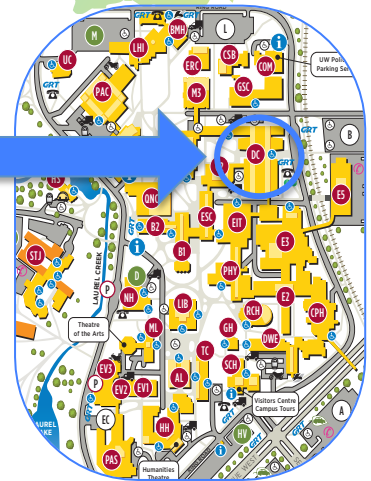# Diversity in Geography: Addressing Global issues

Thursday, November 28th
1 – 5 PM

Davis Conference Room
William G. Davis Computer
Research Centre Library
University of Waterloo

Agenda

1:00 – 1:30 PM – Keynote Speaker

Dr. Jennifer Baltzer, WLU Biology and GES
Canada Research Chair in Forests and Global Change

1:30 – 3:00 PM - Changes in Canada's North

3:00 – 5:00 PM - Emerging Issues in a Changing World

Come see the new PhD students present their research topics

ALL ARE WELCOME

Waterloo-Laurier Joint Programme in Geography
PhD Colloquium

Diversity in Geography: Addressing Global Issues
Davis Conference Room, Davis Centre Library, University of Waterloo

Schedule of Events

Opening Remarks	Dr. Alison Mountz

Keynote Speaker

1:00 – 1:30 PM	Dr. Jennifer Baltzer

Change in Canada's North

Landscape Change	
1:30 – 1:45 PM	Climate variability and extremes in the NWT – Bhaleka Persaud
1:45 – 2:00 PM	Tree-ring analysis of black spruce in the NWT: Growth response to permafrost dynamics and climate change– Anastasia Sniderhan
Community Adaptation	
2:00 – 2:15 PM	Addressing food security in Canada's Northwest Territories – Andrew Spring
2:15 – 2:30 PM	Community Choices: Pathways to integrate renewable energy into remote community energy systems – Konstantinos Karanasios
2:30 – 2:45 PM	Wise Water for Smarter Cities – Simone Philpot

COFFEE BREAK (2:45 – 3:15 PM)

Emerging issues in a changing world

Monitoring Tools	
3:15 – 3:30 PM	Monitoring thermal precursor to understand a near-real time earthquake using remote sensing techniques– Saied Pirasteh
3:30 – 3:45 PM	Exploring The Approach Of DMRT-ML For SWE Retrieval Using AMSR2 Observation- Case study: Snow storm in southern Ontario, Canada in Feb 2013 – Nastaran Saberi
Human Health	
3:45 – 4:00 PM	Living with HIV: An Assessment of Care and Support Services in rural Ghana – George Atiim
4:00 – 4:15 PM	A Cost-Benefit Analysis of Malaria Prevention and Dam Construction: the Koka Resevoir, Ethiopia – Keegan Williams
Quantifying the Intangible	
4:15 – 4:30 PM	The Where and Why of Dive Tourism: A Network Theory Approach – Stephanie Verkoeyen
4:30 – 4:45 PM	Payments for Ecosystem Services: Critique and alternatives – Aleksandra Szaflarska

Closing Remarks	Dr. Sanjay Nepal

Keynote Biography

Jennifer Baltzer is a terrestrial ecologist and Canada Research Chair at Wilfrid Laurier University, with cross appointment between the Biology and Geography and Environmental Studies departments. Jennifer's research interests focus on responses of forest ecosystems to global change and she has worked in tropical, temperate, and subarctic systems. Currently, her primary focus is on the role of changing permafrost conditions on the structure and function of terrestrial ecosystems within the Taiga Plains Ecoregion of the Northwest Territories. She collaborates with hydrologists and remote sensors to provide an integrative understanding of these complex landscape changes. Jennifer works closely with the Government of the Northwest Territories through an ongoing Partnership between Laurier and the GNWT.

Session 1: Change in Canada's North

Landscape Change

Bhaleka Persaud

Bhaleka grew up in Guyana, South America and has a Bachelor of Science Degree in Physics from University of Guyana and a Master of Science Degree in Weather, Climate and Modelling from the University of Reading in the United Kingdom. At present she is a PhD candidate at the Department of Geography and Environmental Studies, Wilfrid Laurier University, Canada. Her general research interests include climate change and variability, hydrology, and teleconnections. Prior to commencing the PhD program in Canada she worked with the Hydrometeorological Service of Guyana for ten years.

Climate variability and extremes in the NWT

River systems in the cold regions support a major area of Canada's food and energy production {including oil sands and agriculture production}, forestry, critical riverine and delta ecosystems, growing cities, rural and indigenous communities, and freshwater supply to the Arctic Ocean. Interactions amongst meteorological, hydrological, and cryospheric drivers, processes and feedbacks, and thresholds leading to system changes still need to be investigated at the local scale as climate changes and its impacts are so rapid that current models have limited predictive capacity. What is required is more statistical downscaling of outputs from existing models such as GEM - LAM that operate at a higher resolution especially in the Taiga Plains ecoregion. Enhancing the climate analysis and modelling ability of Canada's cold regions will assist critical sectors and policy-makers in planning. My PhD research will examine the potentially significant consequences of warming-induced land-cover change on basin discharge and northern water resources in order to increase the understanding of the causes of observed increasing streamflows throughout much to the Northwest Territories over the last few decades. This PhD study also seeks to improve the understanding of the widely occurring thaw-induced

conversion from forests to wetland on hydroloclimatic regimes, and the potential impact of changing hydroloclimatic regimes on basin runoff. This presentation will highlight some of past changes in precipitation and other hydrometeorological variables in Canada and NWT.

Anastasia Sniderhan

Ana was born in small-town Nova Scotia, but was relocated to rural Ontario in the latter parts of her childhood. She graduated from the University of Guelph with a BSc in ecology, and a whole lot of enthusiasm to keep learning. She found her calling in the form of an MSc position in biology at Laurier in 2012, and was promptly dropped off in the middle of the Northwest Territories to study forest ecology. This fall, Ana transferred into the PhD program in Geography and Environmental Studies. Aside from her outward excitement about science, some of Ana's favourite things about research in the north are "commuting" to work via canoe, northern lights, and snow!

Tree-ring analysis of black spruce in the NWT: Growth response to permafrost dynamics and climate change

The impacts of global warming have been widely documented around the world, but circumpolar areas have been impacted by some of the most extreme changes. The boreal forest accounts for approximately 82% of Canada's total forested area, yet this area is expected to change radically as the warming trend continues and climate deviates from optimal growth conditions for northern forest communities. Black spruce (*Picea mariana*) is one of the most dominant, widespread boreal tree species, and understanding its resilience to changing climate conditions is critical to anticipating the future of the boreal forest. Through a series of tree-ring analyses, I will be examining the effects of the changing climate regime, permafrost conditions, and moisture gradients on black spruce growing in the Northwest Territories.

Community Adaptation

Andrew Spring

Andrew Spring has a diverse background in sustainability and the environment. Trained as an environmental engineer, his expertise is creating innovative programs to engage communities in sustainable planning and environmental conservation. Andrew has developed award-winning programs in waste management and sustainable tourism as well as led regional initiatives in local food, conservation planning and ecotourism. He has a strong track record in working with a broad range of stakeholder groups, from government to businesses and NGOs, to develop and deliver these programs on local, regional and national scales. Andrew is also involved in establishing research networks to address climate change in Canada's North and serves as a director on the board of the Ontario Ecotourism Society. Currently, Andrew is enrolled in

the Geography PhD program at WLU where he studies the impacts of climate change on food security in the Northwest Territories.

Addressing food security in Canada's Northwest Territories

Climate change is having profound impacts on the remote First Nation communities in Canada's Northwest Territories (NWT). As many of these communities have a deep connection to the land and depend on it for their livelihoods, changes to the ecosystem such as decreased sea ice thickness, permafrost thaw, changing migratory patterns of animals, and the increased intensity and frequency of weather events are disrupting traditional ways of life, in particular the ability to hunt and gather traditional food sources, known as "country foods". However, the decreased availability of country foods has resulted in the shift towards a greater reliance on food purchased from stores. This change is having a negative impact on the health of these communities as purchased food often provides less nutritional value and more energy in the form of carbohydrates and fat than traditional diets and has been linked to increases in diet-related health issues such as obesity and diabetes. There are a high proportion of individuals in these communities reporting food insecurity at some point during the year citing lack of country food and the expense of store bought food. By using food security as an issue to engage communities, regional authorities and the Territorial government in constructive dialog, we will look to build collaborative partnerships aimed at determining community needs and priorities. This will lead to the creation of community-defined programs that will enhance the capacity at the community level to plan and address food security issues. By addressing vulnerability in the food system we will be strengthening the adaptive capacity of the communities to deal with future impacts and risks of climate change in other sectors as well. Therefore addressing food security in the NWT is a priority, not only for the immediate health and well-being of the people who live there, but also to build stronger, more resilient communities in the face of the impacts of climate change.

Konstantinos Karanasios

Originally from Greece, Konstantinos holds a Mechanical Engineering Degree from NTUA, Greece and a Master's of Science Degree in Industrial Engineering from RWTH Aachen, Germany. In 2011 he moved to Canada and in 2012 he completed a Masters in Local Economic Development with the University of Waterloo. His general research interests include residential energy efficiency, renewable energy and economic development. Konstantinos is currently enrolled in the University of Waterloo, Department of Geography and Environmental Management, working towards his PhD.

Community Choices: Pathways to integrate renewable energy into remote community energy systems

The objective of my research is to examine the decision making approach at the community level, where technical, economic and social aspects of renewable energy projects are conceived and designed to create economic development opportunities and improve the environmental performance of remote communities. The research will investigate the energy systems in remote communities, the priority that First Nations place on resources and renewables, the renewable energy resources and technologies

available, the development of engagement strategies and the design of policies to (a) promote a holistic approach to community energy planning that considers not only the consumption of electricity, but also thermal energy, conservation opportunities and the use of renewables to reduce fossil fuel consumption, and (b) engage communities to maximize benefits, including the creation of local economic development and employment opportunities through increased access to energy. Renewable energy that is produced locally can contribute to employment generation, the creation of profitable enterprises at the local level, local skill development and the empowerment of local communities to manage their resources. Community needs, renewable energy integration challenges and community visions of future energy systems will be addressed through discussions and interviews with focus groups, community leaders and economic development managers.

Simone Philpot

Simone holds an M.A. in Interdisciplinary Studies from Concordia University, Montreal, and a B.A. in Anthropology from Trent University, Peterborough. Simone's background in archaeology led to a Master's thesis examining aspects of water management in Ancient Maya society. Simone is now pursuing research interests in contemporary water challenges at the University of Waterloo. Her PhD thesis is directed towards the operationalization of tools from the decision sciences to improve decision making in urban environments. This research is being conducted with supervision from Geography and Environmental Management at the University of Waterloo and Systems Design Engineering, also at the University of Waterloo. Simone's research interests include water management, systems theory, decision sciences, technology, and interdisciplinary scholarship.

Wise Water for Smarter Cities

Canada's National infrastructure is in dire need of repair and replacement. In particular, many regions of Canada currently experience water infrastructure failures and degradation. The pending expiration of The Building Canada Plan highlights the need for new initiatives to support decision-making in infrastructural renewal. Advancements in data collection, analysis, and technology offer synergies that may be harnessed by water managers and city planners. These advancements simultaneously add further complexity to the decision-making process. Tools from the field of Decision Sciences are becoming increasingly effective at supporting decision-making in complex water problems by facilitating Systems Approaches to water management and Integrated Water Management approaches. Water management challenges facing Canadian cities frame a discussion of the opportunities to improve decision-making through the use of tools from the field of Decision Sciences, with an emphasis on the use of Decision Support Systems. The operationalization of an integrated Value-Focused Thinking approach is proposed as an innovation to improve water management decision-making to address current and future challenges in Canadian cities.

Session 2: Emerging Issues in a Changing World

Monitoring Tools

Saied Pirasteh

Saeid Pirasteh received his B.Sc. degree in Geology, M.Sc. degree in Applied Geology specialized in watershed basin analysis and remote sensing, and PhD degree in Geology specialized in structural geology and morphotectonics using Remote Sensing & GIS technologies, all from Aligarh Muslim University, Aligarh, India in 1998, 2000, and 2004, respectively. From 2002 to 2008, Dr. Pirasteh was assistant/associate professor at Islamic Azad University, Dezful, Iran. He also was a visiting faculty of Khorramshahr Marine Technology University, Khorramshahr, Iran. He was a Post Doctoral Fellow at Asian Institute of Technology (AIT), Thailand from 2005-2007. Later, he became a representative of AIT in Middle East till 2008. From July 2008 to September 2011 he was a senior researcher and Associate Professor in the Institute of Advanced Technology (ITMA) at the University Putra Malaysia (UPM), Malaysia. He has supervised more than 16 PhD and MSc students internationally. He joined University of Waterloo, Canada as a visiting professor in December 2011. He is currently pursuing his second PhD at department of geography and environmental management, University of Waterloo, Canada. He is author/co-author of more than 172 publications in refereed journals, conference proceedings and books. He is currently the Editor-in Chief of the International Geoinformatics Research and Development Journal (IGRDJ) and the founder of the International Association of Geo-information and Communication Technology (GeoICT) as well as International Conference on Geo-information Technology for Natural Disaster Management (GiT4NDM). He has been working very hard internationally to develop geo-information solutions for natural hazards & disaster management and environmental sustainability. Dr. Pirasteh is able to communicate in four languages. His research interests multi-disciplinarily research in earth and environmental sciences include applied geology, water issues, hydroinformatics solutions, watershed management and basin morphometric analysis, hydrology & modeling- mapping, soft computing and programming, dimensions in GIS, SAR data processing, digital image processing, remote sensing and GIS in various applications such as earth science and natural resources, environmental studies, natural hazards and disaster management, geology and exploration.

Monitoring thermal precursor to understand a near-real time earthquake using remote sensing techniques

The theory exploring mechanism of the earthquake occurrence has been an intriguing part of research interest for scientists so far. Thermal infrared (TIR) anomaly has been attempted for the Bam earthquake that occurred on December 26, 2003 in Iran. Thermal infrared satellite data analysis revealed that the land surface temperature (LST) rise ranging from 5° - 10°C in and around epicenter areas.This paper demos that the thermal anomalies started developing about 1 - 5 days prior to the main event depending upon the magnitude and focal depth, and disappeared after the main shock. Thus, TIR, probably could give us a clue to understand near real time earthquake forecasting in the

region. However, this research has been planned to continue in different environment like British Columbia to find correlations between the build-up and disappearance of thermal anomalies in British Columbia if available. In addition, to establish a relationship between surface deformations developed from Cascadia Subduction Zone and appearance of the TIR anomaly and changes, if available.

Nastaran Saberi

Nastaran studied Geomatics- Remote Sensing in the Faculty of Engineering, University of Tehran after graduation in Geomatic Engineering in same the Faculty. Then, she got involved in a project funded by "Water Resources Management Company of Semnan-Iran" as her Master's thesis on snow runoff modeling using optical and radar remotely sensed observations. After graduation, she worked in Aero Space Research Institute- Iranian Space Agency for almost two years, involving projects which were mainly focused on applications of Remote Sensing in environmental management criterion. Now she is a PhD student in the Department of Geography, Faculty of Environment, University of Waterloo working on passive microwave remote sensing of snow under supervision of Prof. Richard Kelly, which is a part of JAXA project on Snow water equivalent retrieval by AMSR2 observations.

Exploring the Approach Of DMRT-ML For SWE Retrieval Using AMSR2 Observation- Case study: Snow storm in southern Ontario, Canada in Feb 2013

The importance of modeling the physical state of snow is widely recognized as a challenging aspect in the microwave remote sensing of snow. Snow physical properties have a strong influence on emitted waves from substratum; this makes snow property retrieval using surface brightness temperature observed by passive microwave sensors feasible. Time series records of daily snow coverage and its most critical properties such as snow depth and snow water equivalent (SWE) could be helpful in many applications depending on data spatial resolution, ranges from modeling snow variations in a small catchment to global climatologic studies. The Advanced Microwave Scanning Radiometer 2 (AMSR2) launched on JAXA's Global Change Observation Mission Water in 2012 with 10-15 years mission, continues the observation record of Earth from space. The SWE product for AMSR2 is being developed as a satellite-based retrieval system that relies on static ancillary data sets to parameterize land surface properties that initialize retrievals. In this research Dense Media Radiative Transfer Theory for Multi Layered (DMRT-ML) snow pack, a physically based numerical model is applied (Picard et al., 2012). The model is based on the Dense Media Radiative Transfer (DMRT) theory for snow scattering and extinction coefficients computation and uses Discrete Ordinate Method to numerically solve the radiative transfer equation. Using DMRT-ML assumptions, the application of the DMRT-ML model to the February 2013 snowstorm in southern Ontario to the Eastern seaboard of USA is explored. To supply DMRT input variables, Canadian Meteorological Center (CMC) daily analysis snow depth product and AMSR2 brightness temperature have been used. AMSR2 data has been utilized for surface physical temperature estimation. Using forward DMRT simulation for one layer snowpack, model sensitivity to snowpack grain

size via AMSR2 observations is studied. This provides insight into the inversion look-up table matrix that is being developed using DMRT-ML for AMSR2 SWE retrievals.

Human Health

George Atiim

George holds an MPhil and BA in Geography and Resource Development both from University of Ghana. Before joining the University of Waterloo for his PhD, he worked with the Centre for Migration Studies at the University of Ghana where he was involved in projects focused on migration and poverty linkages and migration policies in the ECOWAS region. His general research interests include health, environmental change, gender and development, migration.

Living with HIV: An Assessment of Care and Support Services in rural Ghana

Social care and support services are important components of health outcomes especially for Persons Living with HIV (PLWH). Very few studies have addressed care and support services of PLWH especially in a poor and resource constrained area such as the Upper East region of Ghana. I will assess the role and level of care and social support services provided to PLWH in the Bolgatanga Municipal area in Ghana; a commercial town at the interface of major trade routes within Ghana and between its neighbouring countries. The Municipality has witnessed consistent increases in HIV/AIDS cases over the past decade. I also present results of interviews with PLWH that highlights the need for a paradigm shift in the way support and care services are rendered to PLWH by integrating the work of public health care institutions, community based associations and people in the management of HIV/AIDS especially at the local level in order to limit social stigmatization of PLWH in the municipality.
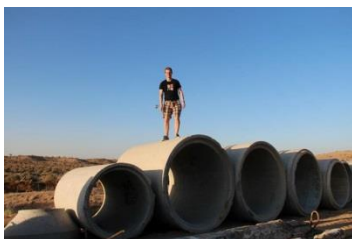
Keegan Williams

Keegan Williams comes from a multi-disciplinary background with a focus on political economy, political geography, and statistics. He has a B.A. (Honours) in mathematical economics and political science from the University of Waterloo, completed Ph.D. work in political science at the University of Rochester, and holds a Master's in international public policy from Wilfrid Laurier University. His current Ph.D. research is on the global governance of international human migration using large data analysis and GIS mapping.

A Cost-Benefit Analysis of Malaria Prevention and Dam Construction: the Koka Resevoir, Ethiopia

I construct a cost-benefit analysis (CBA) of treatment and prevention strategies targeted to malaria in the context of a newly-constructed dam in Sub-Saharan Africa. The CBA is partly based on the Koka Dam in Ethiopia, and it was spurred by a policy brief published by the International Water Management

Institute in 2010 called "Dams and Malaria in Sub-Saharan Africa". I draw and describe statistical relationships between dam construction and the incidence of malaria from a sample of 55 water projects around the world, and find significant correlations supported by current scientific theory. While the CBA may be rooted in data on the Koka Dam and reservoir, a hypothetical population has been used to demonstrate how the results of the CBA can change with the number of people affected. This report operates under the assumption that it is more efficient to provide treatment or prevention measures. By doing so, economic losses in the form of productivity will be avoided. The results of the analysis are likely applicable to a variety of water projects worldwide.

Quantifying the Intangible

Stephanie Verkoeyen

A long time water aficionado, Stephanie completed a BSc (Honours) from the University of Windsor and a MESc degree from the University of Toronto. After graduating, Stephanie continued to seek a broad range of experiences within the water world, ranging from heavy metal transport to stormwater management, and is actively involved with the Canadian Water Network. After completing a CIDA internship in St. Vincent and the Grenadines, and her subsequent work in the Caribbean with the United Nations University, Stephanie gradually made the shift from natural science to social science. Through her PhD research, Stephanie hopes to combine these two disciplines by exploring the nature of scuba divers travel patterns.

The Where and Why of Dive Tourism: A Network Theory Approach

With nearly 1 million new scuba divers qualifying each year (PADI 2011), questions of where and why tourists choose to dive at specific sites remain fundamental to tourism marketers. Using dive logs as a source of longitudinal data, I propose to use a network theory approach to track divers' travel patterns through space and time, with dive clubs acting as behavioral aggregates. Interviews/surveys will be used to discern underlying motivation for travel behavior.

Aleksandra Szaflarska

Aleksandra worked for an environmental organisation based in Cracow, Poland for several years after completing her undergraduate degree. As Project Coordinator, her responsibilities ranged from translating articles to planting trees, and organizing conferences to educating preschoolers. She returned to Canada with the intention of supplementing her professional experience with academic knowledge and subsequently returning to the field to apply that knowledge. She completed her Master of Forest Conservation degree at the University of Toronto's Faculty of Forestry, where she focused on market-oriented mechanisms in forest conservation and alternatives to such initiatives. Instead of providing her

with a solid foundation upon which to continue conservation work, her studies served to complicate her understanding of forest conservation as a discipline. As such, Alex decided to pursue further studies and is currently enrolled in the Waterloo-Laurier Geography Graduate Program, hoping to further explore forest conservation issues. She is interested in the nexus between large conservation projects and the communities impacted by them – a site too often riddled with conflict (given a broad understanding of the term).

Payments for Ecosystem Services: Critique and alternatives

"The concept of ecosystem services increasingly structures the way conservationists think, the ways they explain the importance of nature to often skeptical policy makers, and the ways they propose to promote its conservation." (Redford and Adams 2009) Given the growing pervasiveness of Payments for Ecosystem Services (PES) models, it seems only prudent to examine some of the intricacies of the concept. As argued by Kosoy and Corbera (2010), examining new and expanding markets for nature's services "is considered one of the most important themes in critical geography and environmental research [and there is thus a] need to identify and address their pitfalls, and challenge their logic by looking at whose interests pricing and marketing serve, and why money and monetary valuation are considered so useful and persuasive as a sign of ultimate worth". This presentation is aimed at those conservationists and practitioners contemplating the adoption of this framework. As such, it avoids adopting any one theoretical lens, instead approaching the issue from a trans-disciplinary standpoint. The presentation also introduces several alternatives to PES.