraction on resource rich communities using the EJ framework so as to identify and find solutions to the true drivers of the marginalisation and exploitation of these communities. Furthermore, the government of Ghana should effectively perform its development responsibility to resource rich communities. In line with the arguments of Hermann (2004), the study proposes that CSR should be standardised and legislated with effective enforcement of standards and laws and also be aligned to the development agendas of the country and communities.

Exploring the Motivations and Implications of Transnational Land Deals on Environmental Justice in Sub-Saharan Africa

Daniel Amoak (Brock University)

The rising demand for land for food and biofuel production, especially in an era of climate change and variability, has resulted in rich countries acquiring perceived "wasting" lands in Sub-Saharan Africa. However, given the high number of smallholder farmers in this region whose livelihoods are directly tied to land, leasing large tracts of such lands to foreign investors has implications for environmental justice viewed through the lens of social accountability, economic viability and environmental conservation. An analysis of available literature on transnational land deals in Sub-Saharan Africa reveals entrenched injustices on the local people by the elites, mainly due to weakened state institutions, and the plurality and ambiguity of land tenure systems. This paper makes a case for a robust local-farmer sensitive approach for transnational land transactions if the "pro-poor" and "win-win" situation often pitched by investors is to be realised.

Towards Sustainable Water Resource Planning in Siem Reap City, Cambodia: Integrating Traditional Khmer Ecological Values in a Tourism Hot-Spot

Charles Hostvsky (Brock University) and Sophorn Phal (Ministry of Land Management, Urban Planning & Construction, Cambodia)

Cambodia, due to the lack of finances and poor water management techniques, is experiencing significant urban potable water issues. Siem Reap City (SRC) was created to accommodate tourists visiting the massive Angkor Wat temple complex, one of the most visited tourist sites in Asia. The temple complex is situated in a vast water management network, developed by the Khmer between the 8th to 14th centuries. Through traditional Khmer ecological values the water management network has existed sustainably for the past 1000 years until recently. The city's tourism growth increased 10 times over the past decade, hence UNESCO warned that uncontrolled development will significantly

degrade archaeological monuments built on less stable sand is groundwater levels drop. The number of hotels has grown from 8 to over 350. The hotel industry has become the largest water consumer in SRC. However, the water supply authority does not have the capacity for this urban growth. Therefore, to make up for the shortfall hotels pump their own ground water for daily uses, which is not sustainable if left unchecked. In response the city is upgrading the capacity of the potable water treatment and sewage facilities, that is, increasing the supply side. This study tackles the demand side through environmental planning. The research methods implemented in 2015 included a literature search of hotel Best Practices in water conservation, an audit of water usage and wastewater, interviewing 20 key Cambodian government officials, and water use audits at a sample 15 hotels in SRC. Overall the research suggests that water planning in SRC is focused on increasing supply with little effort put into conservation (demand). Hotel managers had limited knowledge about sustainability and water conservation in particular. There is potential for up to 40% reduction in water consumption based on established LEED standards.

Remote Sensing Applications in Hydrology and Urban Environments

Chair: Valerie Freemantle (Queen's University)
Time: 10:15-11:45am
Location: JDUC 352

Land Cover and Habitat Diversity Assessment for Small Scale Land Conservancies

Danielle Beaulne and Rebecca Hudson (Queen's University)

Identifying the most effective areas to focus conservation efforts is one of the primary goals of land conservancies. Therefore, it is important that models of land cover, habitat diversity, and other landscape metrics are robust to variations in the processing techniques employed. In this study, the researchers worked with the Land Conservancy of Kingston, Frontenac, Lennox and Addington, a local land conservancy, to develop a land cover map of the area. Information on habitat diversity and landscape configuration was then extracted in order to inform the selection of new areas to protect. Using LANDSAT data, the classification accuracy of random forest and decision tree classification algorithms using both pixel-based and object-based image analysis techniques was tested. The selection of areas of conservation is complicated as the effects of climate change prevail. Areas that are not currently threatened may need to be re-evaluated sooner. To estimate what the land cover and habitat diversity may look like in the near future we used a combination of future predictions and past data. Since 1960 the air surface temperature has increased 1.5˚C and the average monthly rate of precipitation has increased by 5.86mm. During this time the land cover has changed dramatically with decreasing habitat diversity. For the KFLA region, it is estimated that the air surface temperature will increase 4-7˚C and average daily precipitation would increase 0.3-0.6 mm/day by 2090.Past changes in land cover and future changes in climate will contribute to the land conversancy's decision making process in land acquisition strategies.

Quantifying Precipitation Event Influences on Stream Geometry from UAV Imagery

Marissa I. Chase (York University) and Tarmo K. Remmel (York University)

Precipitation events are drivers of change in streams, impacting flows and geometry. Changing stream geometry can be seen by alterations to channel width, bank position, curvature, complexity, and meander form. Remote sensing provides the opportunity to study these characteristics instantaneously, rather than through intensive and timelagged field study. Unmanned Aerial Vehicles (UAV) are especially suited to the study of narrow stretches of streams at high spatial resolutions. We identify a 150 m reach of the Rouge River in Ontario, Canada for repeated examination to determine whether semi-automated geometric characterizations of change due to precipitation events are possible. Imagery will be collected with a Tetracam ADC Snap optical multispectral camera mounted on a quadcopter before and after precipitation events throughout one summer, and then compared. Images will be mosaicked using a structure-from-motion program that creates textured 3D models of the region through the matching of common points between images. The orthomosaics produced by this program will then be classified using an ISODATA unsupervised classification to determine land cover types, and from this, the shoreline will be extracted. Shoreline vectors and land cover classifications will then be compared across time using change detection and overlap statistics. Aside from simply detecting changes, we will produce maps of change location, magnitude, extent, and susceptibility. Overlap statistics, morphologic changes, and geometric form alterations will be used to identify those locations most impacted (and likely to be impacted) by precipitation events of known intensity and duration.

Evaluating the performance of local topographic position metrics for multiscale applications

Newman, D., Lindsay, J.B., and Cockburn J.M.H. (University of Guelph)

The field of geomorphometry has increasingly moved towards the use of multiscale analytical techniques, largely due to the availability of fine-resolution digital elevation models (DEMs), and the inherent scale-dependency of many DEM-derived attributes such as local topographic position (LTP). LTP is useful for landform and soils mapping, and numerous other environmental applications. This research assessed the suitability of the deviation from mean elevation (DEV), percent elevation range (PER) and the novel relative topographic position (RTP) LTP metrics for multiscale terrain characterization by quantifying their computational efficiency and ability to approximate the prohibitively slow but theoretically robust elevation percentile (EP) metric under varying topographic conditions occurring in three data sets. The results demonstrated that deviation from mean (DEV) calculated using the integral image technique offers fast and scale-invariant computation. DEV spatial LTP patterns were strongly correlated with EP (r2 range of 0.699 to 0.967) under all tested conditions. The novel relative topographic position (RTP) index was a slightly weaker predictor of EP (r2 range of 0.594 to 0.934) compared to DEV and achieved linear time complexity. Percent elevation range (PER) was the weakest predictor of EP (r2 range of 0.031 to 0.801) without offering a substantial improvement in computational efficiency over RTP. PER was therefore determined to be unsuitable for most multiscale applications. It was concluded that the scale invariant property offered by the integral image used by the DEV metric counters the minor losses in robustness compared to EP, making DEV the optimal LTP metric for multiscale applications.

Detection of Waste Dumping Location in Landfill using Temporal Landsat Thermal Images

Jasravia Gill (Ryerson University)

The practice of solid waste disposal in conventional landfills has always been associated with adverse environmental impacts, leading to the migration of landfill gas and bad odour to the proximate areas. Apart from the obnoxious fumes and hazardous leachate, the potential of heat generation within these vast disposal sites has been observed during the aerobic and anaerobic decomposition process. Therefore, this study aims to demonstrate how to utilize thermal remote sensing technique to monitor the heat flux, which can aid in detecting the waste dumping location with a case study in the Jeleeb Al-Shuyoukh landfill in Kuwait, where the record of its physical boundary was found missing during the Gulf war. A ten-year (1985 to 1994) of Landsat TM/ETM+ images were acquired and subsequently processed with atmospheric correction so as to compute the land surface temperature (LST). Through overlay analysis, the multi-temporal LST contours were combined in order detect the most probable dumping locations within the landfill. With reference to the 50 borehole locations drilled by the Environmental Protection Authority of Kuwait, our results derived during the summer season yielded a better accuracy (72%) comparing to that derived during the winter season (58%). This can be explained by the waste decomposition process reaches to the peak in summer and more heat flux can be captured from the ground cover. In addition, the dumping locations buried with construction waste were always found with a higher LST as compared to the organic waste or a mixture of both regardless of the season.

Geographies of Ageing, Health and Health Care

Chair: Kyle Plumb (Queen's University)
Time: 10:15-11:45am
Location: JDUC 351

Ageing in the Wrong Place at Home

Kyle Plumb and Prince Amegbor (Queen's University)

Although not intrinsically wrong and certainly not malicious in intent when conceptualized as static and universal and applied as a one-size-fits-all policy initiative, ageing in place can contribute to the institutional and even inhumane situation that it aims to relieve. While most older people in Canada are and ought to be ageing in place in their homes, this paper contends that there are some individuals that are better suited for assisted group living due to extenuating circumstances that amount to the (re)casting of the home as a place of dissatisfaction and isolation. Indeed, older adults are a dynamic and heterogeneous group that require nuanced policy initiatives to support their diversity in needs. To this end, data from the 2014 annual component of the Canadian Community Health Survey was analyzed to compare the general satisfaction or quality of life of older adults living at home with factors such as income, age, frailty and sense of belonging. It was found that many older adults are not satisfied with ageing in their home especially when these factors are considered. With this in mind, the concept of "ageing in the right place" is explored and presented as an expansion to the initial formulation that has potential to reorient it as a nimbler and more responsive policy that is appropriate for the diversity and dynamism of the older population.

Enrolment in Ghana's National Health Insurance Scheme: The Role of Mass Media

Moses M. Kasanga, Joseph A. Braimah, Yuji Sano, Roger Antabe, Emmanuel Kyeremeh and Isaac Luginaah

Although previous studies have discussed the National Health Insurance Scheme (NHIS) in Ghana, very little attention is paid to the influence of mass media exposure on NHIS enrolment. Yet, understanding this linkage is important, particularly due to the critical role of mass media in disseminating health information and shaping people's health perceptions in Ghana. Using data from the 2014 Ghana Demographic and Health Survey, we employed logistic regression analysis to understand the relationship between NHIS enrolment and exposure to print media, radio, and television. Our findings indicate that women with more exposure to radio (OR=1.23, $p<0.01$) and television (OR=1.24, $p<0.01$) were more likely to enrol in the NHIS than those with no exposure. For men, more exposure to print media was associated with higher odds of enrolling in the NHIS (OR=1.41, $p<0.01$). In conclusion, all three types of media may be helpful in promoting NHIS enrolment in Ghana. Given that the relationship between media exposure and enrolment in the NHIS was gendered, we recommend that policymakers and interventional programs should pay attention to the type of media for targeting specific groups to ensure increased enrolment into the NHIS.

It's a big world out there: re-placing aging in place

Susan Elliott and Andrea Rishworth (University of Waterloo)

'Place' and 'aging in place' are central concepts in the geographies of aging literature. Yet, there is relatively little comparative research of aging across or within places, with a virtual disregard to aging in low and middle income countries (LMICs).. With aging now an axiomatic backdrop for much research and policy related to 21st century populations, it is important to problematize geographical contributions to understand aging processes and outcomes. While geography of aging has become a substantive discipline within geographical gerontology, the concepts of space and place may have been undertheorized. Drawing on literature within and outside geography, this paper presents a discussion of the relationship between aging and place, drawing in particular on the unique circumstances of aging in sub Saharan Africa. We argue that in order to address the 'hidden geographies of aging' that remain under researched, the geography of aging needs to expand the use of theory to capture the true complexity of aging in place. This will offer insight into the multiple relational dynamics operating across places, spaces and scales that shape the aging process. By taking place seriously on a global scale, the geography of aging has the potential to increase contributions to the theories, methods and impacts of geographic gerontology.

Sexual Behaviours and Socioeconomic Predictors of HIV Status in Uganda: A Gendered Perspective

Prince Amegbor (Queen's University) and Laura Pascoe (Queen's University & Bedroom Feminist)

Studies acknowledge the power inequalities between men and women in sexual relationships, especially in the Global South where poverty, precarious living conditions, and other vulnerabilities exacerbate gender inequalities. Sexual relationship power and sexual negotiations abilities differ significantly among men and women in this part of the world. These, in turn, influence sexual behaviors and exposure to HIV infection. Using the 2011 Uganda AIDS Indicator Survey (UAIS) data, we examined HIV prevention knowledge and sexual behaviors as determinants of HIV status

among men and women living in Uganda. We performed a cross-sectional analysis of the relationship between gender, sexual behaviors, HIV prevention knowledge, socioeconomic characteristics, and HIV status. The results of our analysis show that knowledge of condom use and having only one sexual partner as HIV prevention strategies were significant in predicting HIV status among men and women respectively. Employed women were 20 percent (OR=1.203, $p<0.1$) more likely to be HIV positive compared to unemployed women; however, employed men were 40 percent (OR=0.596, $p<0.5$) less likely to be HIV positive. Paradoxically, women who consider themselves rich were more likely to be HIV positive compared to the reference group (poor) although highly educated women were less likely to be HIV positive (compared to uneducated women). We conclude that sexual relationship power and sexual negotiations in Uganda predisposes women to the risk of HIV infection irrespective of their economic and employment status, although HIV prevention knowledge helps reduce their risk of HIV.

How to decide service program locations for preventing child maltreatment more effectively

Yuan Li (Queen's University)

Child maltreatment is one of the most challenging public health issues facing families in Massachusetts, which has one of the highest child maltreatment rates in the United States. As the states' leading family support organization, the Children's Trust of Massachusetts (CT) works on preventing child abuse by supporting parents and strengthening families. CT is currently developing an expansion of their existing Family Centers, which are place-based hubs that provide universal access to families with young children. The ambitious maltreatment prevention initiative will operate at 10-15 sites across the state, with the Family Centers serving as the focal points. Prior to any expansion, it is useful to document the geospatial distribution of child maltreatment risk across Massachusetts, and whether existing locations of Family Centers are effectively placed to maximize access to services among target populations that are most in need. Our study aimed to: 1) Identify the geospatial clusters of child maltreatment counts and rates at the zip code level for the entire state by conducting hotspot analysis in a Geographic Information System (GIS); and 2) identify areas with a high child maltreatment risk but low geospatial access to existing Family Centers. Our findings will allow policymakers and the CT to better understand the landscape of child maltreatment risks in Massachusetts, and provide recommendations on the geographic and strategic placement of future Family Centers in Massachusetts to ensure prevention programs are best targeted to under-served areas with a high risk of child maltreatment.

Understanding children's perceived barriers to physical activity in varying urbanicities

Leah Taylor, Clark, A., and Gilliland, J. (Western University)

The declining levels of physical activity (PA) among Canadian children has been identified as a national public health crisis due to the associated increases in childhood obesity. Researchers suggest children's perceptions of their outdoor environments may be equally as important as the environmental influences alone, for predicting PA. While research surrounding children's perceptions of PA barriers does exist, there is little specifically focusing on children in rural Canada. Addressing this gap is crucial to understanding how children's PA is influenced by the integrated social and environmental contexts of their communities. Therefore, the question guiding this research is: how do children's perceptions of barriers to physical activity vary across different levels of urbanicity? The

longitudinal population based study being drawn is called the Spatial Temporal Environment and Activity Monitoring (STEAM) project. This work collected data on 916 children in Southwestern, and Northern Ontario communities which vary in their population density and urbanicity. The objective of this research is to demonstrate at which level of the SEM children's perception of barriers are being most influenced by their environment, based on the varying levels of urbanicity. The results will demonstrate how children's PA perceptions are most impacted by their environment. This presentation will conclude with recommendations for practitioners and researchers, as to where interventions should be focused in order to most effectively impact children's PA levels, based on what children perceive as important.
Keywords: children's health, physical activity, environment, rural Canada

Food Systems & Agriculture

Chair: TBD
Time: 10:15-11:45am
Location: QC 505

Food Systems for Future Cities: Understanding Urban Agriculture in Nanjing, China

Geoff Luehr (University of Waterloo)

Rapid population growth and urbanization are creating profound social, economic, and environmental challenges, particularly in the Global South. These challenges have prompted criticism of the industrial agriculture system, which despite supplying large volumes of foods to global markets has ultimately been deemed unsustainable. Therefore, there is a need to reexamine how urban spaces are not only being developed but how urban inhabitants are being fed. One promising avenue may be the expansion of urban agriculture, a practice that is seen by many as beneficial to social, economic, and environmental issues in both post-industrial and developing cities. The purpose of this research is to better understand the motivations of residents practicing urban agriculture in the case study city of Nanjing, China. While studies have shown the existence of urban agriculture in China, empirical research on the perceptions and benefits of it is greatly lacking. Using a mixed methodology, this research aims to (1) assess the demographics of those practicing urban agriculture within Nanjing and where it is taking place, (2) identify the types and methods of urban agriculture being used, (3) understand why populations are engaging in small-scale urban agriculture and the perceived benefits of it, and (4) critique the extent to which current, future and past policies have impacted the practice of urban agriculture. Preliminary findings of this research will be presented with a focus on the survey data collected to address demographic, geographic, and usage characteristics of urban agriculture in Nanjing.

The role of gender in determining experiences of food insecurity in rural Bénin

Ragetlie, R. and Luginaah, I. (Western University)

Despite ongoing projects and policy changes, food insecurity remains a significant and persistent issue in Bénin. As a social determinant of health and wellbeing, food insecurity poses a significant problem in rural areas in Bénin, particularly in households reliant on agricultural production. While questions

of how and why food insecurity is intertwined with gender have been addressed in countries across Africa, it appears that little similar work has been done in Bénin. Furthermore, current food insecurity reports from Bénin rely largely on information collected from male heads of household. Therefore, a qualitative research project was undertaken with the aim of filling these gaps by asking the following research questions: (1) how are gender dynamics influencing women's food security in rural Atacora, Bénin? (2) What inter and intra household dynamics shape experiences of food insecurity at the household level? This research aims to improve understandings of localized gendered experiences of food insecurity in rural Bénin, the objective of which is to inform more effective policy which can address rising levels of food insecurity. In order to answer these questions, a combination of participatory community-level focus groups (n=6x8) and semi-structured interviews (n=40) at the household level were undertaken. Male and female partners in selected households were interviewed separately using the same interview guide, in order to differentiate between male and female experiences and explore household power dynamics. This presentation will outline the context and justification for the research project and present preliminary findings.

Data Power: Understanding the Impacts of Precision Agriculture on Social Relations

Emily Duncan and Evan Fraser (University of Guelph)

Precision agriculture has been greatly promoted for the potential of these technologies to sustainably intensify food production through increasing yields and profits, decreasing the environmental impacts of production, and improving food safety and transparency in the food system through the data collected by precision agriculture technologies. However, little attention has been given to the potential of these technologies to impact social relations within the agricultural industry. This paper argues that for precision agriculture to deliver its intended benefits the social consequences are imperative to consider. This article begins by mapping and analyzing the current precision agriculture technological landscape in Ontario in order to understand the current state of adoption. It then further examines the changing relationship between precision agriculture retailers and primary producers due to the introduction of precision agriculture through a qualitative analysis of interviews. By understanding the shifting power relations between these two actors along with the political and economic motivations for technology adoption, I highlight the social impacts of precision agriculture adoption, focusing on issues of cost, labour, and data as a new form of capital on the farm. The results emphasize the pressing need for knowledge transmission and capacity development in precision agriculture as the vast majority of agriculture data collected is underutilized. This research focuses specifically on data gathering technologies in the crop and dairy sectors in ten counties with the highest adoption rates of precision agriculture in Ontario.

But Where Are You Really From?: Diaspora, Memory and the Intimacies of a Global Food System

Katrina E. Fukuda (University of Toronto)

Some scholars have pointed to the importance of paying attention to how global processes are at play in everyday life. This paper works through the interactions of memory, family, and food as they are mediated through global flows of people, power, products and much more. It takes a hyper-local focus at the author's memories and family, and is partly informed by narrative, unstructured interviews with

women in the family and scholarship on food, diaspora and culture. It investigates the gendered relationships, journeys both long and short, emotional ties and affect of the foodways practiced by a multi-generational, multi-ethnic and diasporic family in the context of rural Alberta. Exploring the intimate, relational practices that are mediated by far away markets, politics and policies, as well as the immediate geographic context can offer a way to explore concepts such as belonging, difference, race, gender at a different scale, offering insights into the immediacy of their operations.

Ecological Food as a Pathway to Food Sovereignty: Challenges and Opportunities for Agrarian Organizations and Youth in Puerto Rico

Ileana Diaz (University of Waterloo)

This paper discusses farmers' perceptions of the challenges and constraints they face in contributing to Puerto Rico's food system, and compares the views of ecological and conventional farmers. Young farmers and their role in the Puerto Rican food system are an important part of this paper's focus. I draw on fieldwork completed in the summer of 2015 in Puerto Rico and lay out a number of the challenges raised by farmers. I focus on two substantive themes that were strongly prevalent in semi-structured interviews: 1) government interventions in agriculture and farmers' responses to them; and 2) the economic collapse in Puerto Rico and its implications for farmers. I begin by presenting the range of viewpoints expressed in the interviews about the challenges faced by both conventional and ecological farmers on these two themes. I then introduce the major organizations that comprise Puerto Rico's agrarian social movements and explore their role in the lives of ecological farmers. The major projects, activities and actions that Puerto Rican agrarian organizations have undertaken in support of food sovereignty goals, as well as the values that their members expressed are also discussed. Since agrarian organizations seek to create positive social and economic change, this paper highlights the opportunities for food sovereignty that agrarian organizations are currently pursuing.

Historical and Cultural Geographies

Chair: Carolyn DeLoyde (Queen's University)
Time: 10:15-11:45am
Location: QC 504

Engaging in Interdisciplinary Research: Connecting Bermuda's Histories of Meteorology to Canada

Muldoon, Laurel and Greer, Kirsten (Nipissing University)

Collaborative work stems from a passion for research. From climate date to historical archives and meteorological equipment, how does the data primary source materials, and scientific artifacts merge when engaging in research? Can a natural science researcher and a historical geographer push the boundaries of interdisciplinary work? The intent of the research project was to explore the relationship between Canada, and Bermuda's meteorological history during a time when the two territories were connected historically to the nineteenth and earlytwentieth-century British Empire. This project is part of an interdisciplinary umbrella project titled: "Empire, Trees and Climate in the North Atlantic

Towards Critical Dendro-Provenancing", which aims to create a better understanding of contemporary cultures and climates. The following paper will highlight networks of meteorological science between Bermuda and Canada to contextualize Bermuda's historical climate data. Key figures include Sir William Reid (1791-1858) whose professional experience expanded a large breadth of natural earth systems science, is known for his hurricane research. He was appointed governor to Bermuda and focused his meteorological knowledge to improve irrigation, fertilization and crop yields. Sir Henry Lefroy (1817-1890), known as the traveling Canadian meteorologist, who specialized in Earth's Magnetism was also appointed Governor of Bermuda. During his time there, he wrote the most detailed history of Bermuda's earliest colonial years, which included information on climate and the islands natural history. James Patterson (1872- 1956), who shaped Canadian meteorology and meteorological equipment in Canada, influenced weather monitoring after World War II for Canadian and Bermuda aviation. As these figures reveal, Bermuda's meteorological past is closely linked to Canada.

Retracing the explorations of Don and Phyllis Munday around Mystery Mountain in the British Columbia Coast Mountains

Dan Smith (University of Victoria)

Don and Phyllis Munday are renowned mountaineers and explorers of the central Coast Mountain region of British Columbia. After pinpointing the location of 'Mystery Mountain' from a summit on Vancouver Island in June 1925, they undertook a tenacious expedition in 1926 from Bute Inlet up the challenging Homathko River canyon to view the big, rugged, spectacular glaciers and mountains surrounding the summit later named Mount Waddington (4042 m). Despite their limited means and income, over the next twelve years they repeatedly returned to the region to explore, photograph, map and name virtually all of the features of this remote mountainscape. Of their many celebrated accomplishments, it is Phyllis' glacier photographs from the late 1920s and 1930s that are deserving of greater attention. Collectively, the photographs offer a singular historical record of the state of glaciers just as they were beginning to recede from their maximum Holocene Epoch positions. Repeat photographs taken within the last decade illustrate the significant volumetric losses experienced by these glaciers. Documenting the magnitude of glacier decline in this seldom-visited region over the last century, the pairing of Phyllis' historic images with contemporary photographs strikingly communicates the impact of climate warming on glaciers located in the British Columbia Coast Mountains.

Material engagement theory (MET): A geography for Ecopsychologists?

Peter Graham (Queen's University)

Geography is well suited to describing the material world as well as human interactions with all types of materiality, but when it comes to Ecopsychology, geographers might well wonder what exactly can be described or mapped. Matter is tangible to the geographer, mind is often perceived as dangerously ephemeral and intangible. Material engagement theory offers a potential solution to this dilemma. Material engagement theory (MET) was developed within the field of cognitive archaeology. MET builds on a diversity of foundational literatures, including the work of Gregory Bateson, Vygotskian psychology, material culture studies, sociocultural analysis, and cognitive science. MET extends the

boundaries of mind to include a stone hand axe or iphone, for example, while simultaneously extending the stone tool or electronic device into mind. Material engagement theory, in other words, takes what happens in sociocultural action out of the black box and makes it accessible to the geographer and ecopsyhcologist alike. This paper provides a brief overview of what MET is and how it can be used. It then uses the example of an educational garden to demonstrate how it might be used to make ecopsychology accessible and meaningful to geographers and vice versa.

Mobile 'Homes': An Ethnographic Study with American Vandwellers

Stephanie Murray (Brock University)

Hundreds of human beings across North America are currently living a life of full-time nomadic mobility in their vans. In order to learn about the meanings that these nomads assign to their mobility, and the ways in which that mobility could change the way that geographers conceptualize the scale of the home, a number of van gatherings were attended in the United States between July 1st and August 20th, 2017. This paper presents preliminary findings from 9 weeks of participatory research, during which 10 face-to-face semi-structured interviews were conducted with 7 couples and 3 single "vanlifers." Findings from my participatory research, which revealed some of the unique challenges of living in a 60 square foot van while conducting research with a highly mobile community, will also be presented. The aim of this paper, ultimately, is to depart from geography's traditional focus on fixity and place, and consider the unique spaces and meanings woven into a life of nomadic movement.

Urban Geography

Chairs: Evan Cleave (Western University)
Time: 2:00-3:30pm
Location: JDUC John Orr

Periphractic Space: Mapping Racial Construction in North American Urban Landscapes

Forren, J., Wilson, E. (Dalhousie University); Qin, S. (Harbin Institute of Technology)
In Razing Africville Jennifer Nelson (2008) describes actions taken by the City of Halifax, Nova Scotia to isolate the community of Africville – African-Nova Scotians forcibly relocated in the late 1960s. The city encircled Africville with land purchases used for an infectious disease hospital and city dump among other noxious services, creating a targeted space of neglect. This common activity in North American cities constructs ideas of race by penning-in communities. It geographically restricts their movement and access to services and isolates them in the civic imagination: a condition identified by Theo Goldberg in Racist Culture (1993) as periphractic space. Rather than separating populations, however, this circumference of isolation actually facilitates activities of transgression, defilement, and return by dominant groups: a pattern of asymmetric exchange. As communities and their borders evolve over time the response of insurgent groups for greater social and political incorporation challenges and weakens the conscriptions of the periphractic boundary. Through a method of mapping which incorporates social and technical instruments like timelines, oral histories, city reports, archived surveys, and GPS data this paper traces the penning-in of African-Nova Scotian owned properties and the ensuing tug of war for land ownership between the dominant and insurgent

populations of Halifax. This process synthesizes fragmented sources, visualizing the progression of this particular urban geography and enabling us to empirically test Goldberg's thesis of periphractic exclusion and uncover patterns of activity which resist it. This research is conducted with Tri-Council and MITACS Globalinks-funded student researchers in partnership with the Africville Museum.

Creating sustainable communities: Skills and learning in Ontario's small urban municipalities

Turvey, Rosario A. (Lakehead University)

Canadian communities are adopting strategies to protect their natural resources, address climate change, confront resource competition and balance rising demands for social, cultural and economic development. This paper highlights the results of a survey of skills and learning in sustainable community development (SCD) in 74 small urban municipalities (SUM) in Northern and Southern Ontario. The question is to find out ways to construct places for building a sustainable world, specifically in terms of sustainable communities. Building sustainable communities require 'upskilling' of the workforce as it poses a challenge to those hoping to make a real progress at the local level. The survey examined the generic, technical and specialist skills, whether they are skills already acquired and/ore required by professionals and practitioners for building sustainable communities. The survey addresses the skills question in the labour market whereby sustainability-related professionals such as architects, planners, landscape architects and economic development professionals participated in the study. Ensuring the availability of skilled professionals with relevant skill sets could hold promise towards achieving SCD. The study was expected to contribute to the geography of community sustainability and gain insights on skills development and learning opportunities. If the Province of Ontario continues to invest in human capital, it will sustain its economic competitiveness and achieve a healthy environment, economy and society in the 21st century and beyond.

Exploring Media Discourse on Sanctuary Cities

Torrens, S, Cleave, E., Chatwin, M., Arku, G. (Western University)

The topic of sanctuary cities has become a major political issue in the United States, with over 150 cities adopting "Sanctuary City", "Access Without Fear", or "Don't Ask, Don't Tell" policies. It is well documented that immigrants with precarious immigration status face discrimination and many barriers to accessing services and are confronted with various forms of control in cities. This means that many immigrants are unable to access the services they are entitled to, due to the fear of being detained or deported. In Canada, the concept of sanctuary cities is relatively new, with Toronto becoming Canada's first sanctuary city in 2013. In the intervening five years, the debate around sanctuary (or the similar 'Access Without Fear') policies in Canada, has occurred in at least nine other cities (Montreal, Ottawa, Hamilton, London, Winnipeg, Regina, Saskatoon, Calgary, and Vancouver). Indeed, coverage and discourse on sanctuary cities has proved to be divisive in all cities, regardless of whether policies have been adopted or not. To further explore these media narratives around sanctuary cities, a content analysis of fifteen papers (three national, twelve local papers) was conducted to identify common themes, perspectives, and arguments around sanctuary city policy. This presentation

will describe some of the emerging themes that were identified, and explore and critique the main arguments for and against sanctuary cities presented by the media.

A Place Left Behind? Declining Inner-Suburbs in the Toronto CMA and its Changing Typologies

Pham, S.(University of Toronto)

North American inner suburbs are facing disinvestment, population loss, and dilapidation. Their decline has occurred concurrently with local and national processes and policies which have transformed the inner-city and outer-suburbs into prosperous centers in the neoliberal era. A "suburbanization of poverty" within these inner suburbs is leading to new patterns of poverty, vulnerability, and racial segregation. These patterns occur unequally across the inner suburbs; varying across axes of demographics, income, education, employment, housing, and race. Using regression analysis, this paper will examine socio-economic variables relating to the aforementioned axes driving inner suburban decline in the Toronto CMA, including their degree, significance, and geographical pattern across the landscape. A large section of this paper will address how deindustrialization, the rise of the knowledge-based economy, and market preferences have transformed the social ecology of Toronto's inner suburbs, and reveal their degree of diversity by comparing their typologies in 1981 versus 2006 via cluster analysis. The resulting patterns will reveal exactly how the processes and policies driving inner city and outer suburban prosperity have shaped inner-suburban decline in Toronto. Finally, this paper concludes by discussing the local geographies of poverty across inner-suburban neighbourhoods.

Smart Growth and Smart Cities

Chatwin, M., Arku, G. (Western University)

Global issues of corruption, inefficiency, and abuse of power, combined with increasing complexity and scarce resources, have catalyzed public demand for increased involvement in governance. City administrations around the world are embarking on government reforms in pursuit of rebuilding public trust and legitimacy in their administrations. With the rapid advancement in digital and information technology many cities are pursuing 'smart' reforms to improve service delivery and re-engage their constituents. Technology enabled open government reforms can build smart citizens who are willing to provide feedback on the day to day issues and demand involvement in the political process. In this context, 'open' is reflective of the administrations willingness to redefine its relationship with constituents with the support of new technology and digital innovation. As African cities continue to experience rapid urbanization there is an opportunity for administrations to invest in emerging smart technologies to open their governments through public participation, accountability, and transparency initiatives. There is a necessary confluence between 'smart' and 'open' government reforms for African cities to realize a return on their investment in improved livelihoods and economic investment. This chapter will explore the increase in demands from the public for active participation in government processes, decision-making and service delivery. Further, it will examine the benefits of aligning smart and open government reforms to address corruption, inefficiency and an increased demand for services in African cities.

The (re)development of vacant land to parks in Toronto, Ontario

Stanov, S. (University of Toronto Mississauga)

Given the lack of vacant land in Toronto's downtown core, the redevelopment of available land tends to be highly contested. While there is competition to develop vacant land as commercial or residential properties, politicians, activists or residents may instead lobby for the land to be developed as a park in order to increase access to social and environmental services. The need for these services is intensified in low-income neighbourhoods where vacant land may be more plentiful and existing green space is minimal. However, concerns have emerged related to "green gentrification," which refers to the exclusion or displacement of vulnerable populations through the in-migration of wealthier, whiter residents as a result of the creation of parks or green spaces in traditionally low-income neighbourhoods. Using a case study approach to three vacant land to park transformations in Toronto, this research works to understand the following: the historical use of the sites, the decision making processes related to the parks' development, and the implications this land use change has had on the surrounding neighbourhoods. Interviews were conducted with stakeholders involved with the redevelopment of these space including: former city councillors, local residents and activists, and members of local organizations with connections to the park. Results from the interviews related to their experiences of the park's transformation, as well as any perceived changes in neighbourhood socio-demographics will be discussed.

Remote Sensing of Northern Environments

Chair: Dr. Paul Treitz (Queen's University)
Time: 2:00-3:30
Location: JDUC 352

Remote Sensing of Environmental Change in the Canadian High Arctic

Paul Treitz (Queen's University), Rebecca Edwards (Ducks Unlimited Canada), Dave Atkinson (Ryerson University), and Neal Scott (Queen's University)

Arctic ecosystems account for a large proportion of Canada's land surface and are important systems within the context of environmental change research. High Arctic environments are thought to be particularly sensitive to changes in climate, yet it remains unclear as to how tundra ecosystems will respond. Our research in the Canadian High Arctic examines the potential for remote sensing data to quantify biogeophysical variables that control carbon fluxes at landscape scales. This presentation will outline an integrated satellite remote sensing and field measurement strategy for examining environmental change at the Cape Bounty Arctic Watershed Observatory (CBAWO) on Melville Island, NU. First, vegetation types were derived from high spatial resolution IKONOS data [4 m]). Second, Normalized Difference Vegetation Index (NDVI) data spanning the past 30 years (1985-2015) were derived from Landsat TM/ETM/OLI data [30 m]). The land-cover classification for the CBAWO was used to partition the Landsat NDVI time series by vegetation type. Climate variables (i.e., temperature, precipitation, and growing season length [GSL]) were examined to explore potential relationships of NDVI to climate trends. The NDVI time series for the CBAWO (1985–2015) demonstrated an overall significant increase in greening, specifically in the dry and

mesic vegetation types. Based on climate data from the nearest permanent weather station (Mould Bay, Nunavut), the overall increase in NDVI at the CBAWO was largely attributed to a significant increase in July temperatures and GSL. In this presentation, we will explore the potential impact of these changes in productivity on the overall net ecosystem exchange (NEE) for vegetation types at the CBAWO.

Landscape variability of vegetation change across the forest to tundra transition of northern Canada

Mitchell Bonney, Dr. Paul Treitz, Dr. Ryan Danby (Queen's University)

Vegetation productivity increases in tundra ecosystems and stagnation, or even productivity decreases, in boreal forest ecosystems have been detected from coarse-scale remote sensing observations. Finer-scale studies have shown that these changes are heterogeneous and potentially related to variability in climate, land cover, topography and moisture. In this study, a Landsat Normalized Difference Vegetation Index (NDVI) time-series (1984-2016) was examined for a study area spanning the boreal forest to tundra transition of central Canada. NDVI trend analysis indicated that 27% of pixels exhibited a significant ($p < 0.05$) trend and virtually all (99.3%) of those pixels were greening. Greening pixels were most common in northern tundra and southern forest-tundra ecotone areas. These results were supported by ground validation, which found a strong relationship ($R2 = 0.81$) between bulk vegetation volume (BVV) and NDVI for non-tree functional groups in the North Slave region of Northwest Territories. Field observations indicate that alder (Alnus spp.) shrublands and open woodland sites with shrubby understories were most likely to exhibit greening in that area. Random Forest (RF) modelling of the relationship between NDVI trends and environmental variables found that increased summer temperatures, shrubland and forest land cover, closer proximity to major drainage systems, longer distances from major lakes and lower elevations were generally more important and associated with larger positive NDVI trends. These findings indicate that the largest positive NDVI trends were primarily associated with the increased productivity of shrubby environments, especially at, and north of the forest-tundra ecotone in areas with more favorable growing conditions.

How have the different High Arctic Vegetation Communities Changed at Cape Bounty? A Time-Series Analysis of High Spatial Resolution Imagery (2003-2016)

Freemantle, V., Treitz, P., Atkinson, D., Gregory, F. (Queen’s University)

Vegetation communities in the Canadian High Arctic have been shown to be related to moisture and temperature gradients. In order of increasing moisture content, the dominant vegetation communities present at Cape Bounty are polar semi-desert, mesic heath and wet sedge. There is uncertainty over how the vegetation communities will react as the climate of the High Arctic changes. To address this uncertainty, a time series of high spatial resolution images (Worldview-2, 3 and IKONOS) from 2003 to 2016 has been made. Long satellite records this temporal (near annual) and spatial (<4 m pixels) are not common in the Arctic. The fine spatial scale of this imagery will allow for a more detailed analysis of changes in different vegetation communities while the number of images during the peak growing season (eight) will allow for better understanding of inter-annual patterns. Trends in each of the vegetation communities will be tracked using two the normalized differential vegetation index

(NDVI, measure of vegetation productivity) and sensor specific Kauth-Thomas Tassled Cap Transformations (a measure of landscape wetness). This analysis will be supported by observations of percent vegetation cover and soil moisture from four field campaigns (2004, 2008, 2012, and 2017) and weather records of the site (2003-2017). Examination of these data is hoped to reveal trends and relationships between temperature, precipitation, soil moisture and vegetation productivity. With this information, it is hoped that a better understanding of how each of the vegetation communities represented at Cape Bounty may react to changes in climate.

Iceberg monitoring using synthetic aperture radar: A technology roadmap and research gaps

Ronald Saper and Derek Mueller (Carleton University)

Icebergs originate from ocean terminating glaciers and ice shelves, when ice breaks (or calves) from the parent mass. Subsequent drift can cover thousands of kilometres and can last years, often with periods of immobilization due to grounding or entrapment in sea ice or fjords. Icebergs fracture and melt such that a small minority endure and drift into southern waters where they may threaten offshore infrastructure or shipping. Today, long-term iceberg drift defies accurate forecasting, largely due to poor understanding of how environmental conditions affect drift and survival.
Synthetic aperture radar (SAR) satellite imagery is used to detect icebergs episodically, but revisit times have been infrequent. With the launch of the Sentinel-1 mission, and the upcoming launch of the RADARSAT Constellation Mission, more frequent imaging may support re-observation of individual icebergs. In future, combined high resolution and wide swath SAR sensors can be expected, which should improve iceberg detection performance, though ocean clutter and sea ice will remain a challenge. Here we propose to use short term iceberg drift modelling to anticipate the likely position of icebergs between satellite passes and enhance the probability of re-sighting and following individual icebergs.
This presentation will outline available and anticipated remote sensing assets, automated iceberg detection algorithms, and drift modelling capability. We suggest a future architecture for regional-scale monitoring of icebergs, and a simulation strategy to evaluate this approach.

USING DINSAR TO INTERPRET SEASONAL SURFACE DISPLACEMENTS IN A CONTINUOUS PERMAFROST HIGH ARCTIC ENVIRONMENT

A.C.A. Rudy, S.F. Lamoureux, P. Treitz (Queen’s University), N. Short, B. Brisco (Natural Resources Canada)

Arctic landscapes undergo seasonal changes as the active layer thaws and freezes. Gentle continuous subsidence is expected as the active layer settles due to top-down thawing as the summer season progresses. Localized or irregular subsidence occurs in areas with high ground ice content or where active layer thaw penetrates the uppermost permafrost leading to the formation of thermokarst terrain. Knowledge of the relative magnitude of displacement, as well as the temporal and spatial variability

of that displacement, is valuable information for risk assessment in the planning and engineering of northern communities as well as the overall assessment of environmental and ecological stability. Differential Interferometric Synthetic Aperture Radar (DInSAR) is a technique capable of measuring ground surface displacements resulting from thawing permafrost at centimetre precision and is quickly gaining acceptance as a means of measuring ground displacement in permafrost regions. Using RADARSAT-2 stacked DInSAR data from 2013 and 2015 we determined the magnitude and patterns of land surface change in a continuous permafrost environment. At our study site situated in the Canadian High Arctic, many DInSAR values are close to the detection threshold (i.e., 1 cm) and therefore do not indicate significant change; however, DInSAR seasonal ground displacement patterns were consistent with field observations, aligned well with climatological and soil conditions and offer geomorphological insight into subsurface processes in permafrost environments. The results of this study demonstrate that DInSAR is an applicable tool for understanding permafrost dynamics in the High Arctic.

Geographies of Work and Wellbeing

Chair: John Haffner (Queen's University)
Time: 2:00-3:30pm
Location: JDUC 351

Gendered Daily Mobility Story: Visibility of Invisible Female Domestic Work

Hilal Kara (Queen's University)

This study analyses female urban practices and daily gendered mobility patterns focusing on waged domestic work. What is the novel in this study is that it is based upon ethnographic data collected from workers during work-home trip on the bus, also from the author who is one of the characters: "de te fabula narratur", meaning that as the study refers to workers' experiences, it would do for the author so. Drawing on the fieldwork conducted in Ankara Turkey through in-depth interviews, this research investigates spatial practices of women in domestic work by tracking significant moments of their mobility as well as urban stories; the first arrival in the city and gaining mobility across the city by involvement in the labour market, particularly locating their long-distance commuting at the center of this study. This research, mainly focusing on female domestic workers' visibility and spatiality in the city, explores how they respond to the challenges of long-distance commuting created by the restructuring of the city. By following thirty-two women's diversified and/or similar urban mobility patterns for last thirty years, their urban stories will be narrated.

"We Are Prepared to Go That Extra Mile": An Analysis of the Mental Well-being of Part-time Female Retail Workers in St. Catharines, ON

Jennifer Williamson (Brock University)

The purpose of this paper is to put context to the age-old phrase "going that extra mile," by examining how mental health impacts the everyday experiences of female retail workers. Currently, academia is situated in the mental wellness of retail workers and the wage gap between men and women. Although, there is focus on the mental wellness of workers, in order to understand the changing

demographics of precarious work; focus needs to shift towards the mental health and subjectivities of women in retail work environments. St. Catharines, Ontario is a city faced with dramatic shifts in the service and symbolic economy; encouraging gendered work environments with little hours and poor wages. Based on qualitative interviews with female retail workers in St. Catharines, this research situates itself in both economic and feminist geographies - surrounding the experience of gender and labour in the workplace, concepts of surveillance and control and materiality of everyday life. The service sector is a current phenomenon, which is gaining importance with the increase in retail employment. Therefore, results from research in this subject matter can contribute to future literature in health geographies to understand individual mental health in precarious workplaces. In addition to, feminist geographies in further investigating gendered work environments.

The Influence of Personal, Social, Ethical and Environmental Beliefs on Clothing Consumption

Waqar, M., Jesuthasan, N., and Leydon, J. (University of Toronto Mississauga)

This research investigates the connections between University of Toronto Mississauga students' personal, social, environmental and ethical beliefs and their purchases of clothing. The clothing sector has been the focus of much criticism for poor environmental and social practices, especially with the rise of fast fashion products that target young consumers. University students, as informed consumers, represent an ideal subgroup of consumers to investigate the relationship between beliefs and consumption practices. Data was gathered through an online survey made available to students enrolled in economic geography courses. The survey responses indicated that although students viewed environmental sustainability, ethical production, and social justice practices as important, their consumption behaviour did not reflect these beliefs. Reasons for engaging in shopping for clothing, influences on clothing purchases, and clothing purchasing behaviour all contradicted stated ethical, social and environment beliefs. The disconnection between beliefs and practices of this group of informed consumers does not bode well for advancement of ethical or socially just production practices nor for environmental sustainability. However, it provides insight into consumer behaviour useful to reconsidering approaches to sustainable consumption.

"Look at these little plants!"- Using gardening as a tool to Foster Children's Environmental Engagement at the Laurentian Child and Family Centre (LCFC)

Chantel Desrochers, Dr. Nicole Yantzi, Dr. Yovita Gwekwerere (Laurentian University)

Gardening has many positive benefits for children, including improved mental, emotional and physical health. In addition, the garden increases social interactions with others, promotes healthy food choices, and helps to create a meaningful connection with nature. This presentation will examine how gardening can be a useful tool to meet the Ontario government's focus on play-based learning occurring in the natural environment. Participant observation data were collected with children both during school and during the summer. A total of 25 pre-school and 21 school-aged data collection periods occurred from June to September 2017, with data consisting of pictures, real-time observations, debriefing notes and children's journal entries. During the study, the children were encouraged to take ownership of their garden by deciding what plants they wanted, where to place the plants, how to decorate their garden space, and participating in harvesting the vegetables. Fun garden-based activities were used as informal learning tools and ways to increase the children's

curiosity and excitement in their garden space. The preliminary analysis reveals examples of actions aligned with environmental curiosity and social skills development. Particular attention will be paid as to whether the actions were child-led or adult-led. The garden served as a tool to broaden the children's attention and curiosity towards their everyday outdoor environments. Children enthusiastically interacted with insects, invertebrates and amphibians found around the garden, often taking initiative to recreate a suitable habitat. Some of the benefits and challenges of using gardening as a tool for play-based learning will be discussed.

"Oh, the weather outside is frightful": The influence of season on rural children's physical activity

Button, B., Tillmann, S., Clark, A. & Gilliland, J (Western University)

Current research suggests children are not getting the recommended amount of physical activity (PA). This is a major concern as low rates of PA have been linked to numerous negative health outcomes. Most PA research is completed in larger centers and fails to recognize rurality and seasonality as a determinant of PA. The purpose of this research is to fill this gap by examining the PA of children in rural Northern Ontario communities in two different seasons. Using a cross-sectional design data was collected using accelerometers, surveys, and global positioning devices, to gather information on children from four schools in grades 4-8. The exact same methods and students are used to explore differences in two different seasons; fall and winter. Preliminary results show that there is a large difference in moderate to vigorous PA (MVPA) between the two seasons and the two sexes, with all children being more active in fall and males being more active than females. Similar to other studies we found that boys were more active than girls and children were more active in warmer months as compared to cooler months. These findings demonstrate that seasonality has the potential to significantly affect children's PA levels. Future research should examine seasonality as a predictor of MVPA levels. These findings also effect policy and programs targeted towards children, adaptations to policy and programs should be made to accommodate differences in season.

Climate, Water, Energy, and Ecosystems

Chair: TBD
Time: 2:00-3:30pm
Location: QC 505

Mechanisms of pathogenic transmission in agroforests: the role of leaf functional traits in shade coffee systems.

Gagliardi, S. (University of Toronto); Isaac, M. (University of Toronto); and Avelino, J. (Centro Agronómico Tropical de Investigación y Enseñanza and Centre de Coopération Internationale en Recherche Agronomique pour le Développement)

Coffee leaf rust (CLR), a pathogenic disease that results in premature leaf fall and significant yield loss, has become a major concern in coffee-growing regions, especially in Central and South America, after recent intense epidemics. CLR is caused by the basidiomycete fungus Hemileia vastatrix Berk. et Br., an obligate parasite, which infects new leaves via dispersed urediospores. While there is evidence

of biochemical responses of susceptible Coffea varieties to H. vastatrix invasion, these responses occur too late rendering them ineffective. An important system component that has not been thoroughly investigated is the leaf morphology of both coffee plants and shade trees, which may have a potential coordinated role in CLR incidence and severity on a plot-scale. We hypothesize that (1) coffee leaves with enhanced toughness traits, reduced stomatal density, and greater leaf inclination angle will negatively affect CLR; and (2) shade trees with closed canopy architecture and lower leaf inclination angles in the lower canopy stratum will strongly reduce rain throughfall kinetic energy (TKE) thus moderating H. vastatrix invasion. Preliminary results suggest that coffee leaf traits have variable effects on CLR severity, differing between shade management systems, which are similarly reflected in the TKE variability within the shade tree stratum. These preliminary findings advance our understanding of non-chemical resistance measures available in agroecological systems, which may lead to more sustainable and more economical options to battle CLR and pathogen invasions in general.

Accounting for missing data in monthly climate series: Testing rule-of-thumb omission of months with missing values

Conor I. Anderson and William A. Gough (University of Toronto Scarborough)

The '3/5 rule' is a commonly used rule-of-thumb for dealing with missing data when calculating monthly climate normals. The rule states that any month that is missing more than 3 consecutive daily values, or more than 5 daily values in total, should not be included in calculated monthly climate normals. We sought to quantify how much error the '3/5 rule' (and a related rule which we have dubbed the '4/10 rule') permits. We tested the statistical robustness of these rules using observed temperature data from a temperate station and a tropical station. We show that the '3/5 rule' permits an average of between 0.06 and 0.07 standard deviations of error in the calculated monthly mean when 3 consecutive, or 5 random values are missing. For its part, the '4/10 rule' permits a maximum of between 0.08 and 0.09 standard deviations from the true mean when four consecutive values are missing, or up to 0.10 standard deviations when ten random values are missing. The proportional impact of missing values was similar across variables and stations, however February is disproportionately affected by missing values, when compared to other months. We performed a correlation analysis, and show that each additional missing value from a given year-month of data contributes between 0.01 and 0.02 standard deviations of error to the calculated monthly mean. Linear interpolation can minimize the impact of missing values when few values are missing at random, but is less effective when there are consecutive missing values.

Water use and management in the context of climate variation in the Lawra District of Ghana

Abu Thelma Zulfawu (University of Waterloo), Chris Gordon, and Adelina Mensah (University of Ghana)

Access to safe water in sufficient quantities is a key requirement for achieving the Sustainable Development Goals (SDG6). However access to safe water in the right quantities remains a major challenge especially in semi-arid regions and in rural areas, where livelihoods are often tied to access to water. The competing interest for water results in water resources management challenges. We adopted a mixed methodology to assess water quality, water use, and identify adaptation measures in

four selected communities in the Lawra District of the Upper West Region, Ghana. Results indicate that water quality varied across the different sources of water. For instance, nitrate ranged from 0.37 to 12.8 mg/L, phosphate from 0 to 1.62 mg/L, iron from below detection to 12.2 mg/L and arsenic from 0.001 - 0.5 mg/L for both the dry and wet season. Water uses range from domestic purposes, irrigation, to livestock use depending on quality. The perception of water quality varied significantly in terms of colour, taste and smell among the different communities. Even though there was a reported decrease in the number of water related conflicts in the communities compared to 15 years ago, about 18% of respondents believe that water related conflicts will increase should the current challenges persist. The Water and Sanitation (WATSAN) committees with the support of traditional authorities play significant roles in water management in each community, however there is no proper monitoring and evaluation of District water policies and interventions. Policy recommendations for water management are presented.

A Comparison of Climatological Observing Windows and Their Impact on Detecting Daily Air Temperature Extrema

Ana Žaknić-Ćatović and William A. Gough (University of Toronto Scarborough)

Climatological observing window (COW) is defined as a time frame over which continuous or extreme air temperature measurements are collected. A 24-hour time interval, ending at 00UTC or shifted to end at 06UTC, has been associated with difficulties in characterizing daily temperature extrema. A fixed 24-hour COW used to obtain the temperature minima leads to potential misidentification due to fragmentation of “nighttime” into two subsequent nighttime periods due to the time discretization interval. The correct identification of air temperature extrema is achievable using a COW that identifies daily minimum over a single nighttime period and maximum over a single daytime period, as determined by sunrise and sunset. Due to a common absence of hourly air temperature observations the accuracy of the mean temperature estimation is dependent on the accuracy of determination of diurnal air temperature extrema. Qualitative and quantitative criteria were used to examine the impact of the COW on detecting daily air temperature extrema. The timing of the 24-hour observing window occasionally affects the determination of daily extrema through a mischaracterization of the diurnal minima and by extension can lead to errors in determining daily mean temperature. Hourly air temperature data for the time period from year 1987 to 2014, obtained from Toronto Buttonville Municipal Airport weather station, were used in analysis of COW impacts on detection of daily temperature extrema and calculation of annual temperature averages based on such extrema.

Discerning the effects of major energy projects, climate change and distributary flow on hydrology of lakes in the Athabasca Delta using paleolimnology

Mitchell Kay, Casey Remmer, Jasmina Vucic, Laura Neary, Erin MacDonald, Kristen Wesenberg (University of Waterloo), Kate Thomson (Wilfred Laurier University), Kathleen Brown, Johan Wiklund (University of Waterloo), Brent Wolfe (Wilfred Laurier University), Roland Hall (University of Waterloo)

The Peace-Athabasca Delta (PAD) in northern Alberta is the world's largest boreal freshwater delta. For the past 50 years, there have been many unresolved concerns over the potential effects of major energy projects, climate change and reduced river discharge on lakes in the delta. This year, a report by UNESCO/IUCN has reignited these concerns by declaring that hydroelectric regulation of the Peace River by the Bennett Dam has reduced flood frequency and lowered lake levels in the PAD. In response to concerns about drying in the PAD, paleolimnological analyses at three lakes along the unregulated Athabasca River previously identified that hydrological conditions in the southern Athabasca sector of the delta are strongly influenced by recent changes in distributary flow. Yet, uncertainty remains regarding the extrapolation of these results over space and time across the Athabasca Delta, given the hydrologically dynamic and complex nature. Consequently, sediment cores were collected in summer 2015, 2016 and 2017 from eight lakes along a ~45 km transect in the Athabasca Delta to assess spatial and temporal patterns of variation in hydrological conditions and their drivers. Results show directional hydrological change in recent decades to reduced flooding in the Athabasca Chipewyan First Nation Reserve and adjacent regions, and increased flooding along the north-western region of the delta. The timing and patterns pinpoint the 1982 Embarras Breakthrough, a natural geomorphic event that diverted flow northward and away from the First Nation Reserve at the Athabasca Delta terminus as the principal cause, not the widely perceived Bennett Dam.

Forest restoration at Tommy Thompson Park: solutions for urban double-crested cormorant disturbance

Marcoux-Hunter, Danielle (Ryerson University)

This paper will examine the relationship between double-crested cormorants and urban deforestation at Tommy Thompson Park in Toronto, Ontario. The park, located on a man-made spit, became a highly attractive site for the once-extirpated double-crested cormorant to make its return to Lake Ontario in the 1990s. Cormorant colonization of the park has resulted in the deforestation of 24% of the park's total canopy. As this is an emerging problem for Toronto, the Toronto and Region Conservation Authority (TRCA) is constantly updating its management techniques and searching for recommendations. The focal area for this study is Peninsula C, a large area of the park that is experiencing severe degradation due to consecutive years of cormorant nesting in its' early-successional tree species. This study analyzes the current ecological conditions on Peninsula C and aims to use these results to provide restoration recommendations to the TRCA. I have collected primary data from the site which I will use to geospatially interpolate a continuous surface of ecological conditions across my target area. Data analysis for this project is still ongoing, however, preliminary results show that landscape conditions are more variable than expected at the site. I will pair my interpolation results with classical statistics, ground-observations, and international cormorant management examples. I expect that I will divide the site into multiple ecological zones in order to recommend steps that can be taken to restore soils, improve tree canopy, and promote the maturation of the forest while consecutively deterring the spread of cormorant nests in the park.

Understanding the Complexity of Canadian Energy Landscapes: Indigenous communities

Chair: Bronwyn Lazowski (University of Waterloo)
Time: 2:00-3:30pm

Location: QC 506

Whose plan is it anyway?: Investigating the institutional landscape and process of community energy planning in Canada's remote Indigenous communities

Joanne Shantz, Ben Bradshaw, and Kirby Calvert (University of Guelph)

Communities are playing an important role in the shifting energy system in Canada through the creation of community energy plans. By planning their own energy futures, communities can pursue specific opportunities and manage risks while more actively engaging their membership. One context where this governance innovation could prove to be especially promising but remains understudied is in Canada's remote Indigenous communities. Many of these communities rely on diesel fuel for energy, posing issues of environmental impact, high costs, and unreliable service. Community energy planning offers an opportunity for these communities to address energy issues in a way that could account for social and political dynamics while simultaneously pursuing goals such as economic development, self-sufficiency, and sustainability. Through the development of a case study in partnership with Eabametoong First Nation, this research examines the extent to which the institutional framework through which community energy planning is operationalized is consistent with community perspectives. An analysis of the institutional landscape of community energy planning in Ontario was completed in combination with semi-structured interviews. Data surrounding community perspectives were collected through engagement with Eabametoong First Nation membership at community events focused on discerning future visions and priorities for energy in the community. Emergent themes from this analysis include environmental protection, independence, economic development, and community engagement. This research emphasizes the need to better understand how community energy planning works in unique contexts such as remote Indigenous communities, how it is operationalized more broadly, and whose visions are represented.

Renewable Energy to Advance Off-Grid Community Sustainability: A Case Study of NunatuKavut, Labrador

Nicholas Mercer (University of Waterloo)

On a national scale, Canada is a leader with regards to renewable energy [RE] development, as the country is the fourth largest producer of RE globally. However, at the local/remote community scale, Canada remains highly dependent on fossil fuels. Of the 292 remote off-grid communities in Canada, 253 rely almost exclusively on diesel fuels for electricity generation. While stakeholders frequently mention the economic, environmental, and societal challenges of diesel-generation - and argue in favour of a transition to RE resources, there is not an in-depth understanding of how energy landscapes (i.e. diesel vs. RE technologies) affect the sustainability off-grid communities. Working with the NunatuKavut Community Council, whom represent the Southern Inuit of Labrador, the proposed research project seeks to: (1) identify economic, environmental, and societal impacts of diesel-generation in Labrador's off-grid communities, (2) to determine stakeholder perceptions of diesel and renewable electricity technologies in case study communities, and (3) to develop community-driven RE action plans.

Technical solution or wicked problem?: Divergent perspectives on Indigenous community renewable electricity in northern Ontario

K. Karanasios and P. Parker (University of Waterloo)

For 144 indigenous remote communities in Canada with a population of approximately 100,000 that are not connected to any provincial or territorial electrical grid, electricity is provided through utilities owned isolated diesel plants. The views of key informants in a remote northern Ontario community on their current diesel-powered electricity system and new renewable electricity generation alternatives are examined through semi-structured interviews and literature reviews of academic, policy, and utility documents through the lens of a wicked problem approach to identify policy direction and strategies for the development of renewable electricity projects. According to informants, the complexity surrounding the deployment of renewable electricity technologies (RETs) in remote Canadian indigenous communities is the result of different stakeholder perspectives on the issues that RETs are expected to address. Furthermore, institutional complexity of the electricity generation system, and uncertainty over both the choice of off-grid renewable technology and the future of electricity generation systems structure and governance add to this complexity. Given the government's legal obligation to consult with indigenous people for projects within their territories, community perspectives provide insights for policy design to support both the deployment of RETs and address indigenous communities' sustainability goals.

A SHARED Future: Achieving Strength Health, and Autonomy through Renewable Energy Development for the Future – a CIHR-funded Team Grant on Intersectoral Partnerships for Healthy Lands, Healthy People

Jon Aarssen, Heather Castleden and 'A SHARED Future' Team (Queen's University)

The defining issue of our time is anthropogenic climate change. Of all the extractive natural resource industries operating across the Canadian landscape, non-renewable energy development and the combustion of fossil fuels are causing the most significant and irreversible climatic impacts. Indigenous peoples are often the first to witness significant and direct impacts of such extraction and development. Indigenous peoples are also in a position to take on leadership roles towards increasing our mitigative and adaptive capacities in both Indigenous and Settler contexts through renewable energy initiatives. Stories of leadership are only just beginning to emerge: Indigenous Ways of Knowing in renewable energy projects. From this premise, we form the basis of a shared vision for our CIHR-funded research program called "A SHARED Future". Our partners - Indigenous and Settler governments, organizations, industries, advocates, and scholars - are on the leading edge, moving forward with projects intent on achieving Indigenous strength, health, and autonomy through renewable energy development But this resurgence has knowledge gaps. Accordingly, our team's research goal is to examine, through stories, how Indigenous knowledge systems - as applied to intersectoral partnerships for renewable energy development - have the potential to lead us towards 'healthful environments' through reconciling and healing our relations with each other as well as the land, air, and water around us. The purpose of this presentation is to screen a short (15-minute) video of our inaugural team meeting held this year and take questions, comments, and critiques as we embark on our five-year research program.

What does reconciliation and healing look like for IISD-ELA and Treaty 3 First Nations?

Elissa Bozhkov, Heather Castleden (Queen's University), Derek Kornelsen (University of Manitoba) Pauline Gerrard (Institute for Sustainable Development)

The International Institute of Sustainable Development (IISD) assumed responsibility for the Experimental Lakes Area (ELA) in 2014 after the Harper Government threatened to shut it down in 2012. The ELA is a unique freshwater research facility, home to vital Western scientific research that has worked to inform policy for nearly 50 years through a better understanding of human impacts on the ecosys-tem. The field station is located on traditional Indigenous territory, and home to Treaty 3 signatories. Yet throughout the life of the ELA, Indigenous peoples—who are great knowledge holders of their land—have been largely excluded from the governance and research activities taking place there, until now. The IISD wants to develop new relationships with Indigenous peoples in the ELA watersheds. Drawing inspiration from the final report of the Truth and Reconciliation Commission of Canada – which calls upon governments to fully adopt and implement the United Nations Declaration on the Rights of Indigenous Peoples - we are proposing a study that will investigate the relationships that are developing between IISD-ELA and local First Nations communities. With a focus on reconciliation and healing, a survey will be created to explore how ELA staff perceive IISD's efforts at engaging and collaborating with First Nations Communities. The main objective of this study is to address personal capacity building, and to identify challenges and opportunities for relationship-building. Our goal is to further our understanding of how Western-trained scientists and Indigenous knowledge-holders can work together to address ecosystem-based environmental and health challenges.

Clean Energy as a Contribution to Reconciliation Efforts? Exploring Indigenous Leadership in Renewable Energy Development in Canada

Dr. Chad Walker and Dr. Heather Castleden (Queen's University)

While creating low-carbon electricity systems and reconciling Indigenous-Settler relationships can be done in several independent ways, the development of renewable energy by, for, and with Indigenous communities presents a case where we may address both in the same space. Past Nation-to-Nation divides have actually widened when efforts were not made to balance economic development goals between partners. Through a CIHR-funded program of research that explores renewable energy development in intersectoral partnerships through the lens of reconciliation,we are developing a case study of Indigenous leadership and development approaches with a partnering Mi'kmaq First Nation. The primary question we are concerned with is: what kind of roles are Indigenous peoples taking in considering and implementing renewable energy and how does this align with the expectations and traditions of local Indigenous knowledge? This study will use a Community-Based Participatory Research (CBPR) approach and data collection methods will be chosen alongside the partner community. We will seek to equitably involve Indigenous community partners during all stages of the study, encourage avenues for knowledge exchange and share decision-making responsibilities. This research will contribute towards a national dialogue on renewable energy taking place within and across Indigenous communities via the sharing of experiences through Indigenous and equity-focused knowledge translation. This will be done with the wider goal of informing short and medium term priority calls to actions which have been identified by the Truth and Reconciliation Commission

across the Canadian landscape- especially in parts of Indigenous Canada where independent, cleaner electricity systems are needed the most.

Thesis Proposals

Chair: Laurence Simard-Gagnon (Queen's University)
Time: 2:00-3:30pm
Location: QC 504

Past, Present, and Future Effects of Heritage Preservation in Vancouver's Downtown Eastside

Seraphina Skands (Queen's University)

This study will be built around cultural, social, and political discourses focusing on heritage and cultural preservation. Through urban neoliberal practices, heritage zoning and preservation has become a tool for cities and stakeholders to restore chosen parts of the built environment, creating a hierarchy of importance based upon what is arguably aesthetic characteristics above stories of lived experience and habitation. With particular attention paid to Vancouver, Canada's Downtown Eastside, an examination of how historicizing the contemporary landscape can create unilateral stories of existence will be conducted in order to better understand the question - heritage preservation for whom? Development of protected heritage spaces not only leaves out the nuances of daily life and struggle, but also the political factors that enable their building and preservation in the first place. Through a perceived consensus around what is important to preserve, cities and stakeholders negate the inherent power and political relations that the physical landscape is built upon, and continues to develop under today.

Post-Baguazo: Reconsidering Indigenous - State Relations and Mining Conflicts in the Peruvian Amazon

Carola Ramos (Queen's University)

Literature on Latin American political economy has focused on a mixture of debates on (post) neoliberalism, resource extraction, and social conflicts. Peru exemplifies a clear example of extractivism under neoliberalism. In terms of social mobilisation, however, Peru is anomalous: despite having the largest absolute number of indigenous peoples in South America and the highest number of social conflicts linked to mining, unlike in Ecuador or Bolivia, protests in Peru are considered as "localized, sporadic, and spontaneous in nature", without entailing a sustained challenge to neoliberalism. How, then, does Peru maintain its neoliberal order in resource extraction? Using concepts of governmentality, a neoliberal state and coloniality of power, with a decolonial approach, my hypothesis is that the evocation of the Baguazo, a violent confrontation between police forces and civilians in 2009 that resulted in 34 deaths (including among the Awajún), activates a memory of violence that shapes, redirects or postpones confrontation, reconfiguring indigenous-state relations, while
maintaining the neoliberal order. I aim to demonstrate this through a genealogical review of the introduction of the neoliberal mining framework in Peru; a critical analysis of the monitoring and management of a specific "mining conflict", using discourse analysis of online media outlets and

semi-structured interviews with Awajún individuals and representatives of the state, industry and NGOs; interviews and group discussions with (in)direct participants in the Baguazo and the mining process to understand their perspectives on their struggle post-Baguazo; and participant-observation of communal and public events involving Awajún groups and representatives of the mining industry, respectively.

The Financialization of Urban Decline: Interest Rate Swaps, Financial Innovation, and Fiscal Distress in Detroit, Michigan

Rachel Phillips (University of Toronto)

Since the 2008 financial crisis, geographers have increasingly engaged with questions surrounding the financialization of urban space and urban processes. While much of this research focuses on the financialization of the urban built environment—from housing, to infrastructure, to commercial real estate—scholars have recently begun to apply the financialization lens to urban politics, focusing on the ways in which financial actors, logics, and imperatives have come to influence the local political process. This research seeks to contribute to this new direction in the financialization literature through a case study of Detroit, Michigan. In 2005, Detroit entered into a series of complex financial agreements known as interest rate swaps. These swaps would later become central to the city's fiscal crisis and subsequent bankruptcy, exacerbating Detroit's already precarious financial position. In light of this, my research aims to understand why policy makers and local officials in Detroit turned to these high-risk financial instruments, and to explore how financial actors and institutions facilitated this. This research examines these questions through a qualitative analysis of data collected through interviews with public officials, policy documents and public reports, and legal documents related to Detroit's bankruptcy case. Preliminary findings indicate that as the global economy has become increasingly financialized, cities have become key sites of capital accumulation and important sources of financial yield. This has encouraged financial institutions to exert a strong influence over local political processes and financial decision-making, resulting in extreme financial risks being imposed on cities and their residents.

Modeling the tidal energy resource of Frobisher Bay, Nunavut to investigate its potential to meet the energy requirements of Iqaluit.

Jordan Carlson (Queen's University)

In Canada, tidal power research has largely been focused on the Bay of Fundy. The proposed research will draw on tools and data from Fundy studies and apply them to Frobisher Bay in Nunavut. Iqaluit, the largest settlement in Nunavut and on Frobisher Bay, presently relies on imported diesel fuel for electricity and heat production. Past research efforts on renewable alternatives for northern communities identified challenges for the deployment of wind and solar energy technologies, including the seasonal availability of energy. Both federal and territorial governments continue to seek alternatives to diesel energy in Nunavut, as evidenced through the prioritisation of such efforts at the Canadian High Arctic Research Station. The tidal energy sector has great potential in Canada's north, with more than 29,000 MW of Canada's extractable tidal resource found in the Hudson Strait and surrounding bays—including Frobisher Bay. The goal of the proposed research is to model the tidal resource in Frobisher Bay utilizing existing tools developed for the Bay of Fundy and European

settings, to test the validity of the model, and to evaluate the suitability of tidal power to meet energy needs in Iqaluit.

Gendered Experiences of Climate Change: Coping with High Flooding in the Peruvian Amazon

Jennifer Langill (University of Toronto)

Global climate change has caused an increased severity of environmental shocks in Amazonia, particularly extreme flooding. This creates high livelihood vulnerability among floodplain communities. This project explores human coping mechanisms to the 2014 major flooding along the Ucayali River in the Peruvian Amazon. It considers both the individual and community scales, and accounts for gendered experience and perspectives. Earlier research has demonstrated the importance of social networks in the region, however analysis of how local populations leverage these social networks in times of environmental shock has yet to be explored. This project thus seeks to fill this research gap. Researching local and gendered experiences of environmental vulnerability will deepen understanding of the lived implications of broader environmental change. This research uses a feminist political ecology framework to question how community members were affected and how they coped, what social networks were available and leveraged, why individuals and households exercised these responses, and to what extent these processes are differently experienced between different community members. A mixed-methods research study was conducted in the Peruvian Amazon over three months. Data collection included semi-structured interviews, a household survey, and participant observation in two riverine communities. This presentation will introduce the research context and questions, the data collection methods employed, and the plans for quantitative and qualitative data analysis.

Public health, the work of the dead, and remaining in Vancouver's Downtown Eastside

Angela Kruger (Queen's University)

This interdisciplinary study will examine the state of public health in Canada by focussing on Vancouver's Downtown Eastside (DTES), where numerous health crises (fentanyl, housing, homelessness) are devastating the neighbourhood. This study will ask: how do governments, healthcare institutions, and non-profit organizations care for the dead in the DTES (if they do)? How does the nature of that care (or lack thereof) impact care for (and the health of) the living? By advancing a theory of the public health gaze, engaging in the conversation (battle) about/between quantitative versus qualitative health research, and exploring the ways in which grassroots groups in the DTES community enact healing by re-membering the dead in public space (e.g. commemorations, artwork, and activism), this study will suggest new approaches to public health work in the DTES. I will conclude with a brief discussion of remains and remaining, exploring what it means to remain, reviewing embodied understandings of remaining, and offering new ways to consider remaining in the DTES.

Comparing Development Charges in Calgary and Toronto

Christopher Bell (University of Waterloo)

In most Canadian municipalities, land developers are required to pay development charges during or after the planning review process. Effectively, these charges are conditions of a project's regulatory approval, and reflect the capital costs associated with urban growth. Examples include sewage treatment plant upgrades, and additional libraries, recreation centres, and parks. Charges amounts are usually expressed in terms of dollar amounts per square metre, unit, or hectare, and are calculated and administered in accordance with provincial enabling legislation. Development charges are one of the few significant own-source revenue tools available to local governments in Canada. While this fiscal tool has played an important role in Canadian land use planning for over fifty years, the literature on development charges is limited. Key issues previously discussed include impacts on urban form, the role of development charges in promoting or inhibiting urban sprawl, economic efficiency in calculating and administering charges, and deficiencies in current charge application in Canada. My thesis will explore the use of development charges in the context of urban intensification. I will explore how, and to what extent, local governments use development charges as a strategic tool to direct urban (re)development to specific locations and in desired forms. To this end, I will compare development charges in Toronto and Calgary using a mixed methods approach. This will include a legislation and policy review, mapping and analysis of census data, regression analysis, and targeted interviews of land developers, urban planners, local politicians, and other relevant stakeholders.

Animal Geographies

Co-Chairs: Lauren Van Patter and Sandra McCubbin(Queen's University)
Time: 3:45-5:15pm
Location: JDUC 351

"The vices fowl…are most addicted to": The Geography of Strife in the Pursuit of Winter Eggs at Canada's Central Experimental Farm, 1890-1900

Peter Anderson (Queen's University)

At the end of the nineteenth century fresh eggs were only available during the warm months. While spring eggs were considered the most flavourful, there was a noted decline in quality the longer a hen was laying and the preserved eggs available during winter months were deemed to be the lowest quality of all. In this context, during the 1890s Poultry Husbandman A.G. Gilbert, working at the dominion government's Central Experimental Farm in Ottawa, pursued a research program to hatch the economic potential of fresh winter eggs. Unfortunately, Gilbert's scientific optimism soon came face-to-beak with chicken behaviour. The close winter quarters incubated contagious diseases and behavioural problems. Vicious fighting erupted with hen attacking hen, and many valuable fresh winter eggs were destroyed in the conflicts. This paper examines Gilbert's attempts to understand his birds and create environments that limited the potential for illness and antagonism. As "a business of small things," Gilbert examined the social interactions of his flock—including between individual birds as well as different age-cohorts—and the spaces in which conflict occurred in order to develop a series of architectural changes that improved the conditions in his chicken houses to allow the production of the much sought after fresh winter egg. I argue that by attending to the geography of his flock, and the personality of his birds, Gilbert was able to bend chicken nature to human ends.

A Spatial Bestiary: Understanding human-animal laboratory relations through the lens of biopolitical-animal geography

Carley MacKay (York University)

In this essay, I use the frameworks of animal geographies and biopolitics to consider how the space of the animal laboratory shapes human-animal relationships, and how, in turn, these relations impact the laboratory and the spatially-bound practices that unfold within it. Illustrating these analytics, I conducted participant interviews with individuals who work with animals in laboratory-like settings, animating several themes that I locate at the intersection of biopolitics and animal geography. These themes draw on how, within the laboratory, biopower structures human-animal relations in a variety of ways, resulting in the production of several subjectivities for humans and animals. Within the laboratory, biopower functions via the production of science, exercising the production and management of life. Alongside this functioning of science as a form of biopower, I look at how science also signifies a market economy that shapes the commodification of animals. Lastly, I look at the role of spatiality in shaping the entanglement of biopower, subjectivities, and science. Understood as a process that produces effects, spatiality impacts bodies by shaping the ways in which they are biopolitically examined, understood, and acted upon.

Silenced Howls: Algonquin wolves and the A2A

Patrick Braszak (University of Toronto Mississauga)

Wildlife conservation is currently undergoing a paradigm shift. Traditional, centralized approaches are becoming increasingly questioned for their inability to address the extrajurisdictional drivers behind species loss – namely habitat loss, habitat fragmentation and climate change. Transboundary conservation models have been steadily gaining traction around the world as the more suitable alternative given their wholesale rejection of artificial, anthropogenic boundaries in favour of scales determined entirely by ecological processes. In response to these new understandings, international conventions and national policies have emerged with goals to enhance protected area coverage and connectivity, but state action across North America has thus far been latent. As a result, civil society actors have been largely responsible for implementing transboundary conservation projects on this continent. This paper will share the results of a case study on one such civil society group – the Algonquin to Adirondacks Collaborative – which aims to establish a transboundary corridor across the Frontenac Arch from Ontario, Canada to New York State, U.S.A. The Algonquin to Adirondacks Collaborative had initially framed its proposed corridor as an opportunity to restore the Algonquin wolf to a significant portion of its historical habitat range, but has since abandoned the large carnivore from its rhetoric and instead has come to emphasize climate change adaptation as the primary justification for transboundary conservation in the region. This paper will touch upon the Algonquin wolf's position in North American society to better understand the Algonquin to Adirondacks Collaborative's decisions, and will conclude by pondering the future of the wolf in the region.

Toward a Political Ecology of the Cecil Moment

Sandra McCubbin and Alice Hovorka (Queen's University)

This paper explores the Cecil moment; that is, the series of events that unfolded after the killing of Cecil the lion in Hwange National Park, Zimbabwe in July 2015. Drawing on political ecology and actor-network theory, I ask: i) What actors became enrolled in the Cecil moment? ii) How were these actors connected to one another? iii) How did the Cecil moment create and distribute benefit? Research methods include discourse analysis of online media in the days, weeks, and months after Cecil's death as well as semi-structured, key informant interviews. The goal of the paper is to illuminate an anatomy of the Cecil moment, explore who the Cecil moment empowered, and consider the implications for lion conservation policy and practice. Findings will be discussed in relation to recent arguments by critical conservation scholars about entanglements of celebrity, philanthropy, and conservation.

Elusive neighbors, unlikely companions: urban coyotes in a postmodern animal geography

Nhi Ha Nguyen H. (Queen's University)

The history of human–animal relations in urban spaces is a socio–historical account of spatial–ideological negotiations and multiple natures in the context of environmentalist governance. Inconspicuous in everyday life unless an element of risk makes them visible in encounters with others, urban wildlife appears, at best, a pragmatic lesson on eco–social co–existence, and at its most unruly, a sobering, embodied reminder of a sublime nature "red in tooth and claw", as awe–ful as it is an escapist spectacle for upper–class recreation (Cronon 1996). A liminal social imaginary that increasingly transgresses modern nature–culture boundaries, the urbanized, non–domesticated nonhumans colloquially known as urban wildlife thus provide a unique lens, through which the complexities of governing human–animal relations can be examined. Situated at the crossroads of public imagination, popular media and "nature" narratives, this research investigates environmental hermeneutics and the construction of "risk" as a determinant of accountability in urban wildlife interactions. Divided into three consecutive phases of archival research, media analyses and interviews, the project seeks to contribute a comprehensive literature review of research on urban coyotes as a starting point to the reimagination, reinterpretation, as well as restructuring of urban animal geographies.

Mitigating the extinction in Royal Bengal Tiger Population in Bangladesh

Zarrin Tasneem (University of Waterloo)

The bengal tiger is the national animal of Bangladesh. Currently the Royal Bengal tigers are critically endangered (Jalais, 2008). The declining population of these tigers are due to the over-hunting of its food, as well as poaching of the tigers because of commercial purposes (Chapron, Miquelle, Lambert, Goodrich, Legendre, Clobert, 2008). The depletion of prey population is slowly killing the tigers through starvation. The poaching of the bengal tigers include human intrusion, commercial forestry and cattle grazing. However, habitat destruction of these tigers is the main cause of the Bengal tiger depletion, which plays a crucial role in the tigers' vulnerability (Chapron, Miquelle, Lambert, Goodrich, Legendre, Clobert, 2008). This is due to illegal cutting of forestry, intrusion of forest areas, as well as illegal poaching of wildlife causing them to lose biodiversity at an alarming rate (Hayward, Jedrzejewski, Jedrzejewska, 2012). However, in order to facilitate the response actions, which will

hopefully alleviate human-carnivore conflict, management tools were tailored to create a framework (Khan, 2004). This framework was applied to the human-tiger conflict in the Bangladesh Sundarbans. It includes creation of a profile to improve understanding of the nature of the conflict and the causality behind the Bengal Tiger's depletion (Khan, 2004). These actions include deterrents, education, direct tiger management as well as response teams. However, it was determined that direct tiger management and response teams were best options from the framework (Khan, 2004). Other actions can be taken in order to mitigate the extinction of the Royal Bengal tigers by replanting the forests after the trees have been cut down or plant trees around the infrastructure. Poaching of the tigers could be avoided, in order to protect the tigers that are currently left over by bringing awareness about the tiger's extinction to the villagers and hunters.

Biogeochemistry and Arctic Environmental Change

Chairs: Gillian Thiel (Queen's University)
Time: 3:45-5:15pm
Location: JDUC 352

Examining the spatial and temporal effects of soil nitrogen availability on carbon exchange in a High Arctic wetland

Hung, J.K.Y. (Queen's University), Atkinson, D.M (Ryerson University), and Scott, N.A. (Queen's University)

The trajectory of change in the Arctic regions depend on the positive and negative feedbacks between Arctic ecosystems and the climate system. To predict how these feedbacks will develop, an understanding of the environmental controls over nutrient cycling and gas exchange in High Arctic ecosystem and their spatial and temporal variability is needed. A High Arctic wet sedge meadow was studied to examine spatial patterns of soil nitrogen availability and its influence on carbon exchange. Ammonium and nitrate correlated highly with total and early season gross primary productivity. Higher ammonium concentrations coincided with greater CO2 uptake. Nitrate concentrations correlated strongly to soil moisture, but nitrate levels were much lower than ammonium concentrations, suggesting low rates of nitrification versus mineralization. Similar patterns were observed regardless of whether the wet-sedge meadow was classified as wet or dry, but the relationships were always stronger in areas classified as wet, which is indicative of the importance of moisture and water availability on abiotic processes in High Arctic wet sedge meadows. Areas of lower topography had the highest inorganic nitrogen concentrations, as influenced by its movement and transport in water. Generally, the low-lying areas had the highest inorganic nitrogen concentrations. The results demonstrate the occurrence of finer scale processes that alter nitrogen availability, which in turn influences the carbon balance of wet sedge meadows in the High Arctic, and how these ecosystems may respond to changes in climate.

Methylmercury Hotspots and Cycling Across a High Arctic Freshwater Sub-Catchment

Varty, Stephanie, I. Lehnherr (University of Toronto Mississauga), J. Kirk (Environment and Climate Change Canada), K. St. Pierre (University of Alberta) AND V. Wisniewski (University of Toronto Mississauga)

Methylmercury (MeHg), is a toxin which bioaccumulates and biomagnifies through food webs. Elevated concentrations of MeHg in certain freshwater fish is a potential concern for Arctic Indigenous People. It is important to gain an understanding of the spatial and seasonal variations in the sources of MeHg as climate change is likely to alter the fate of MeHg in Arctic ecosystems. This research is aimed at determining where production (methylation) and degradation (demethylation) of MeHg occurs in a High Arctic freshwater system and how these processes vary between ice-on and ice-off conditions. To address these objectives a series of field based experiments to quantify Hg methylation and MeHg demethylation, as well as spatiotemporal surveys of MeHg and total Hg concentrations, were conducted in the Skeleton Lake sub-catchment of Lake Hazen, Ellesmere Island, Nunavut, Canada. Preliminary data suggests that while MeHg is produced in the lake and pond sites along the continuum, wetland soils act as a sink for MeHg reducing its export into Lake Hazen, through both demethylation of MeHg and sorption onto soils. This research will provide a better understanding of Hg cycling across the Arctic landscape and how changes in climate may alter biogeochemical processes relevant to contaminant cycling in the High Arctic.

Impacts of a Warming Arctic on Freshwater Ecosystem Productivity, Processes, and Resources

Wisniewski, V., Lehnherr, I. (University of Toronto Mississauga), Schiff, S., Aukes, P. (University of Waterloo), and Kirk, J.L. (Environment and Climate Change Canada)

Lake Hazen, located on Ellesmere Island (82°N) is Canada's largest lake north of the Arctic Circle. Historically and culturally, this region served as a significant hunting and fishing ground for paleo-Inuit people approximately 4000 years ago. Lake Hazen watershed is currently experiencing various impacts of climate change (i.e., warmer temperatures, increased precipitation, decreasing ice cover, etc.). Consequently, my research focuses on how these changes are impacting freshwater processes, specifically primary productivity, which supports aquatic food webs (i.e. fish stocks) with energy necessary for survival. The objective of this study is to determine how high Arctic lakes are responding to climate change by calculating rates of total ecosystem productivity achieved by quantifying net primary productivity in surface waters, ecosystem respiration, and air-water CO2 fluxes. In summer 2016 and spring 2017, we quantified metabolic processes during the ice-off and ice-on seasons, respectively, on Skeleton Lake (a smaller, but relatively more productive lake within the Lake Hazen watershed). Current rates of ice-off ecosystem productivity were determined using state of the art instrumentation deployed on floating platforms to continually measure dissolved carbon dioxide and dissolve oxygen in surface waters. Instrumentation was deployed beneath the ice surface during ice-on for estimates of winter/spring productivity.

Dissolved organic matter biodegradability in surface waters of a High Arctic watershed

Thiel, G. (Queen's University), J. Fouché (Université de Bourgogne), M. Lafrenière, and S.F. Lamoureux (Queen's University)

Climate change effects such as enhanced active layer thaw will result in altered surface water distribution in the High Arctic. Increased ponding in this environment could play a vital role in organic matter cycling and carbon fluxes to the atmosphere. The aim of this study was to better understand how dissolved organic matter (DOM) lability in surface water bodies at the Cape Bounty

High Arctic Watershed Observatory on Melville Island, NU varies with geomorphological setting of the water bodies. Water samples were collected from six shallow ponds. Two ponds were in active layer detachment (ALD) scars, one formed at a break in slope, and two were at an undisturbed mesic tundra site. Each pond was sampled between July 12-24th (early-season) and again on August 8th (late-season). Triplicate samples were incubated over 28 days, with five time steps: 0, 2, 7, 14, and 28 days. At each time step, sample aliquots were removed and analyzed for dissolved organic carbon (DOC), total dissolved nitrogen (TDN), dissolved inorganic nitrogen species (DIN; NO3-, NO2-, and NH4+), and fluorescence-absorbance properties. Labile DOM was quantified as the concentration of DOC lost over the incubation period. Results suggest a complicated definition of lability which cannot be identified by optical properties alone, but depends on a combination of DOM quality and nutrient availability. Results of this study will contribute to a better understanding of DOM lability in High Arctic ponds, thus allowing for better prediction of atmospheric carbon fluxes.

Space, Power, and Neoliberalism

Chair: John Haffner (Queen's University)
Time: 3:45-5:15pm
Location: QC 504

The politics of place (re-)naming: Symbolic power and the urban toponymic landscape of Minsk, Belarus

Dr. Sergei Basik (Conestoga College) and Dr. Dzmitry Rahautsou (Mogilev State A. Kuleshov University)

The focus of the toponymic research recently has been directed from the traditional linguistic and socio-onomastic methods towards a critical analysis of the spatial politics of naming and the studies of the socio-political role of the place names as the symbolic landscape components. The (re-) naming of the streets and other geographical objects has been a valuable tool for the political regimes to legitimate their symbolic power. The goal of this study is to analyze the relationships between the political power, the toponymic practices, and the symbolic landscapes on the example of the eclectic urban toponymic space of Minsk, the capital of Belarus, through the prism of the critical toponymic approach. Based on the archival and cartographic research, as well as urban field expeditions, the study reveals that the modern toponymic system of the city of Minsk has several elements that can be connected to an assortment of the symbolic spatial strategies of nation-building adopted by the governing authorities. The findings indicate that the urban toponymic space of Minsk is symbolically motivated, and that the heterogeneity of the contemporary urban toponymy reflects actual political agendas of the independent Belarusian state.

Local Immigration Partnerships and the New Local Governance of Immigration in Canada

Rebecca Pero (Queen's University)

This research undertakes a policy analysis of the Local Immigration Partnership (LIP) program. Initiated in Ontario in 2008, this national policy takes a local approach to the settlement and integration of immigrants. An objective of the Canada-Ontario Immigration Agreement, the LIP

program is a community-built, multi-stakeholder strategy to attract and retain greater numbers of immigrants in small- to medium-sized municipal and regional areas in Ontario, and across Canada. The program serves to understand immigrant needs in these communities and to coordinate settlement service supports. Drawing on governmentality literatures, I seek to understand the process of policy localization as well as how this process and the enactment of policy in and through the local sphere governs immigrant settlement and integration. Between 2013 and 2015, I undertook a strategic analysis of existing federal-level immigration policies, federal-provincial agreements, provincial strategies, and LIP documents, and conducted semi-structured interviews with key informants such as government officials, political leaders, LIP coordinators and council members, and community stakeholders in Guelph-Wellington, Kingston, and Peterborough. Findings indicate a neoliberal reorganization of immigration management; responsibility for aspects of settlement and integration are increasingly decentralized, but without an equal transfer of authority, leaving actors in the LIP organizations limited in their ability to make decisions and advocate for change. Federal funding and established measurements for project outcomes add layers of uncertainly for program success and sustainability. This research contributes to governmentality literatures as well as policy debates by offering new links between immigration policy and practice under advanced liberalism in Canada.

What is success? Immigrants' Perception of Successful Integration in Canada

Emmanuel Kyeremeh, Evan Cleave, Godwin Arku (Western University)

The concept of 'success' is featured prominently within Canadian policy on immigrant integration. These policies – which are generally cited as the authoritative source on successful integration – are inadequate, as they lack the perspective of immigrants, especially immigrant groups identified as having the most difficulty integrating (for example, African immigrants). In fact, there is a general lack of knowledge in both scholarship and policy over what constitutes successful integration. To try and address these lacunae, this paper reports on empirical research conducted through a series of in-depth interviews (n = 29) among African immigrants in London, Ontario, Canada (who had spent a minimum of 6 years in Canada), focusing on their key perspectives and discourse on successful integration. A phenomenological approach was adopted and thematic analysis was employed to interrogate the qualitative data collected during the in-depth interviews. Findings show that immigrants' perception about successful integration converges with that of policy makers in terms of their economic integration. However, participants were quick to point out that successful integration transcends economic integration as most policy documents suggest. Further, most participants' perceived successful integration to be a mindset, one that needs to be adopted by all regardless of the challenges they may encounter in their integration process. Almost all participants noted that integration is an on-going process and therefore did not consider themselves to be fully integrated, even though many had spent more than a decade in Canada. The practical implication for policy makers will be to identify ways that can facilitate immigrants' integration into the social, cultural and political dimension of the Canadian society, as well as identify means of bridging integration policies with other policies in order to facilitate the successful integration of immigrants in Canada.

Geographies of enforced heteronormativity in public parks: a case study of Project Marie

Bronwyn Clement (University of Toronto)

The policing of sex in public parks raises questions regarding how the access and use of public space is regulated and how normative framings of urban park space are reproduced and enforced. Using the recent police operation known as Project Marie as a case study - in which dozens of individuals were ticketed for by-law infractions and trespassing in Etobicoke's Marie Curtis Park - this paper examines how park space is conceptualized and policed through (hetero)normative framings. Drawing from queer theory and urban political ecology, I situate this case study within discussions of the spatial practices of public sex, the socio-political conditions and decisions that shape urban natures, and the ways values and meanings are used to construct and confine park spaces. Through a critical discourse analysis of the media and grey literature surrounding Project Marie and interviews with key groups and individuals (city staff, members of community and environmental organizations, lawyers) involved in the regulation of public park space and the public discussions and activism that sprung from the police's actions, I seek to assess how Project Marie reflects the social regulation and enforcement of heternormative ideas of public park space. Additionally, I ask how the policing of park space maintains and reinforces heteronormativity and selective policing more broadly.

Understanding challenges and risks of LGBT life online

Dean Mizzi (Brock University)

Advancements in information and communications technology, particularly access to the Internet and later to mobile telecommunications, have changed the nature of LGBT communities. More interaction is taking place via online services, such as social networks, in contrast to the traditional physical spaces associated with gay villages. Most current scholarship describes these new interactions in the context of their benefits such as increased accessibility of information, community-building for activism, or as a means of social support. This paper presents preliminary work for a larger review and analysis which contests the current liberatory discourse surrounding LGBT life online and proposes how geographers can approach the challenges and risks associated with this online life. With the rise of a small group of American multinational corporations providing services to online users around the world, along with increasingly prevalent censorship and surveillance, the geographies of LGBT life online have become increasingly complex. The review will examine several conceptual frameworks of virtual geographies to determine how they can provide insight into these issues of LGBT life online (such as the creation of "virtual closets" on social media and the role of Internet governance structures in mediating LGBT content and expression).

Community-Based Environmental and Resource Management

Chair: Prince Amegbor
Time: 3:45-5:15
Location: QC 505

Locally Grounded Adaptation to Climate Change in the Cook Islands

Diamir de Scally (University of Waterloo)

Climate change is expected to have devastating impacts on small island countries like the Cook Islands. Changes in the frequency and intensity of climatic hazards, one of many anticipated impacts

in the Pacific region, will have significant implications for both climate change adaptation and disaster risk reduction efforts. It has been argued that local and traditional knowledge can play an important role in climate change adaptation and disaster risk reduction, particularly in small island countries where vulnerability is unique and a long history of adapting to environmental change exists. Through a comparative study between a core and periphery island, the purpose of this research is to investigate the local and traditional adaptation strategies that exist in the Cook Islands, assess the successes and challenges of incorporating this knowledge into government policy, and understand the variability in knowledge between islands. By employing qualitative research methods, this project aims to understand the perspectives of both Indigenous and local Cook Islanders and government officials in hopes of strengthening the contribution of local knowledge to climate change adaptation and disaster risk reduction. Preliminary findings from a three-month field season in the Cook Islands will be presented with a particular emphasis on the local and traditional adaptation strategies that exist and the variability in knowledge between the core island Rarotonga and a periphery island Mitiaro.

Changing places: Household perspectives of climate change impacts and adaptation in Ottawa and Halifax

Magdalene Goemans (Carleton University)

This presentation presents findings from doctoral thesis research that aims to help fill a gap in knowledge about perceptions of climate change adaptation among residents in Canadian cities. Scholars have called for more extensive empirical data that explores individual perceptions of climate change, and have identified the household as an important scale of analysis regarding responses to climate change impacts and risk. This study considers how climate change influences understandings of place and adaptation action at the micro-scale of the home site (i.e. residential property) in Ottawa and Halifax, two mid-sized Canadian cities. The study employs a qualitative approach to discourse analysis through interviews and focus groups with residents, as well as reviews of municipal public consultation records and other secondary data. Varied responses by residents reflect gradual to more pronounced shifts in concerns related to climate change, emotional and physical impacts that residents experience, and differences in outward- versus inward-focused understandings of risk that residents hold. Results reveal that for many residents, ‘local’ and personal experiences of climate change are felt more keenly at wider city scales. More commonly, perceptions of climate change vulnerability and risk (i.e. perceptions about where climate change is ‘taking place’) are often directed further outward, at global scales and in other, faraway areas.

Community-based forestry and Institutions: A case study of Fung Shui Forests in Hong Kong

Shau Lin Yi (The Chinese University of Hong Kong)

Fung Shui forests, which is a manifestation of community-based forestry, are forests patches cultivated by Hakka villagers in China and Hong Kong based on the traditional geomancy beliefs in the past. Owing to the spiritual significance of Fung Shui forests, local village communities had formulated collectively-held rules for protecting these forests. Such collective rules could be seen as a form of informal institutions at local level, and their roles have been contrasted with that of formal institutions at societal level, particularly the government and legislation. With two Fung Shui forests in Hong Kong, namely Tai Om and She Shan Tsuen, as case-study, this research aimed at revealing

the roles of formal and informal institutions in the forestry resources governance in Hong Kong as well as the interplays between them. Local villagers and government officials were interviewed, and government papers were analyzed for studying how local village communities and the government utilize as well as manage the Fung Shui forests respectively. Findings suggested that: (1) the roles of local communities had declined over the past few decades because of the shrinking forest functionality, (2) the forest management mechanism of the government were fragmented, and (3) a mismatch in expectation existed between local communities and the government due to difference in mentalities. These observations intend to shed light on community-based natural resources management and stimulate future studies of natural resources policies in the context of a metropolitan.

Community-Informed Spatial Planning for Sustainable Renewable Energy Development

Rebecca Jahns and Kirby Calvert (University of Guelph)

Renewable energy (RE) development suffers from a 'green-on-green' problem, in which global and local environmental objectives can be at odds with each other. Although RE technologies mitigate climate change on a global scale, they can also lead to environmental change at a local scale. These changes can be ecological or visual, such as deforestation or the building of new roads for development, or socioeconomic, such as changes in job availability or property values, among many other scenarios. Ideally, the identification of potential impacts on the community and mitigating strategies should be established during the planning stages of any RE project. This can be achieved in part by meaningfully engaging the community in the spatial planning process of RE development. One avenue through which to understand tensions caused by RE development, and facilitate community participation in the decision-making process, is via the use of map-elicited interviews. Map-elicited interviews (MEI) represent a form of Participatory Geographic Information Systems (PGIS) in which semi-structured interviews with stakeholders revolve around spatial information. We argue that MEI can help us better understand the role of landscape values in shaping stakeholder attitudes toward RE development in place, and therefore is useful on both practical and theoretical levels to those who are looking to advance and study RE development. This presentation will situate MEI in the context of other possible methods for understanding landscape values, present the chosen methodology, and highlight preliminary results.

Enhancing Source Water Protection in Rural Regions: Exploring the Role of Governance and Capacity Building

Sarah Minnes (Memorial University)

This presentation will outline findings from papers related to the emerging findings of an interdisciplinary PhD research project. The primary goal of this research is to examine the implementation of Ontario's source water protection policies and explore implications for rural regions. The research asks: i) What have been the successes and challenges with source water protection planning and implementation of source protection plans under the Clean Water Act in Ontario? ii) Did the source water protection planning process in Ontario build capacity for water and watershed governance, particularly in rural areas? iii) Is there capacity for source water protection in unserviced rural municipalities in Ontario? This research derives findings from 30 key informant interviews, conducted in two case study areas in Ontario (the Cataraqui Source Protection Area in

eastern Ontario and the North-Bay Mattawa Source Protection Area in near-north Ontario), and extensive policy and literature review. The results in relation to implications of the Clean Water Act for serviced rural municipalities indicate source water protection in rural areas requires enforceable mandatory legislation; sustainable provincial funding and municipal fiscal frameworks to support ongoing source water protection planning and implementation; technical aid at the regional level; and support and commitment to source water protection at the local level (e.g., municipalities, local health units, landowners, residents and watershed users). Other preliminary findings will also be presented in relation to source water protection for unserviced areas, and rural watershed governance.

Right to farm or right to an odour-free healthy environment: Biosolid management and procedural justice in the Thompson-Nicola Valley, BC

Sarah Mason-Renton (University of British Columbia)

Urban regional biosolids management has become an extremely contentious issue in the British Columbia interior. Drawing on literature regarding issues of process, perceived procedural inequities and rural-urban environmental justice, this research utilizes qualitative interviews to examine residents' perceptions of procedural (in)justices related to the local processing and management of urban biosolids in their locale. Opposing residents expressed anger towards feelings of procedural inequity and lack of control in what is occurring in close proximity to their rural properties. Many referenced 'right to farm' legislation where on-farm practices considered agricultural are not required to undergo the same local approval processes that other non-agricultural commercial or industrial operations would be. This research seeks to dig deeper into rural community contentions about what should be fairly included in provincial 'right to farm' legislation and what is being brought to their community in a procedurally unjust manner from surrounding urban regions, most notably the lower mainland of British Columbia which includes the large metropolitan area of Vancouver.

Understanding the Complexities of Canadian Energy Landscapes: Technology, Society & Policy

Chair: Bronwyn Lazowski (University of Waterloo)
Time: 3:45-5:15pm
Location: QC 506

"Historically, we're risk-averse"- Stakeholder perspectives on the current application and future potential of energy storage within the Ontario distribution sector

Dane Labonte and Ian H. Rowlands (University of Waterloo)

The Canadian federal government has highlighted the importance of decarbonizing and subsequently expanding the role of electricity systems in society in the Federal Actions for a Clean Growth Economy report. While transitioning electricity systems towards sustainability goals will be a technical challenge, there are additional socio-political factors, such as mobilizing actors and updating regulation, that will influence the energy transition pathways that develop. While energy storage technologies offer a variety of potential services that may contribute to sustainable energy transitions

(e.g., balancing renewable generation, providing enhanced services to customers, or offering alternative system design opportunities), they are not currently widely applied in the electricity distribution sector. The Ontario electricity sector includes more than 60 local distribution companies (LDCs) that manage the lower-voltage distribution networks that connect customers to the provincial transmission grid. LDCs represent a major stakeholder group that has the potential to influence how the Ontario electricity system evolves; however, each LDC is an independent company that operates in distinct territory. The geographic size, infrastructure needs, and customer base within LDC territories vary greatly, and, as result, LDCs have differing administrative capacities, suites of stakeholders, and strategic motivators. At this stage, it is not yet clear if/how the diverse profiles of LDCs will impact a sustainable energy transition. Based on semi structured interviews with representatives from 15 LDCs, this research begins to capture industry perspectives on current applications and the future potential of energy storage technologies. This research aims to identify consistent and divergent perspectives that could influence how the LDC sector integrates emerging sustainable energy technologies.

Using Multi-Criteria Analysis and GIS to Obtain a First-Order Siting Assessment for Developing Compressed Air Energy Storage in Canada

Fraser Lord, Jai Duhan, Mina Lee, Logan Miller, Eric Tharumalingam, Dr. Dipanjan Basu and Dr. Maurice Dusseault (University of Waterloo)

At the federal and provincial levels Canada continues to push towards increasing the penetration of sustainable energy sources such as wind and solar power on the electrical grid. While this movement helps the country meet its emission reduction commitments, it comes with significant drawbacks such as intermittency and added stress to an already aging electrical grid. Renewables have had to be substantially over-built in Ontario to satisfy our large energy demands leading to power curtailment higher costs for ratepayers. Compressed air energy storage (CAES) is a technology that relies on using low demand energy to compress large amounts of air into a pressure vessel, usually a salt cavern, and releasing it during high demand periods to generate electricity. CAES is a logical step forward for our grid to become more resilient to fluctuations and more capable of matching supply and demand using the highly variable energy created from solar and wind power. However, CAES has specific siting requirements for underground air storage, which needs to be addressed before detailed facility studies can begin. The research established a robust multi-criteria analysis in combination with GIS to analyze all of Canada, which has rich salt deposits, ideal for underground storage. The analysis results highlight potential areas in Western Canada, Ontario and the Maritimes where there is high potential for implementing CAES to support renewable energies.

Engage or Enrage: A Policy Shift in Ontario's Large Wind Energy Planning

Ron Pushchak, Sam Carter-Shamai, Anna Golovkin, Kahlin Holmes, Kirstin Jensen, Sunjay Mathuria, Graham Wilson, and Erin Windross (Ryerson University)

To promote rapid development of renewable energy, Ontario passed the controversial Green Energy Act in 2009. While its Feed-in Tariff (FIT) mirrored European incentive policies, it restricted municipal planning and local participation in siting decisions. Large wind projects faced passionate local opposition to "first-come-first-serve" approvals that eliminated municipal planning controls. In

2014 the government reversed its policy with the Large Renewable Procurement (LRP) process. Contract competitions were based on bid prices, adjusted by engagement points developers earned by securing local and municipal support. This study examined the economic and political conditions that generated the Large FIT program and its LRP policy reversal, and how the LRP addressed municipal and public opposition. It examined wind proposals under both policies to assess proponent collaborations with municipalities, First Nations and local communities. It found that the proposal's bid price and continued rapid expansion of large wind capacity were driving factors in LRP approvals rather than winning meaningful public support. Further, experienced wind developers had already engaged in proactive consultation under FIT. The revised LRP policy only offered a tally of consultation actions and it awarded engagement points in a nontransparent manner, without adequately restoring the promised role of municipalities in the planning process.

Exploring Diverse Visions of Rural Landscapes using Visual Q-methodology

Hempel, A. Christine and Landman, Karen (University of Guelph)

In response to climate change imperatives, Ontario's government developed a strong instrumental policy - the Green Energy Act (GEA) - to both incentivize and encourage construction of renewable energy infrastructure. Many support the legislation. However, the spatial change that has resulted from new construction has also been met with fierce resistance and conflict; discourse has become polarized and bitter over time, and distress has escalated. Citizens have deeply rooted and often conflicting belief systems about energy development in general, and divergent views about what future development is harmonious with the character of their existing physical and cultural landscapes in particular. Arguably, for people living in wind-farm landscapes, the greatest impact of IWT development is visual change. People's response to changing landscapes is subjective and personal, and there is limited theoretical information that adequately explains why we hold divergent points of view about this infrastructure. Two innovative applications of Visual Q methodology, using evocative watercolour paintings, were designed to explore visual landscape preferences. The first explored participants landscape character preferences; the second examined responses to wind energy scenarios. A strong response was elicited from participants, who were able to contribute their point of view in a statistically interpretable form, revealing a sense of place protection. These results can provide decisionmakers with a robust tool for proactive local landscape planning in the face of landscape change. Effective siting of energy projects should include knowledge of landscape character, including the biophysical aspects of landscape, cultural values, and aesthetic experiences associated with 'place'.

Investigating the effect of renewable energy incentives and hydrogen storage on advantages of stakeholders in a microgrid

Ehsan Haghi (University of Waterloo), Kaamran Raahemifar (Ryerson University), Michael Fowler (University of Waterloo)

This work aims investigating the effect and cost-efficiency of different renewable energy incentives and potential for underground hydrogen energy storage to the perceived viability of a microgrid project from the prospective of different of a microgrid project from the prospective of different stakeholders, i.e., government, energy hub operators and consumers in Ontario province, Canada.

Hourly simulation of a microgrid in which wind and/or hydrogen are produced is used for the analysis. Results show that using underground seasonal storage leads to the government paying less incentive per kg of CO2\ emission reduction as it lowers levelized cost of hydrogen and provides a higher carbon emission reduction potential. Results also show that for the same incentive policy, incentivizing hydrogen production with grid electricity or a blend of wind power and grid electricity and producing hydrogen using wind power with underground hydrogen storage are more cost-efficient options for government than incentivizing wind power production alone. Regarding the renewable energy incentives, a combination of capital grant and FIT is shown to be more cost-efficient incentive program for the government than FIT only programs. However, FIT programs are more effective for promoting renewable energy infrastructure. There are two main reasons leading to the result of incentivizing hydrogen being a better option for reducing CO2 emissions in Ontario that incentivizing wind power: 1.the already emission free grid electricity in Ontario and 2. Potential of hydrogen to replace NG in industrial applications.

Beyond the smart utopia: Strategies for developing a smart energy culture within Canada

Bronwyn Lazowski and Paul Parker (University of Waterloo)

Energy consumption is sociotechnical and the transition towards a smart city involves a co-evolution of technology and behaviour to develop a smart energy culture. But how do we define this smart energy culture and how can we effectively engage consumers to achieve this culture? The Energy Cultures Framework by Stephenson et al. (2010) brings opportunities to define and study this transition and to identify effective engagement pathways. Simply relying on a technologically-driven smart utopia is problematic; instead, elements of user adoption and consumption patterns need to be incorporated through social science approaches (Sovacool et al., 2015; Strengers, 2013). Utilizing the findings from two Ontario residential smart grid case studies, lessons for engagement pathways can be highlighted. The first study investigated the effectiveness of in-home displays within Ontario households through quantitative analysis. Whereas the other case study highlights the project participants' qualitative feedback following the installation of smart panels and fourteen engagement mechanisms (i.e., weekly newsletters, webportal, goal-setting) over a four-year period. Utilizing the comprehensive approach of Stephenson et al. (2010, 2015), the Energy Cultures Framework allows for in-depth investigation into household decision-making and overall energy culture. Focusing on engagement opportunities to change consumption behaviours is particularly important in an urban setting, where occupants in multi-unit residential buildings have limited agency to make efficiency upgrades; therefore, utilizing knowledge gained from these two case studies for effective engagement strategies can provide meaningful insights to achieve the transition to a smart energy culture.

Poster Session

Determining sources, pathways and spatial distribution of metals in lakes of the Peace-Athabasca Delta from concentrations in periphytic algae and surface sediment

Tanner Owca (Wilfred Laurier University), Casey Remmer, Mitchell Kay, Roland Hall, Brent Wolfe (University of Waterloo), (Wilfred Laurier University)

The Peace-Athabasca Delta (PAD), northern Alberta, is the world's largest freshwater boreal delta. The ecological integrity of the delta is strongly tied to river floodwaters that are critical to replenishing the delta, yet they also transport sediments, nutrients and other substances from upstream sources. Since the PAD is located downstream from the Alberta oil sands, concerns have been raised over the potential transport of metal pollutants to the PAD via the Athabasca River. But metals may reach the PAD by a number of pathways including the Athabasca and Peace rivers, and by the atmosphere. To address this knowledge gap, shields serving as artificial substrates were deployed in ~60 lakes during three consecutive summers (2015, 2016, 2017). These shields served to accrue algal biomass, which provide opportunity to examine biological uptake of metal contaminants. Also, surface sediment samples (top ~1-cm) were collected in September 2017 from the same ~60 lakes, to provide a snapshot of metal concentrations that have accumulated during the past few years. These data, along with measurements of water isotope compositions, will enable determination of the spatial distribution of metals and processes leading to their uptake in algae and deposition in sediment, and identify areas of the delta that may be 'hotspots' of metal accumulation. Metal concentrations will also be assessed for pollution by comparison to baseline, reference concentrations, which are being developed from ongoing paleolimnological analyses. Potential for employing this approach for long-term aquatic ecosystem monitoring in the PAD (and elsewhere) will be explored.

Cultural landscapes of conflict: Changing heritage practice on the Rideau Canal & Kingston Fortifications World Heritage Site

Susan M. Bazely (Queen's University)

Built in response to an ongoing threat of war, and initially used for its intended military purpose of defence and transportation, the Rideau Canal and Kingston Fortifications are comprised of natural and cultural landscapes, extant structures, and archaeological remains. World Heritage status, however, may be under threat. Changing heritage practice and resource stewardship and management since the 1970s is not only influenced by, but also influences how the site is managed, interpreted for, and presented to the public. Additional consideration must be given to how it is utilised by the public on an on-going basis. To assess the current value of, and potential threats to the site, and its world heritage designation, this research examines how this landscape-resource has been perceived over time - from its original construction, subsequent stages of use, to modern initiatives in communication of heritage, and contribution to the "experiential economy".

Effects of Point Cloud Density on the Accuracy of Building Reconstruction from LiDAR

Peter Crawford and Jinfei Wang (Western University)

The use of aerial LiDAR data to automatically generate 3D models of buildings over large areas is an area of ongoing research in urban remote sensing. One complication in the application of this technology is that LiDAR data is expensive to gather, especially at high spatial densities; it is therefore helpful to understand how input data density affects the accuracy of the outputs of building model generation. This paper presents the preliminary results of a study examining this relationship. The study uses high-density LiDAR data of Surrey, BC subsampled to numerous lower-density datasets to generate building models using two independent methods, then compares the results with reference data. Accuracy of 2-dimensional building footprint extraction is measured using both overall classification accuracy and a per-building completeness ratio. 3D model accuracy is measured using

comparisons of enclosed volume, vertex-to-vertex distance, and by comparisons using the vectorization of a Spherical-Harmonic (SPHARM) parametrization of model shapes. The relationship between input data density and the accuracy of the 2D building footprints and 3D models are investigated. Of special interest are potential variations in the relationship between input density and output accuracy for buildings of different types and sizes; it is expected that the automated 3D modelling of smaller buildings and of those with more complex roof shapes benefits more from higher density data than do larger buildings with flat roofs.

Application of terrestrial LiDAR to assess within-season changes in biomass and aboveground structure in a temperate forest

Patel, B., Havelka, M., Richter, C., and Liscio, E. (University of Toronto)

Herbivory, phenological changes over the growing season, proliferation of invasive plant species can all cause changes in understory biomass and structure – but these changes are challenging to document over small spatial and temporal scales. We used a terrestrial Light Detection and Ranging (LiDAR) scanner (FARO Focus120) to create 3-D images of a small (2m by2m) plot within an urban woodlot located on the University of Toronto Mississauga campus every month from June 2016 to October 2016. Using the first set of scans as a baseline, we compared subsequent scans to see if we could develop a time-series with a reliable signal of understory change. CloudCompare (Danielgm.net, 2016) was used to determine the percentage of distance deviation between overlapping points, which were interpreted as change in biomass/structure over time. The degree of overlap declined over time (94.12%, 20.23% and 15.56% of overlapping points), suggesting that the method was effective at detecting small-scale changes in understory structure over time. Our results suggest that this non-invasive methodology may be particularly useful in comparing temporal changes in the understory structure among experimental plots subjected to different treatments such as plant removal or herbivore exclosure.

Isotope Hydrology of the Muskoka River Watershed, Central Ontario, Canada

Emily Dusome (Nipissing University)

The Muskoka River watershed, consisting of the North Branch, the South Branch, and the Lower Muskoka sub-watershed, is a highly managed river system in Central Ontario. The aim of this study was to examine stable water isotope (δ18O and δ2H) signatures within the Muskoka River watershed, over a range of different hydrologic conditions and spatial scales. Results are reported for the available record of surface water isotope data (April 2015 - November 2016), at ten river sampling locations and one auto-sampled headwater site. Surface and source water (e.g. precipitation and groundwater) isotope records, discharge, and meteorological data were examined by building a series of excel graphs. Results of the hydrological analysis demonstrate a depletion trend in heavier isotopes with downstream distance in headwater rivers; however, there is no evidence of this trend within the Lower Muskoka sub-watershed. More positive surface water isotope values occurred during summer baseflow conditions, while the most negative isotope values occurred during the spring (due to snowmelt). While an inverse relationship is observed between discharge and isotope values, extremely high flows do not always result in the most negative isotope values, indicating influence of different sources of water. This study illustrates that collection of water isotope data, in the Muskoka River Watershed, is providing new insight into sources of water to streamflow under a range of hydrologic conditions.

Partners, Participants, and Protesters: An Analysis of Canadian News Media on the Portrayal of Indigenous Leadership in Renewable Energy Projects

Alyssa Aiello, Robert Stefanelli, Chad Walker, and Heather Castleden (Queen's University)

In an era of anthropogenic climate change, there is an urgency to develop renewable energy (RE). Indigenous peoples across Canada, due to their knowledge and the fact that much development will take place on their lands, are well positioned to lead the transition. Yet, there are existing tensions between Indigenous and settler peoples in Canada that need reconciliation in order to effectively draw on Indigenous knowledge systems in this realm.In part because the media wields substantial power in the stories they tell, this study analyzed how four print/online news platforms: Aboriginal Peoples' Television Network, Canadian Broadcasting Corporation, Globe and Mail, and National Post are representing Indigenous RE leadership in Canada. Our study's objectives include: (1) identifying how media sources portray Indigenous involvement in RE; (2) analyzing the differences in media narratives between mainstream and Indigenous news sources and; (3) documenting the differences in media narrative between private-sector and public-sector news sources. Our findings indicate that national news media portrayed Indigenous roles in RE in three primary ways: as protesters, as partners, and as participants. Unlike those mainstream sources, Indigenous news depicts Indigenous leadership as stewardship, action-oriented involvement, and as community-based. Private sector news depicts leadership as economic, while mainstream sources also frame leadership as social and environmental. The key implication for news media sources and consumers is to critically think about the power media has in re(producing) narratives that inform and affect human interaction, and subsequently, the transition from fossil fuels to renewable energy.

The Photochemical Reflectance Index tracks temperature and water stress at a mixed temperate broadleaf forest in Borden, Ontario

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The photochemical reflectance index (PRI) is a narrowband spectral index that tracks light stress of vegetation through its sensitivity to xanthophyll cycle pigment changes. This index shows promise in refining our capabilities for monitoring vegetation productivity through its relation to light use efficiency. However, a predictable relationship between light use efficiency and the photochemical reflectance index remains elusive. PRI is sensitive to total carotenoids, view and illumination angle, and seasonal changes. This can overwhelm the index's sensitivity to changes in light stress. Furthermore, light use efficiency is controlled by many processes, of which light dissipation through the xanthophyll cycle activity is merely one component. This project investigates the potential of PRI to monitor light use efficiency by examining how the signal behaves across temporal scales and environmental conditions. PRI was continuously monitored throughout the 2016 growing season from an eddy covariance tower at the Borden Forest Research Station (44° 19′ N, 79° 56′ W), a mixed temperate broadleaf forest in Ontario, Canada. Reflectance data were compared to meteorological data as well as leaf level fluorescence and gas exchange data from a LI-6400xt portable photosynthesis system. Daily average photochemical reflectance indexvaried with incident photosynthetically active radiation suggesting the index successfully tracks light stress throughout the growing season. Controlling for incident photosynthetically active radiation revealed a correlation between PRI and meteorological measurements including soil moisture, temperature and relative humidity.This suggests that temporal changes in temperature and moisture induced plant stress and can be monitored using PRI.

Le capital social dans les immeubles de grande hauteur: la région du grand Toronto et de Hamilton / Social capital in the high-rise: the Greater Toronto and Hamilton Area

Evan Castel (University of Toronto)

Le capital social -- la confiance, la réciprocité et les normes des réseaux sociaux -- affecte les résultats importants en aval sur la santé et est influencé par l'environnement bâti, comme l'encombrement, le potentiel piétonnier et le mélange d'utilisation des terres. Les immeubles de grande hauteur (IGH) présentent un entrelacement complexe de ces effets, où la densité, un format de logement unique, et les modes d'utilisation des terres idiosyncrasiques convergent. Une première période de recherche menée depuis les années 1970 a critiqué les IGH, mais n'a pas réussi à mesurer et à désambiguïser ces effets de l'environnement bâti. Cette étude traite de ces lacunes pour la première fois dans la région du Grand Toronto et de Hamilton, tout en testant les effets modérateurs putatifs des pratiques de planification urbaine (par exemple, l'amélioration du potentiel piétonnier et le mélange d'utilisation des terres) qui visent à améliorer les possibilités physiques entres les voisins. En utilisant les données des Enquêtes Sociales Générales de 2012/2013, nous comparons la réciprocité (rendre des services aux voisins) entre les habitants des maisons et les habitants IGH pour 6638 résidents de la région, en ajustant les mesures SIG de la mobilité, l'utilisation des terres, et la densité résidentielle et professionnelle générale. La réciprocité était 31% plus faible parmi les habitants d'IGH que pour les habitants des maisons, et les femmes et les nouveaux immigrants étant particulièrement exposés aux risques. La réciprocité s'améliore avec le temps vécu dans l'habitation pour habitants des maisons et IGH, mais l'ampleur était plus forte pour les résidents IGH. Le potentiel piétonnier et la diversité de l'utilisation des terres n'ont aucun lien avec la réciprocité, remettant en cause certaines idées préconçues sur le rôle de ces attributs.

Water Quality of Major Inflows into Lake Nipissing

Rebecca Snider (Nipissing University)

This project documents the monitoring of water quality of the major inflows into Lake Nipissing. From 2013-2017 Nipissing University's Integrative Watershed Research Centre has conducted a study of source water contributions to streamflow, involving biweekly to monthly survey of stable water isotopes on inflows to lake Nipissing and their tributaries. In the fall of 2015 water quality sampling was added to this study, providing preliminary assessment of water quality for seven major inflows into the basin. Samples were collected on a monthly basis and analysis performed at the Dorset Environmental Science Centre, located in Dorset, Ontario. Results were compared to provincial water quality objective, with total phosphorus for rivers being 30 ug/L. Where data was available Q-analysis was performed on the inflows. Meteorological conditions (average monthly air temperature and precipitation) for the sampling year were also examined and compared to climate normals. Sampling for a second year of water quality on the seven major inflows is ongoing.

Validation of snow monitoring products in the Grand River Watershed

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The Grand River Conservation Authority (GRCA) uses in situ snow data from 12 locations within the Grand River Watershed (GRW) combined with Snow Data Assimilation System (SNODAS) products from the National Snow and Ice Data Center (NSIDC) to deliver daily snow cover extent (SCE) and snow water equivalent (SWE) maps to the public. The understanding of snow dynamics at the watershed scale is extremely important for hydrological assessments and climatology predictions. Changes in SCE and SWE in GRW can severely impact the soil moisture and streamflow required for sustaining ecosystems and human populations living within the watershed. Remote sensing data are utilized to improve the spatio-temporal resolution of SWE estimates, which reduces the uncertainty, expense and time associated with in situ meteorological station data for hydrological assessments. In

this study, the satellite passive microwave-based Globsnow products at 25 x 25 km are used to determine the daily average SCE and SWE in GRW from 1979-2016. These data are compared with both the SNODAS data (1 x 1 km) available from 2010-2016 in addition to in situ weather station data to evaluate the reliability of using these data for characterizing SWE and SCE dynamics in space and time. Each dataset is examined given the different temporal and spatial resolutions, with preliminary results showing a consistent difference in SWE estimates between datasets. The aim of this study is to validate the datasets to create an accurate long term time series of SCE and SWE in GRW for hydrological assessments and climatology studies.

Canadian Natural Hazard Risk Management: Increasing Demand for Geoscience

Shona L. van Zijll de Jong (Laurentian University)

In the past decade, Canada has experienced several multi-billion dollar impact natural hazard events (i.e. floods, fires, etc). To manage health risks and safeguard economic security, Canadians need geoscience based hazard risk assessments. As a global leader for providing geoscience information for natural resource development, Canadian provincial geoscience providers are well positioned for such a task. This project has five objectives. First, discover how many publically funded provincial geoscience providers continue to provide geoscience to support mineral exploration potential. Second, determine why few acknowledge their legal obligations to the Canadian Federal/Provincial/Territorial Emergency Management (F/P/T EM) Framework F/P/T EM Framework. Some leaders in 21 Canadian provincial geoscience providers were interviewed to identify why only 2 of the 21 have established geohazard risk programs. Third, share an update on the soon-to-be released provincial geoscience geohazards program logic model built for the Canada's Platform for Disaster Risk Reduction. The geohazard program logic model is meant to support best practices in geoscience to meet policy needs. It was developed around five key pillars: trusted networks; coordination; communication and innovation; hazard education leadership; rish based land use planning for emergency management. Fourth, focus on developing work packages to refine the logic model outcomes. Fifth, highlight that this generic provincial geohazard program raises new questions about coordination, technical capacity and balancing information needs and provincial budgets.

Learning from Amphibious Architecture Vietnam: The Impact of Floods on Livelihoods, Debt, Private Flood Mitigation Measures, Residence and Relocation

Shona L. van Zijll de Jong (Laurentian University) and Brent Doberstein (University of Waterloo)

We begin by asking the question: Is Amphibious Architecture the best, most cost effective, and sustainable method to keep people safe from flood hazard risk? Related questions include: By keeping households in areas at risk to flood hazard - will households be better off economically than relocating them? What do we know about the variance in households' actions taken to avoid flood damage? We describe a preliminary monitoring, evaluating and learning (MEL) plan developed to explore how the poorest and most marginalized might benefit from AA. We built a preliminary database detailing how flood hazard risk impacts local communities, using key informant interviews, field research, desktop review of peer reviewed journal articles, and information from official statistics, survey data, reports and other sources. Factors examined included context: observations of flood events and climate change, socio-economic characteristics of flood prone communities, geographic location, building blocks for land use planning (such as the 2013 Land Law, the National Strategy to 2020). and specific disaster risk reduction activities, such as private flood mitigation measures that support long-term livelihood outcomes and options. Next steps for the MEL study will also be highlighted. These include: Applying "best practice" successful monitoring and accountability approaches (created with people, human rights and local context at the core); Characterizing variance

in households' actions taken to avoid flood damage; Emphasizing that household level analysis will help to identify specific areas of need for low cost private flood mitigation measures to increase the resilience of households, through AA, relocation or alternative means.

Changing Geoethical Practices: Alberta's Hydrocarbon Reserves, Mapping Indigenous Decision-Making Models and Acknowledging Ethical Spaces

Shona L. van Zijll de Jong, Hannah Burke (Laurentian University), Leslie Joynt (Independent Researcher)

During the past decade, an impressive body of knowledge in ethics, environment and social responsibility has been developed. Yet, much of this literature does not document the changing ethical professional behaviors in geosciences or engineering. To address this gap, the International Association for Promoting Geoethics (IAPG) was formed to promote geoethics in geosciences and engineering. Geoethics provides a framework to determine and define ethical professional behaviors to be put into practice, and capture the lessons learnt. Informed by research from IAPG, geoscience education for Indigenous People and social responsibility, this project involves discovering how provincial government agencies, the oil and gas industry and Indigenous People work together to make decisions about how Canadian provinces can sustainably meet the future demand for georesources, including energy, groundwater and mineral commodities. Preliminary analysis details how the Alberta Energy Regulator (AER) focused on the need to create "ethical spaces": spaces that are created "when two distinct, complementary worldviews are acknowledged equally", and a space where the AER could "…respect the knowledge and cultures of indigenous communities" (2017). Using the knowledge of "ethical spaces", the AER, the Blackfoot Nation, and the oil and gas industry seek to leverage this knowledge to better work within Blackfoot decision making circles. Those looking to understand how ethical spaces, Blackfoot decision making circles, geoethics in industry and government, and the global demand for energy and natural resources are connected, will find this paper useful.

Market Locations for Foreign Upscale Retail in Canada's Major Cities

Swales, S., Serrafero, N., Forsythe, K.W. (Ryerson University)

As a wave of foreign upscale retailers arrives in Canada's major metropolitan areas we use GIS to visualise the likely locations of market for these retailers. Forty-seven upscale foreign retail brands were identified with a total of 259 stores with notable clusters in Toronto, Vancouver, Calgary and Ottawa. Census data were used to identify the likely characteristics of the market for foreign upscale retail and K means cluster analysis was applied to facilitate visualisation of market spatial clusters in major centres. Recommended locations for expansion were also identified.

Soil properties, vegetation communities, and CO2 fluxes on exposed bedrock at Daring Lake, NT

Caitlyn Proctor (Carleton University)

The Tundra Shield ecoregion within the Northwest Territories' Southern Arctic includes extensive areas of exposed fractured and ice-scoured bedrock. Despite the overall barren appearance, soil and plant communities exist in these areas and play some role in the carbon budget of the landscape. The purpose of this study is to 1) characterize plant communities and soils on exposed bedrock at the Daring Lake Tundra Ecosystem Research Station, NT and 2) relate the net ecosystem exchange of CO2 (NEE) to soil depth and plant communities. Measurements of NEE were made using non-steady

state chambers on plots containing cranberry (Vaccinium vitis-idaea), bearberry (Arctostaphylos alpina), crowberry (Empetrum nigrum), and no vegetation (clipped plots). For each vegetation type, three soil depths were investigated: 5-10 cm, 10-2 0cm and 20-30 cm. These fluxes will be compared to those from other tundra types in the area including dwarf shrub tundra and sedge fen tundra to evaluate their relative importance in overall surface-atmosphere CO2 exchange.

Spatial & temporal patterns of methane fluxes at an Arctic wet sedge fen

Emma Riley and Dr. Elyn Humphreys (Carleton University)

Natural wetlands account for approximately 30% of global sources of methane (CH4) to the atmosphere, emitting 142-208 Tg CH4 yr-1 for the past decade (Kirschke et al., 2013). Wet sedge ecosystems are a dominant source of CH4 within Arctic and subarctic landscapes, with mean methane fluxes of 100 mg CH4 m-2 d-1 (Vourlitis & Oechel, 1997). CH4 is a potent greenhouse gas and emissions are expected to change in the Arctic with warming and wetting/drying of these wetland ecosystems containing large amounts of soil carbon. This study will investigate how processes driving methanogenesis respond to changes in environmental conditions. The relative importance of several biotic and abiotic variables on temporal and spatial variations in CH4 fluxes at an Arctic wet sedge fen will be identified. The fen is located at the Daring Lake Tundra Ecosystem Research Station (TERS), 300 km northeast of Yellowknife, NT. Closed chamber and eddy covariance methods were used to measure CH4 fluxes during the growing season of 2017. Ten years of chamber measurements and 3 years of eddy covariance fluxes were analyzed for temporal and spatial patterns of CH4. At the Daring Lake fen, variables controlling seasonal temporal patterns of CH4 are soil moisture and temperature. Inter-annual patterns of CH4 are related to water table levels. At the ecosystem scale, the factors influencing diel, seasonal and interannual variability in CH4 fluxes will be identified. These results will be used to evaluate the most important factors needed to predict CH4 emissions from Arctic wetlands.

Detached from Our Bodies: Depathologizing mental health in female autobiographical graphic novels

Katelyn Pierce (Brock University)

The purpose of this research is to challenge pathological perspectives of female mental health in order to advocate for alternate approaches that bring mental, emotional, and embodied experiences to the fore. Using autobiographical graphic novels (Katie Green's Lighter than My Shadow, Nadia Shivack's Inside Out: Portrait of an Eating Disorder, and Elizabeth Swados' My Depression: A Picture Book), I rely on textual, visual, and discourse analyses to interpret a complex intermingling of word and image. Nested in the growing fields of the medical humanities and feminist geographies, this project answers the following question: How can female autobiographical graphic novels be read to provide alternative discourses to understandings of clinical approaches to mental health? To answer this question, I present five key themes in my poster that work to unravel problematic mental health discourses: embodying mental health, a lack of a sense of control, experiences with drug use, writing about/drawing mental health experience, and breakthroughs with/expectations of wellness. Relying especially on the body as a scale, the ways in which the women in these texts manipulate the size and shape of their bodies in space to convey different facets of their mental health are at the crux of this analysis. Taking these ideas into account, the implications of this research will be to not only unearth a more accessible treatment option for mental health sufferers, but to also educate healthcare providers and the general public on the effectiveness of graphic novels in uncovering aspects of mental health that are being overlooked.

A Combined Method for Vegetation Classification Based on Visible Bands from UAV Images: A Case Study for Invasive Wild Parsnip Plants

Jingyi Liu and Dongmei Chen (Queen's University)

Wild parsnip is an invasive plant that would bring a serious health risk to a human being due to the toxin in its sap. Monitoring its existence and spreading has been challenging for conservation authorities due to its small size and irregular shape. On traditional remotely sensed images acquired by satellites or airplanes, wild parsnip cannot be distinguished from other vegetation due to the low spatial resolution. In this study, UAV images captured in a conservation area of Lemoine Point Conservation Area in Kingston, Ontario, are used to test the methodology of distinguishing wild parsnip. The objective of this study is to develop an efficient and accurate invasive wild parsnip classification workflow based on UHR digital UAV imagery. Three vegetation indices and three texture features are calculated and added the first two significant variables as supplementary data to the mosaicked images. The Random Forest algorithm with relevant variables choice is selected as the classifier to recognize wild parsnip plants from other vegetation. The optimal image resolution in parsnip analysis is also discussed by comparing accuracy assessments. The results provide an optimal and executable workflow to distinguish wild parsnip in all kinds of regions and indicate UAV images are an appropriate and economic resource to distinguish small and irregular vegetation types, even if it only equipped with a simple digital-light camera. The combined method brings reliable and valid outcomes in detecting invasive plants wild parsnip as well as shows good performance in mapping vegetation.