



## **Book of Abstracts- Papers and Posters**

### **1.List of Presenting Authors by Session**

#### **Session 1-1: Progress in GIS and Geospatial Analysis**

Cameron Plouffe, Wilfrid Laurier University

Joel C.H. Meier, Wilfrid Laurier University

Haiyan Guan, University of Waterloo

Weifang Yan, University of Waterloo

Matthew Quick, University of Waterloo

#### **Session 1-2: GIS and Geospatial Applications**

Marilyne Jollineau, Brock University

Wai Yeung Yan, Ryerson University

Grant McCartney, Ryerson University

Leane Hindmarch, Scholars Geo-portal

Todd Randall, Lakehead University

#### **Session 2-1: Sustainability across Spatial Scales from Urban to Regional and Beyond**

Francesca Cardwell, University of Waterloo

Sandy Agnew, AWARE Simcoe

Tenley Conway, University of Toronto

Abdurazag Tammar, Wilfrid Laurier University

Clare Wasteneys, Queens University

### **Session 2-2: Special Session A- Field Trip Planning Workshop**

Dr. John Maclachlan, MacMaster University and CAG

### **Session 2-3: Building Environmental Sustainability: Impacts, Tools and Policies**

Kyle Smith, York University

Wanda Leung, Wilfrid Laurier University

Brandon Pike, Wilfrid Laurier University

Elena Kraljevska, University of Waterloo

### **Session 3-1: Sustainable Agriculture, Food Systems and Resource Governance**

Alexander Todd, York University

Nicole Holzapfel, Wilfrid Laurier University

Jeff Wilson, Nipissing University

Bernard Pope, Simcoe County Federation of Agriculture

Zhe Li, Agriculture and Agri-Food Canada

### **Session 3-2: Environmental Change: the Science Basis**

Jonathan Goetz, University of Waterloo

C.M. Wells, University of Waterloo

Colin McCarter, University of Waterloo

Shannon Malloy, University of Waterloo

### **Session 4-1: Special Session B- Prosperous Places Creativity 1**

Martin Prosperity Institute, University of Toronto

Brian Hrats

Zara Matheson

Graham MacDonald

Joe Minichi

Melanie Love

### **Session 4-2: Special Session C- Prosperous Places Creativity 11**

Martin Prosperity Institute, University of Toronto

Kevin Stolarick

Amy Cervenak

Louilia Kouchaji

Marisol D'Andrea

Taylor Brydges

### **Session 5-1: Cartography, Data Assimilation and Evaluation**

Ashley Young, Lakehead University

Xiaoyong Xu, University of Waterloo

Yue Dou, University of Waterloo

### **Session 5-2: Geography of Development and Education**

Stephanie Warr, University of Toronto

Mohammad Moniruzzaman, Wilfrid Laurier University

Lualhati Marcelino, Wilfrid Laurier University

Caroline Laroque, Carleton University

Joseph Leydon, University of Toronto

### **Session 5-3: Geography of Health and LifestYLES**

Laura Senese, University of Toronto

Dana Wilson, University of Toronto

Benita Tam, University of Toronto

Bisung Elijah, University of Waterloo

B. Y. L. Chow, University of Waterloo

### **2.List of Poster Presentors**

Guillermo Azocar, University of Waterloo

F. Besik, University of Toronto

Alexander Brenning, University of Waterloo

Vincent Cheng, University of Toronto

Kimberly Devotta, McMaster University

Igor Dragovic, Ryerson University

Crystal Ferguson, Lakehead University

Adrian Gawedzki, Ryerson University

Yukari Hori, University of Waterloo

Jerry Jien, University of Toronto

Ivan Hui, Ryerson University

Amy Kluke, Ryerson University

Chelsea Leblanc, Ryerson University

Kinson Leung, University of Toronto

Lindsay Matthews, University of Waterloo

Darcie McNeill, University of Toronto

Christopher Murray, Lakehead University

## **Paper Presentations- Abstracts**

### **Paper Session S1-1 (Saturday, October 22, 2011, 8:45 am-10-25 am, OA 1025**

Chair: Dr. Alexander Brenning, University of Waterloo

#### **Progress in GIS and Geospatial Analysis**

##### **Papers**

##### **Temporal GIS Analysis using R**

Cameron Plouffe<sup>1</sup> and Colin Robertson<sup>1</sup>

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**Keywords:** spatial-temporal analysis, geographical information systems, geostatistics

##### **Abstract**

The temporal dimension of GIS analysis has traditionally been poorly defined. With recent developments in open source software available for analyzing spatial data, the implementation of GIS-based space-time analysis may be facilitated. Specifically, the use of the programming language R may be an ideal environment to develop new methods of space-time analysis. Considering there are few statistical computing programs that can also map data, R is a valuable asset for geographers. In this paper we report on the implementation of a recently developed GIS-based space-time analysis method, spatial-temporal analysis of moving polygons (STAMP) within R. The purpose of STAMP is to measure and analyse the duration and extent of spatial events. We report on the technical issues encountered during implementation within R, and discuss the state of the art of GIS analysis and representation within R. Conclusions will be made by covering currently outstanding issues found in STAMP, while also addressing future needs for doing temporal analysis within R using GIS data.

##### **Volunteered Geographic Information Quality for Research Purposes**

Joel C.H. Meier<sup>1</sup> & Colin Robertson<sup>1</sup>

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**Keywords:** Volunteered Geographic Information, Geographic Information Science, Remote Sensing, Data Quality.

##### **Abstract**

In recent years there has been a growing number of online user communities engaged in the creation, visualization, and use of volunteered geographic information (VGI). These data may

represent an untapped resource for researchers analyzing large-area geographic phenomena such as species distributions patterns or land and resource management issues. However very few studies have used VGI for analytic research questions as little is known about the quality of these data. An understanding of the validity of VGI is a prerequisite for further exploitation of these novel data sources in research contexts. This paper looks to identify key issues related to the credibility of VGI through a critical literature review. If the measurement of data quality for volunteered geographic data can be established in a formal framework, many new sources of information that could potentially be used to answer cross-cutting geographic research questions of interest to established communities. This low cost alternative to traditional sources of data can be used for up-to-date geographic information, if the data can be trusted.

### **Building Façade Detection from Mobile Lidar Data**

Haiyan Guan<sup>1</sup>

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Building facade generation nowadays receive an increasing amount of attention. Tasks such as urban planning, disaster management and investigation of the potential of solar energy have led to growing interest in highly detailed 3D urban scenes. Compared to conventional data acquisition technologies, the mobile lidar system (MLS) facilitates the collection of building data because of the capability of providing points with the density up to thousands points per square meter. In addition, rather than survey individual buildings or areas, the MLS can be deployed to map entire cities or hundreds of kilometers of transportation corridors in a short time on the street level. Segmentation in the field of mobile laser scanning is to deal with fully 3D points instead of 2.5 D data; in other words, there is not a single surface that can be modelled by  $z = f(x, y)$  like airborne lidar data. Thus, conventional airborne lidar data process methods are unsuitable for dealing with MLS data. However, 2D range image converted from 3D lidar data can decrease the complexity of data processing by using existing established image processing algorithms. From the point of the view, we transform fully 3D mobile lidar points into 2D/2.5D image by considering point density or intensity information. Similarly, features such as edges or region contours can be extracted as building candidates by image process methods. Then, according to geometrical characteristics such as eigen-values/eigen-vectors, shape and area index, trees can be removed from building candidates, and finally the building facade detection will be achieved.

### **A Method of Establishing a Long Baseline for EDMs Calibration**

Weifang Yan

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**Keywords:** EDMs, Baseline, Cube Corner Prism, Calibration, Scale Error

## **Abstract**

To guarantee data quality of surveying, electro-optical distance meters (EDMs, include electro-optical distance meters and total stations) should be calibrated before being put into field surveying. Traditionally, field baseline method which establishes a long pillar-to-pillar baseline (normally more than 500 meters) in the field is used. Laboratory EDMs calibration method has been regarded as an ideal strategy, compared with the traditional one; because it has advantages such as using much less land, more economical, weather-independent etc. Indeed, laboratory EDMs calibration has been a hot issue in the community of Geomatics in recent years. In this paper, a novel approach using cube corner prisms establishing a laboratory baseline has been proposed. After the author's theoretical analysis and calculation, it has been proved that it is feasible to establish a 1km long laboratory baseline. The baseline has been designed and its uncertainty in 1km baseline is 0.67mm, which meets the requirement of EDMs calibration. To test the theory, an experiment scheme has been designed and some primary experiments have been done. The experiments demonstrate that the distance is repeatable in this system and the system is relatively stable and can be operated easily. However, the baseline length only reaches 200m owing to some experiment equipment limitations.

## **Exploring Crime Hotspots in Toronto: A Comparison of the Spatial Scan Statistic and Local Indicators of Spatial Association Methods**

Matthew Quick<sup>1</sup> and Dr. Jane Law<sup>1,2</sup>

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**Keywords:** crime, cluster or hotspot analysis, spatial scan statistic, local indicators of spatial association

## **Abstract**

Despite generally decreasing crime rates in Toronto, crime and the fear of crime persist and exact a tremendous monetary, psychological, and social burden on public agencies and individuals. Spatial cluster detection is one of the most effective methods of exploratory data analysis to quickly identify crime hot spots, influence police perception, facilitate efficient police resource allocation and strategic policing efforts, and inform crime policy. Two contrasting spatial cluster detection methods are Kulldorff's spatial scan statistic and Anselin's local indicators of spatial association. While both cluster detection methods have been used extensively in geographies of health, there lacks a direct comparison of these two methods and their results with respect to urban crime. This paper will compare and contrast the results of these clustering methods through an examination of crime in Toronto, Ontario in 2006. Focus will be paid to the methodological differences of the two cluster analysis processes, the applicability of the two clustering results to criminology and policing efforts, and extensions of these cluster detection methods to other spatial patterning applications.

## **Paper Session 1-2, Saturday, October 22, 8:45-10:25 am, OA, 2014**

Chair: Dr. K. Wayne Forsythe, Ryerson University

## GIS and Geospatial Applications

### Papers:

#### **Geospatial Technologies for Vineyard Management in the Niagara Region of Ontario**

Marilyne Jollineau<sup>1\*</sup>, and Victoria Tasker<sup>2</sup>

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<sup>2</sup>*Department of Geography, Ryerson University, 350 Victoria Street, Toronto, Ontario, Canada M5B 2K3*

\*Presenting author: Marilyne Jollineau

**Keywords:** GIS, GPS, Remote Sensing, Precision Viticulture, Niagara Region

### Abstract

Geospatial technologies are increasingly used to acquire precise and accurate information about earth surface features of interest. Within a vineyard, the opportunity to acquire geospatial information about vineyard variables that are known to influence winegrape production (e.g., soil moisture and vine vigour) allows vineyard managers to make better decisions about their vineyards. Existing studies suggest that geospatial technologies, such as global positioning systems (GPS), remote sensing, and geographic information systems (GIS), can be used to obtain valuable information about these variables, including their spatial and temporal variability. This is significant since variability can influence winegrape quality and yield, and can ultimately impact wine quality. This study investigates the use of geospatial technologies for vineyard management at Stratus Vineyards in Niagara-on-the-Lake, Ontario. In this study, a GPS is used to map vineyard blocks, demarcate samples vines, and record soil moisture values throughout Stratus Vineyards while remote sensing is used to measure vine vigour. Both soil moisture and vine vigour are two variables that are known to significantly influence winegrape quality and yield. Field data are collected over two growing seasons (i.e., 2009 and 2010) to better understand the spatial and temporal stability of these variables. These data are subsequently integrated into a GIS environment where spatial analyses are used to quantify vineyard variability. Results indicate that geospatial technologies can provide vineyard managers with valuable and timely information that can be used to better inform their management decisions.

#### **Radiometric Correction of Airborne LIDAR Intensity Data for Improving Land Cover Mapping of Urban Area**

Wai Yeung Yan

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**Keywords:** Classification, Intensity, Land Cover, LiDAR, Radiometric Correction

### ABSTRACT

The airborne Light Detection And Ranging (LiDAR) systems have been used extensively for digital terrain/surface modelling by measuring the range from the sensor to the Earth surface. Commercial

LiDAR sensors usually utilize laser energy which has a wavelength of 1.064  $\mu\text{m}$ . High separability of spectral reflectance can always be found amongst different materials in this near-infrared spectrum range. The peak backscattered laser energy from different objects (intensity data) can be utilized to distinguish different land cover features. Yet, few studies fully explored the use of the LiDAR intensity with the ranging data for land cover classification. This is mainly because the recorded laser energy is attenuated due to the atmospheric effects and the surface backscattering. In this study, a radiometric correction model based on the radar equation is proposed to correct the LiDAR intensity data by considering the scan angle, the range, the surface topography, and the atmospheric condition. A LiDAR dataset covering an urban area is used to evaluate the effects of the radiometric correction of the LiDAR intensity data on land cover classification. The results are evaluated by using a true ortho-rectified aerial image acquired during the same flight mission. The classification results show an accuracy improvement of about 7% to 12% for the LiDAR intensity data used after the radiometric correction. The study proves that radiometric correction of airborne LiDAR intensity data should be conducted in order to maximize the benefits of using the intensity data for land cover mapping.

## **Investigating Forest Disturbance Using Landsat Data in the Nagagamisis Central Plateau, Ontario Canada**

Grant McCartney<sup>1\*</sup> and K. Wayne Forsythe<sup>1</sup>

<sup>1</sup>*Department of Geography, Ryerson University, 350 Victoria Street, Toronto, Ontario, Canada M5B 2K3*

\*Presenting Author: [mccartney.grant@gmail.com](mailto:mccartney.grant@gmail.com)

**Keywords:** forest disturbance, ecosystem, time series, Nagagamisis, Landsat

### **Abstract**

The Nagagamisis Central Plateau located in northern Ontario, Canada is an area of distinct natural and cultural significance in the Boreal shield ecosystem. The importance of this land was officially recognized in 1957 through the establishment of Nagagamisis Provincial Park Reserve. Since its inception, the park has experienced significant expansion and is currently under development as one of Ontario Parks 'Signature Sites'. Since the 1980's, timber harvest activity has led to widespread forest disturbance just outside of the park boundaries. Remote sensing provides a cost effective method for monitoring forest disturbance in vast remote areas, and can contribute insight to policy and management objectives. This research is focused on the detection of stand level forest disturbances associated with timber harvest occurring near Nagagamisis Provincial Park. The image time series data selected for this project is Landsat TM and ETM+; spanning a twenty-seven year period from 1984 to 2009. The Tasselled Cap Transformation and Normalized Difference Moisture Index are derived for use in unsupervised image classification to determine the land cover for each image scene in the time series. Image band differencing and raster arithmetic are performed to create disturbance maps illustrating the size and spatial distribution of stand level forest disturbances between image dates. A total area of 1649 square kilometres or 26.1% of the study area has experienced stand level disturbance over the twenty-seven year study period.

## **Scholars GeoPortal: Improving geospatial data access for Ontario Researchers and Students**

Leanne Hindmarch<sup>1\*</sup>, Dan Jakubek<sup>2\*</sup>, and Jennifer Marvin<sup>3</sup>

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**Keywords:** data, web GIS, teaching & learning, geographic and spatial literacies

### **Abstract**

The Ontario Council of University Libraries (OCUL) is a consortium of Ontario's 21 university libraries. OCUL enhances information services in Ontario and beyond through collective purchasing and shared digital information infrastructure, collaborative planning and assessment, research, partnerships, and communication. OCUL is currently developing a new service known as the Scholars GeoPortal (<http://geo.scholarsportal.info>). This data storage and discovery tool will provide a secure repository for geospatial files and include an integrated online mapping tool to improve the accessibility and ease of use of georeferenced data. This paper will provide an introduction to the portal project, including visuals and/or a live demonstration of Scholars GeoPortal Beta (launched August 25, 2011). It will offer an overview of the issues this project takes into consideration, including technology, data collections, metadata, and integration with teaching, learning, and research. In addition, it will discuss the expected impact of the portal at Ontario universities, assessment plans, and future development goals.

### **Measuring Land Use Diversity in Residential Neighborhoods: a Case Study from Les Minimes 'Quarter', Toulouse, France**

Todd Randall<sup>1\*</sup> and Sébastien Le Corre<sup>2</sup>

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**Keywords:** suburban sprawl, traditional urbanism, land use diversity, GIS, sustainability indicator, neighbourhood form

### **Abstract**

The term "land use diversity" was described in previous research as representative of many physical attributes of neighbourhood form opposite to typical sprawl patterns. A diverse neighbourhood is one with a mixture of compatible land uses and housing types, containing an array of amenities in reasonable proximity to where people live. Using a GIS-based index model, traditional neighbourhoods were shown to be more diverse than their suburban counterparts for a pair of Canadian case studies. This presentation explores an application of this model to a neighbourhood ('quartier') in central Toulouse to serve as further calibration of what constitutes a desired end (i.e., more sustainable) condition with regards to neighbourhood diversity. The Les Minimes quartier outperforms a comparably-situated North American urban neighbourhood, with its having a higher residential density, greater integration of housing types, and a broader array of amenities within reasonable walking distances. Despite what some may

consider negative characteristics, Les Minimes is a highly desired urban quartier (to live) juxtaposed against metropolitan Toulouse as an example of a suburbanizing European city. Some effort will be made to reconcile some of the cultural and economic forces supporting more diverse forms in this and similar neighbourhoods of Toulouse.

### **Paper Session 2-1, Saturday, October 22, 8:45 am-10:25 am, OA 2015**

Chair: Dr. I. Florin Pendea, Lakehead University

#### **Sustainability across spatial scales from urban to regional and beyond**

Papers:

##### **Knowledge, Attitudes and Practices of Global Environmental Change and Health: Toward Sustainable Behaviour Change?**

Cardwell, F<sup>1\*</sup>; Elliott, SJ<sup>2</sup>.

University of Waterloo, Waterloo, Ontario

Presenting Author: [fcardwel@uwaterloo.ca](mailto:fcardwel@uwaterloo.ca)

**Keywords:** global environmental change; knowledge, attitudes practices; qualitative methods

##### **Abstract**

Environmental sustainability is increasingly threatened by large-scale changes to the natural environment that could significantly affect human and ecosystem health. In addition, changes to the social, political, economic and physical environment will impact populations globally. Sustainable behaviour change is needed to reduce greenhouse gas emissions, mitigate related impacts, and develop the capacity to adapt to future climate and environmental changes. Towards these ends, it is necessary to understand how members of the public perceive and behave in relation to global environmental change. This research begins to explore the knowledge, attitudes and practices of Canadians related to global environmental change and health. In particular, this presentation focuses on results from qualitative, semi-structured in-depth interviews (n=22) with adults (18+) in the Golden Horseshoe region of Southern Ontario. Participants were asked about individual and community health, knowledge and attitudes about global environmental change, actions taken to mitigate environmental change, and potential behaviour change mechanisms. Preliminary results show that although participants are environmentally aware and concerned about local environmental issues (eg. air pollution), the terms climate change and global warming are less distressing. Participants demonstrate the willingness to act in environmentally friendly ways, particularly when financial, temporal or social incentives are offered. Policy implications related to environmental change and health, such as the role of environmental terminology in the public domain, will be discussed.

##### **Simcoe County, Barrie and Orillia as a Geographic Area for Sustainability**

Sandy Agnew<sup>1\*</sup>, John Stillich<sup>2</sup>

<sup>1</sup>Member, AWARE Simcoe Board of Directors

<sup>2</sup>Executive Director, Sustainable Urban Development Association

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Keywords: Simcoe County, Geographical, Sustainable, Area.

### **Abstract**

Sustainability has been defined numerous ways but perhaps the simplest is “Enough For All, Forever.” There has been concern over the last couple of decades, particularly in industrialized countries, about the ability of the planet, with limited resources, to provide for the needs of a world population of seven billion and counting. How can our complex and resource hungry consumer society continue to expand its population and maintain its high standard of living?

The geographic area of Simcoe County, including the cities of Barrie and Orillia, will be examined in the context of environmental, social and economic factors that need to be considered if the area is to maintain a healthy community structure for all residents. Such issues as the provision of healthy food supply, clean water and air, waste management, transportation, energy, education and cultural and social fabric will be discussed.

### **Households and Urban Trees: Attitudes and Planning Activity in Mississauga, Ontario**

Tenley Conway\* and Tooba Shakeel

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**Keywords:** urban environments; urban forestry; households; survey

### **Abstract**

The majority of urban trees are located on private residential property. Yet, little research has looked at residents' preference for neighborhood and property-level trees and the relationship between household characteristics and tree presence. Additionally, it is unclear the extent of the conflict between canopy shade and the desire to grow sun loving plants like fruits and vegetables. To better understand the role residents' play in shaping the urban forest, we conducted a survey in four target neighborhoods within Mississauga. These neighborhoods varied along two dimension (average income and age of housing), which previous research suggests significantly impact canopy extent. In the survey, we asked respondents about their attitudes towards neighborhood and property-level trees, the characteristics of trees on their property, details about any fruit or vegetable gardens, as well as basic household characteristics. The survey response rate was approximately 48%. The results showed overwhelming support for trees in residential neighborhoods. There were, however, some differences in opinion between the four neighborhoods regarding satisfaction with current tree densities and appropriate municipal policy responses. We also found respondents who engaged in fruit and vegetable gardening were equally supportive of neighborhood and property-level tree presence, as compared to those who do not grow fruits and vegetables.

### **Public and Private Responses to Flood Disaster in Saudi Arabia: A Study of Jeddah City**

Brenda Murphy<sup>1</sup>, Khan R. Rahaman<sup>1</sup>, Abdurazag Tammar<sup>1\*</sup>

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**Keywords:** Jeddah city, Flood, Public, Private, Management.

### **Abstract**

The economic damages associated with floods are receiving increasing attention in policy, the media and society more generally. This is being driven by the expectation that flood probabilistic and their consequences will continue to rise in the coming decades – brought about by a combination of a changing climate and an increase in flood plain occupancy. This is being complemented by policy changes in which the nations’ citizens are being asked to ‘live with floods’, ‘prepare for floods’, ‘live with risk’ and ‘make space for water’. Kingdom of Saudi Arabia (KSA) nowadays is facing severe flash floods in some of its major cities including Jeddah and Riyadh. Losses have not been calculated so far in terms of monetary aspects. However, it has been clearly visible that there is not enough room for the policies to work smoothly during these unwanted events. It seemed from this study that flood in 2009 had the lack of contingency planning and emergency rescue operation. As a result, people had to suffer a lot in terms of economy, health and social problems. This research explores the contemporary flood management policies in KSA with special emphasis on Jeddah city and the responses during this event by public and private sectors. It further extends the limit to investigate the presence of contingency planning and the mechanism how it works during the havoc done by flood. Primary and secondary sources of information are being used to analyze present policies and finally recommendations are being cited to improve policy options so that sufferings can be minimized during unwanted flooding events.

### **If You Build More Bike Lanes, Will They Come? How to Change Minds, Hearts and Transport Behaviour in Creating Sustainable Cities**

Clare Wasteneys

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**Keywords:** sustainable transport, cycling, habitus, behaviour change

### **Abstract**

In the face of global warming, Peak Oil and alarming rates of obesity, encouraging citizens to ride a bicycle instead of driving a car, is an important yet challenging goal for auto-dependent North American and Australian cities. Sustainable transportation and bike-friendliness advocates promote cycling as an effective way to reduce greenhouse gas emissions, traffic congestion and transport energy consumption, while improving public health. In Ontario, the bike-friendliness movement has spread into the public realm, as cities adopt sustainable transportation policies and strategic plans, including construction of new bike lanes to improve the safety and appeal of cycling. However, efforts to change transport behaviour must also address psycho-social barriers stemming from socially-constructed perceptions of cycling as a male-dominated, competitive and risky activity. This paper shares insights from current longitudinal research on the influence of gendered norms of appearance and environmental values in the adoption of cycling for transportation by teenagers. This multi-method research (interviews, focus group + participant observation) draws on the concept of “habitus” and models of behaviour change, to assess the impact of an alternative, experiential cycling course on participants’ perceptions and subsequent practice of using a

bicycle for transportation. By engaging their “head, heart and hands”, the course enables participants to see cycling on city streets as a normal, achievable and desirable mode of transportation.

### **Session 2.2 Special Session A, Oct 22, 8:45 am-10:25 am, OA 1022**

‘Field Trip Planning’ Workshop\*\*

Dr. John Maclachlan, McMaster University

Education Study Group, Canadian Association of Geographers

\*\*This elective workshop for students and new faculty relates to the Certificate in Teaching and Learning Program launched by the Education Study Group of the Canadian Association of Geographers (CAG).

### **Paper Session 2-2, Saturday, October 22, 8:45 am-10:25 am, OA 2019**

Chair: Dr. Rosario Turvey, Lakehead University

#### **Building Environmental Sustainability: Impacts, Tools and Policies**

Papers:

#### **Bursting ‘The Bubble’: A Historical Geographic Account of Sewerage and Sewage Treatment in St. Johns, Newfoundland, 1888-2009**

Kyle Smith<sup>1\*</sup>

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**Keywords:** Sewerage, municipal services, urban pollution, St. John's, Newfoundland

#### **Abstract**

Throughout much of St. John's history, sewerage development has been guided by the recommendations of sanitary engineers and urban planners. The reports prepared by these experts are essential in piecing together the history of the city's sewers. These documents also help to highlight key themes within sewerage development as a whole, including disease prevention, urban expansion, environmental protection, technology, and the state of the economy. Despite the recommendations of these experts, sewage treatment did not arrive in the city until 2009. At the time of St. John's incorporation, in 1888, sewerage development was largely driven by disease prevention and the goal of improving public health. However, work was halted in 1892 due to a catastrophic fire. Moving forward, progress was slow and ongoing economic trouble slowed the pace of development leading up to World War II. After the war, economic conditions improved and sewerage development began to take on a metropolitan scale due to increasing urban expansion in the area. This expansion led to the degradation of the city's harbour and many of its inland watercourses. As a result, steps were

taken to protect these watercourses through the continuing expansion of sewage lines. Plans were also made, beginning in the 1970s, to implement sewage treatment. However, financial troubles delayed progress once again as municipal, provincial, and federal officials debated over who would bear the cost of the project. It was not until agreement over the financing of the plant had been reached that construction began on the wastewater treatment plant.

## **Impacts and Influence of the Timber Class Environmental Assessment in Ontario**

Wanda Leung<sup>1\*</sup> and Professor Kevin Hanna<sup>2</sup>

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**Keywords:** environmental assessment, Timber Class Environmental Assessment, forest management, policy impact

### **Abstract**

Ontario provides one of the few examples of the application of Environmental Assessment (EA) to forest management on a large scale—anywhere in the world. In 1994, after 4 years of hearings and review Ontario's Environmental Assessment Board approved the *Class Environmental Assessment by Ministry of Natural Resources for Timber Management on Crown Lands in Ontario* (Timber Class EA), albeit with conditions. The Timber Class EA provides a framework for forest management and has arguably changed both operational practices and the policy setting. This research examined the evolution of the EA Board hearings and the present day influence of the Timber Class EA. This research studies the larger policy and operational impacts of the Timber Class Environmental Assessment in Ontario whilst considering how the experience of EA affects larger policy settings and changes those who constitute governance. In addition to a review of planning and policy documents, semi-structured interviews were conducted with people involved in the hearings, implementation of the EA and the development of subsequent policies. Four key findings have emerged. The importance of the social learning experience of EA, questions about the strength of the Part II (bump-up) provision, the helpful and not so helpful role of intervenor funding, and, whilst some believe that the present forest policy context in Ontario owes much of its structure and language to the Timber Class EA, others are not so sure.

## **A Framework for Managing Cumulative Effects Impacts, Mineral rights Access, and Regional Resource Development: A Case Study of the Yukon's White Gold District**

Brandon A. Pike<sup>1</sup>

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**Keywords:** environmental management, cumulative effects, resource development, public-private partnership, Yukon

### **Abstract**

For the last 113, gold mining has been a mainstay industry in the Yukon. In July 2011, global gold prices reached record highs at 1482.17 U.S. dollars per ounce! In the Yukon, this increase

has translated into a booming mining industry, increased further by the discovery of high grade gold deposits in the White Gold district near the confluences of the White, Stewart, and Yukon Rivers. The industry hype surrounding the discovery has inevitably led to record mineral staking in recent summers and has been touted as the next major gold rush. In the realm of environmental assessment, this recent boom presents a number of concerns - most notably potential cumulative effects. Dozens of industrial operations are likely to develop all within a very short period of time in a largely undeveloped region. The potential for significant impacts on natural systems is high. The Government of Yukon, as regulators of mineral development and road infrastructure, has advocated that a single resource road (as opposed to a slew of private industry road and trail networks) will not only encourage industry by providing access to mineral rights, but also drastically reduce the number of linear features in the landscape. Given the ambiguity of the application of cumulative effects assessment under the *YESAA* and the limitations of outdated placer mining legislation in the Yukon, this paper proposes a framework to reconcile industry demands and environmental concerns through public-private partnerships.

## **Environmental impacts from oil dispersants used at the Gulf of Mexico spill**

Elena Kraljevska<sup>1\*</sup> and Brent Doberstein<sup>2</sup>

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**Keywords:** dispersant, oil spill, environmental impacts, Gulf of Mexico.

### **Abstract:**

This paper summarizes the impacts of dispersant use during the Gulf of Mexico spill in 2010. It was estimated that between April 20 and July 28, 2010, approximately 205.8 million gallons (53,000 barrels per day) of oil leaked. Initially, mechanical containment and recovery techniques such as booming, skimming, and in situ burning were used. However, none of these techniques worked well so dispersants were used. A total of 1.84 million gallons of dispersants were applied, of which 1.06 million gallons, primarily Corexit 9500A and “some” Corexit 9527A, were applied at the surface while a further 0.78 million gallons of Corexit 9500A were applied directly at the wellhead. This paper traces the effectiveness of the two dispersants used at the Gulf spill, and summarizes the state of knowledge about the impacts of these dispersants on marine flora and fauna in the affected region. Both primary and secondary data suggest that dispersants had generally positive impacts on birds and fur-mammals (i.e. as compared to non-treated spilled oil), but had generally negative impacts on fish larvae, coral reefs, seagrasses, planktons, wildlife, and mangroves. The overall impacts of dispersant use on the Gulf marine ecosystem are still uncertain and more research in this area is needed.

**Paper Session: 3-1, Saturday, October 22, 10-50 am-12:30 pm, OA 2015**

Chair: Dr. Todd Randall, Lakehead University

## **Sustainable Agriculture, Food Systems and Resource Governance**

Papers:

### **Climate Change and Water Governance in the Greater Toronto Area**

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**Keywords:** Water governance, climate change, Toronto, inequality, social

#### **Abstract**

Climate change leads to a variety of water-related effects in Toronto and the Greater Toronto Area (GTA), which lead to a multitude of urgent and social and environmental problems. The effects of climate change at the watershed level include an increased risk of erratic and extreme weather events such as heavy rainfalls and, consequently, floods. These events put increased stress on crucial infrastructure like roads and sewer systems, and result in decreased water quality. This opens up a class dimension that includes renters and commuters being most adversely affected. The City of Toronto's homeowner-focused mitigation and adaptation strategies reinforce the class-centric nature of water governance in the GTA. It is the author's conclusion that a more holistic approach must be enacted in order to better accommodate the needs of the city's most vulnerable residents in the face of a changing climate.

### **Once Upon a Time-Revised: How Can Sustainable Food Systems Spaces Empower Children to Become Active Agents for Positive Change?**

Nicole Holzapfel<sup>1\*</sup>

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**Keywords:** food systems, empowerment, mental wellness, care ethics, therapeutic landscapes

#### **Abstract**

Sustainable food systems (SFSs) bear the potential to positively impact our health, the livelihood of our communities, and our planet's ecology. This presentation explores the empowering potential of food in a SFS at a theoretical level. Contrary to the inclusionary and holistic character of sustainability children are often overlooked when discussing and operationalizing sustainability. Based on children's level of (dis)empowerment in our current food system (FS) this work explores how food can contribute to children's building of a sustainable community by helping progress empowerment. More specifically, this presentation seeks to understand how this process can increase mental wellness for a community of traumatized children living in residential care. The question of how children can transition with food to sustainable communities for empowerment and mental wellness is approached with several intersecting concepts: (i) Nussbaum's criteria for a decent life are utilized to comprehend children's (dis)empowerment in our current hegemonic FS; (ii) care ethics enable children, who are often solely viewed as care receivers, to also take on the active role of care givers; (iii) in therapeutic

landscapes, food and the relations evolving around it, are capable to nourish the development of a sense of place.

### **The Application of Hyperspectral Data for Precision Agriculture in North Eastern Ontario**

Jeff Wilson<sup>1\*</sup>, Jeff Cable<sup>1</sup>, Xianfeng Jiao<sup>1</sup> and John M. Kovacs<sup>1</sup>

<sup>1</sup>*Department of Geography, Nipissing University, 100 College Dr., North Bay, Ontario, Canada P1B 8L7*

\*Presenting Author: [jwilson284@community.nipissingu.ca](mailto:jwilson284@community.nipissingu.ca)

**Keywords:** Remote Sensing, Agriculture, Spectral Signature, Yield, Mapping

#### **Abstract**

The purpose of this investigation was two-fold. First, we hope to determine when the maximum hyperspectral separability of five cash crops occurs to establish an optimal time for satellite image acquisition. Second, we wish to determine how fungicide application and alternate harvest times could affect the spectra and final yields for two varieties of spring wheat. Specifically, spring wheat (*Triticum* spp.), soybean (*Glycine max*), canola (*Brassica campestris*), barley (*Hordeum vulgare*) and oat (*Avena sativa*) were examined over a twelve week period from July 7, 2011 to September 21, 2011 where spectral signatures, leaf area index, chlorophyll content and soil moisture measurements were collected using a variety of handheld equipment. The in situ data were collected from a total of ten different fields; two separate fields of each crop type located in Verner, ON. Each field contained between 20 and 30 data collection points, located in either two or three parallel transects running approximately 140 meters in length. One of the two spring wheat fields contained a second variety of wheat called bearded wheat (*T. dicoccum*) which pertains to part two of this investigation. In addition, yield maps were generated for three of the five crops using an AFS Yield Monitor onboard the combine during harvesting, and Farm Works Software program. Preliminary results indicate that variations in spectral signatures could be used to determine an optimal time for satellite image acquisition.

### **Agriculture and Water in Crisis**

Bernard Pope

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**Keywords:** Green Energy Act, Canadian Land Inventory, Farmland preservation, NAFTA, CETA

#### **Abstract**

The Green Energy Act of 2009 has removed meaningful input from the public and the municipalities with regard to the development of large solar and wind projects meant for the generation of electricity. Although there is token consultation, with both the public and the municipalities, the impetus of the Act is to allow the developers to succeed in their projects with little or no care for the soil that would be destroyed by this industrial construction. The Ontario Power Authority has stated that the Classes 1 and 2, as defined in the Canadian Land Inventory, must be protected from development, but in the plans of the developers, the boundaries are seemingly of little concern. Farmland of many classes is valued by farmers for various qualities that the soil possesses, but with the sacrifice of this farmland, in favour of the large solar (farms) facilities, society will have lost forever the possibility to produce food for an ever increasing world population. Under Nafta, a federal jurisdiction, any resources that are on the property fall under the harvesting jurisdiction of the leaseholder-developer, whether that resource was part of the original agreement or not. The most important resource that could be harvested and lost, is water and by extension, anything on the property. The provincial education system has to include

a serious agricultural-business component to encourage the youth that care about farming, to follow training and courses that provide them with tools to succeed in agriculture and farming as a main career.

### **Monitoring Spatial and Temporal Patterns of Community Pasture Productivity in Saskatchewan Using Time Series NDVI and Census Data**

Zhe Li<sup>1\*</sup>, Ted Huffman<sup>1</sup>, Brian McConkey<sup>2</sup>, and Lawrence Townley-Smith<sup>3</sup>

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**Keywords:** Pasture productivity, AVHRR, MODIS NDVI, stocking rate, Saskatchewan

#### **Abstract**

Pasture degradation is a common environmental problem and is widely found around the world. In this study we examined spatial and temporal pattern of community pastures in Saskatchewan from 1988 through 2009. The pasture productivity was reflected by Normalized Difference Vegetation Index (NDVI). NDVI values were extracted for community pastures from AVHRR for 1988 – 1999, and from MODIS for 2000 – 2009. The AVHRR NDVI values were normalized to be consistent with the MODIS NDVI values by comparing data from two overlapping years – 2000 and 2001. Annual precipitation and stocking rate data for the same period were used to analyze their impacts on annual growing-season (May – September) NDVI of the community pastures. Analysis was based on both overall-community-pastures and ecoregions. A general increase in growing-season NDVI but stable trends in precipitation and stocking rate were found over the 22 years from 1988 – 2009. Results indicate that no significant correlations exist between the current-year or the preceding-year stocking rate and the annual growing-season NDVI. Rather, precipitation was an important factor that accounted for up to 30% of variation of NDVI for all community pastures and up to 41% of variation at the ecoregion level. This evidence suggests a non-degradation of community pastures in Saskatchewan.

#### **Paper Session: 3-2, Saturday, October 22, 10:50 am-12:30 pm, OA 2019**

Chair: Dr. Nandakumar Kanavillil, Lakehead University

#### **Environmental Change: the Science Basis**

Papers:

#### **Assessment of Hydroecological Changes at a Shallow Pond Near Churchill, Manitoba from Sedimentary Diatom Assemblages**

Jonathan D. Goetz

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**Keywords:** Paleolimnology, shallow tundra ponds, diatoms, water isotope tracers, Churchill, Manitoba

### **Abstract**

Shallow lakes and ponds are an important feature of the landscape in the Hudson Bay Lowlands (HBL), yet little is known about their hydroecological response to the warming that has occurred in the past ~50 years. The objective of the research was to reconstruct past hydroecological conditions of a climate-sensitive pond from Churchill, Manitoba. A lake sediment core was obtained from Puddle Pond in the summer 2009, dated using radiometric isotopes ( $^{210}\text{Pb}$ ,  $^{137}\text{Cs}$ ) and analyzed for diatom assemblages. These diatom assemblages were compared with geochemical proxies (OM content, %C<sub>org</sub>, %N, C/N,  $\delta^{13}\text{C}$ ,  $\delta^{15}\text{N}$  and  $\delta^{18}\text{O}$ ) and recent climate records to understand their relationships. Diatom counts revealed that over the past ~300 years, diatom assemblages were dominated by *Denticula kuetzingii* and *Nitzschia amphibia*. Starting in 1945, increases of certain taxa, like *Achnathidium minutissimum*, indicate increased alkalinity. Algal productivity has increased since the early 1900s. This increase in productivity coincides with increases of nitrogen availability as indicated by the geochemical record (increase %N,  $\delta^{15}\text{N}$ ). The increase in nitrogen availability may be due to increased runoff as a result of increased fall rains. Although Puddle Pond showed similar carbon and nitrogen trends as other lakes in Churchill, productivity is limited more by precipitation and evaporative effects due to its ephemerality, which began between 1945 and 1975. The results provide important trends that can be used in further research to investigate the linkages between hydrological and limnological processes of lakes in the Churchill region.

### **Nutrient Mineralization in a Natural, Abandoned, Restored Temperate Bog in Quebec, Canada**

C. M. Wells<sup>1\*</sup>, M. M. Macrae<sup>1</sup>, and J. S. Price<sup>1</sup>

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**Keywords:** mineralization, nitrogen, phosphorus, bog, restoration

### **Abstract**

A balance between external inputs and internal nutrient cycling dynamics governs nutrient availability in wetlands. Bogs are inherently nutrient poor and the supply of nutrients for vegetative uptake depends largely on internal nutrient cycling processes, namely, the mineralization of organic matter via microbes. Peatland harvesting may accelerate the mineralization of nutrients by removing the biological uptake mechanism of vegetation and by exposing anoxic peat to aerobic conditions. The goal of this research is aimed at better understanding the long-term success of peatland restoration by assessing the availability and cycling of mineral nitrogen (N) and phosphorus (P) in a natural (NAT), restored (RES), and unrestored (UNR) bog at the Bois-des-Bel (BdB) research station. Concentrations and seasonal net mineralization rates of P were negligible at all sites over the entire study period. On average and for all sites, ammonium ( $\text{NH}_4^+$ ) comprised approximately 80% of the total inorganic nitrogen (TIN) found in the peat, with  $\text{NO}_3^-$  concentration making up the remaining TIN concentrations. Seasonal net mineralization rates were dominated by ammonification ( $\text{TIN} \rightarrow \text{NH}_4^+$ ) and were greatest at the UNR. Rates of seasonal mineralization were lowest over the entire season at the RES, possibly due to an efficient microbial community actively immobilizing available N in the

substrate. Nutrient dynamics at BdB still appear to be different than in natural conditions ten years post restoration. Low mineralization rates found at the RES, however, may suggest that belowground processes are retaining nutrients and indicates restoration is following a suitable trajectory.

## **Hydrological Assessment of Restoration of the Bois-des-Bel Peatland, Quebec: a Decade Later**

Colin McCarter<sup>1\*</sup>, Jonathan Price<sup>1</sup>

<sup>1</sup>*Department of Geography and Environmental Management, University of Waterloo, 200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1*

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**Keywords:** Peatlands, Ecohydrology, Restoration, *Sphagnum*

### **Abstract**

Understanding the ecohydrological processes occurring within both restored and natural peatlands is an integral part of determining the success of the restoration and the current hydrological trajectory of a restored ecosystem; however, it is currently unknown if restored peatlands will eventually behave similarly to natural peatlands. The Bois-des-Bel peatland was restored in 2000 and the ecohydrological functions were assessed at the restored site along with unrestored (abandoned 30 years) and natural sections of the peatland in 2010. Since restoration, a complete cover of *Sphagnum* moss (primarily *S. rubellum*) has developed at the restored site, while no *Sphagnum* regeneration has occurred at the unrestored site. The unrestored and restored sites had similar average water tables (-48 cm), while the natural site had an average water table of -36 cm. In addition to higher water tables, the average volumetric water contents within the upper 10 cm of the *Sphagnum* was 20 - 25 % at the natural site compared to 10 - 15 % at the restored site. Similar volumetric water content trends were seen in peat monoliths collected from the three sites and run under controlled laboratory conditions. Although Bois-des-Bel has complete *Sphagnum* cover, the water table does not yet fluctuate within the new moss layer. These soil water characteristics sets limitations to the accessibility of water to the uppermost portion of the moss layer where the plants have physiological water supply requirements. The presence of a complete moss layer is one measure of success, but the divergent hydrological conditions indicate that the ecohydrological function has not yet fully returned.

## **Hydrological Response to Rewetting in a Fen Peatland near Rimouski. QC**

Shannon Malloy<sup>1\*</sup>, Jonathan Price<sup>1</sup>

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**Keywords:** Peatlands, Restoration, Gytija, Fen, Water Table

### **Abstract**

Water availability is a major concern when restoring degraded vacuum harvested peatlands. Rewetting is typically the first step in peatland restoration and aims to improve the hydrological

conditions necessary for nutrient cycling and ecological development. Restoring peatlands has traditionally been limited to bog peatlands with little research pertaining to fen peatlands. The extraction process at Bic-St. Fabien (a vacuumed harvested moderate-rich fen underlain by a gyttja layer) resulted in a surface variable in elevation and residual peat depth. Restoration (rewetting) occurred fall 2009 by blocking active drainage ditches and contouring the peat surface to create bunds to prevent runoff. Rewetting has been effective as water tables have risen upwards of 50 cm across some of the site; however, these trends are more localized to areas directly affected by rewetting practises (blocked ditches/surface contours). Regions that were not directly influenced by rewetting still experienced a rise in the water table of about 20 cm. A wetness gradient still exists across Bic-St. Fabien Peatland. In addition to the rewetting, the role that the gyttja layer has in the restoration was also assessed. Gyttja is a lake bottom sediment high in organic content with low permeability, and conductivity ( $1 \times 10^{-2} \text{ cm d}^{-1}$ ). Since the overlying peat is as low as 20 cm it is important to understand how water is stored and moves in gyttja to determine if this layer has implications for the success of restoration. It was found that gyttja does not desaturate and has very low seasonal deformability (<1 cm) based on in field experiments.

#### **Paper Session 4-1: Special Session B, Saturday, October 22, 10:50 am-12:30 pm, OA 1022**

Chair: Brian Hrac, The Martin Prosperity Institute, University of Toronto

#### **Prosperous Places: Scaling Creativity 1**

Papers:

##### **A Tale of Two Scenes: Civic Capital and Retaining Musical Talent in Toronto and Halifax**

Brian Hrac

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**Keywords:** music, civic capital, Toronto, Halifax, social dynamics

#### **Abstract**

For several decades Toronto has served as the centre of the music industry in Canada. Yet, recent research reveals that industrial restructuring may be affecting the choices that musicians make about where to live and work. In the era of contemporary independent music production some smaller city-regions are becoming more attractive to musicians. Drawing on 84 interviews with musicians and key informants in Toronto and Halifax, this presentation explores the ways in which musicians consider the economic and social dynamics of city-regions in making their location choices. In particular, the presentation demonstrates that although Toronto still offers advantages related to size and economic opportunities, many musicians described the city as an intensely competitive and difficult work environment. By contrast, respondents in Halifax described the city's music scene as a supportive and collaborative community that welcomed newcomers, encouraged performance, and facilitated creativity. In the contemporary context

where digital technologies afford independent musicians with unprecedented geographic mobility, this presentation argues that communities high in civic capital may gain an advantage in attracting and retaining talent.

### **Benchmarking for Creative Economy in Rural Ontario**

Zara Matheson

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**Keywords:** Rural Development, Creative Economy, Ontario

#### **Abstract**

The objective of this research is to examine the creative economy in rural communities across Ontario and produce a document that can then be used by any community seeking to better understand how to execute creative economy research and begin to interpret results. We hope to contribute to the existing body of research on the creative economy in rural communities and assist in the transfer of that knowledge in an accessible format to reach and better inform communities interested in applying the concepts themselves. This presentation benchmarks one focus community from each of the five major economic regions in Ontario against 10 other communities from that region. This reflects the fact that Ontario is composed of five very distinct regions, each presenting unique opportunities and challenges. The types of data examined will focus on the occupational structure of the workforce and attempt to provide measures that characterize a community's creative and quality of life assets, including its levels of talent, technology. The final report will allow communities not only to gauge their own performance in the creative economy, identifying strengths, weaknesses and opportunities, but also to better understand how their community fits within the larger context of the region in which they exist.

### **Examining Creativity as a Development Tool in the Remote and Rural Context: Creativity-Led Development in the Tanna, Vanuatu**

Graham Macdonald

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**Keywords:** Creative economy, creativity, rural, remote, development, policy transfer

#### **Abstract**

Digital media and music artist Paul D. Miller (DJ Spooky), and the Manhattan based Vanuatu Pacifica Foundation have been invited by the Naihne People of Tanna, Vanuatu to develop an artist retreat within their native lands. The Tanna Center for the Arts will become a sustainable and culturally supportive demonstration model that works to build creativity and deliver education in sustainable building techniques. The aim is foster an equal exchange of ideas between local cultures and the international art community, while working to rebuild a local living economy that retains youth and Traditional Ecological Knowledge (TEK). This research

project will explore how linkages between the Tanna, Manhattan, and the international art world have been constructed; and to what extent these linkages facilitate the transfer narratives, knowledges and policy models in, out and between these three geographical locations. The focus on economic development through art and creative industries lends itself to be examined from through creative economy lens. I will examine how urban-based creative economy policies and practices transfer to remote underdeveloped locations. The literature does not account for “creativity-led” development practices; the successes and failures of this model will work to instruct new discourses on how creativity and alternative economic spaces that embed local social practices and environmental knowledge, can be combined to create a new development model

### **The Rising Cost of Studio Space for Musicians in Toronto**

Joe Minichini

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**Keywords:** Musicians, rehearsal space, studio space, rent, gentrification, Toronto

#### **Abstract**

The availability and affordability of studio space is an essential consideration for musicians in all cities. Like other artists, musicians require space for writing, recording and rehearsing their creative content. Although geographers have considered how artists contribute to and suffer from gentrification, the relationship between the cost of studio space and musicians remains unexplored. In burgeoning music scenes in cities like Toronto, musicians face fierce competition, declining incomes and the rising cost of live/work space. To explore these dynamics, this presentation considers the relative affordability of studio space across the GTA. Drawing on a survey of rehearsal spaces, maps and wider academic literature, particular attention is paid to the following key question: why do independent musicians continue to migrate to downtown Toronto? How much does studio space cost in different neighbourhoods across the city? What factors are pricing out musicians from Toronto’s central city? What are the implications of rising costs for individual musicians and the city more broadly? Ultimately, this presentation considers Toronto’s ability to incubate musical talent.

### **Service Class Jobs 1993-2008: Who’s Leaving? Who’s Staying? Are They Who We Think?**

Melanie B. Love

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**Keywords:** Labour mobility, service class, immigrants

#### **Abstract**

As part of an ongoing series of papers on the labour market in Canada, Martin Prosperity Institute (MPI) has reported on different trends using the occupational typologies of MPI

Director, Richard Florida (2002) – the creative, the service, and the working classes. This research complements this work by conducting a longitudinal analysis of data from Statistics Canada's Survey of Labour Income Dynamics in order to isolate the mobility effect of workers into and out of the largest and fastest growing occupational class in Canada: the *service* class. Who is working in service class jobs and what might these workers have in common? Over 15 years, from 1993 to 2008, we will look at some typical demographic characteristics of workers in the service class (e.g., level of education, sex, immigrant and visible minority status, urban size) as well as work-related characteristics (e.g., scheduling and hours, benefits received) and identify commonalities amongst those who stay, those who change jobs or occupations within the service class, and those who leave the service class altogether. Who is leaving? Who is staying? And are they who we think?

**Paper Session 4-2 (Special Session C), Saturday, October 22, 2:15 pm-3:55 pm, OA 2019**

Chair: Dr. Kevin Stolarick, The Martin Prosperity Institute, University of Toronto

**Prosperous Places: Scaling Creativity II**

Papers:

**The Inventive, the Educated, the Creative: Do They Make a Difference to Metropolitan Productivity?**

Kevin Stolarick

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*1L7*

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**Keywords:** Regional productivity, patents

**Abstract**

Longstanding tradition and research assumes that endogenous technological development increases regional productivity. It has long been assumed that regional patenting activity or measures of human capital were the best, if not only, way to measure the endogenous creation of new technology that results in regional productivity, wage, and other economic benefits. It has always been a process of at least two stages. First, the new idea is generated, and then it is developed and commercialized to create benefits for the individual or firm owning the idea. Typically, researchers collapse these steps into a single model of the "invention in/productivity out" variety. Using comprehensive data on patenting (inventors), human capital (education), and creative workers along with measures of metropolitan regional technology, regional population, and both GDP per capita and change in GDP per capita, we unpack the model back to the two-step process and use SEM to investigate the relationships among inventive activity and potential inventors, regional technology levels, and regional productivity outcomes. Our results, quite robustly and across a variety of different formulations, clearly show almost no significant direct relationship between invention and productivity, except through technology. Clearly, the simplification of the "invention in/productivity out" model does not hold, which supports other

work that questions the use of patents and patenting related measures as meaningful innovation inputs to processes that generates regional productivity and productivity gains. Further, we show that the most effective measure of regional inventive capacity with an ability to directly influence regional technology levels and indirectly increase regional productivity is share of the workforce in the creative class rather than patent or human capital based measures.

## **Festivals as Temporary Cluster: How Toronto Film Festival Spaces and Networks Bridge an International Geography of Film**

Amy Cervenán

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**Keywords:** Film festivals, networks, spaces of work, risk mediation

### **Abstract**

A film festival is many things to creative workers in the film industry. For some, it is the chance to sell their film, to screen their story, or to pitch their idea; for others, it is the opportunity to secure distribution in foreign territories, to gain industry specific knowledge, or to connect with individuals in a global and mobile industry. Ultimately, a major film festival is a space to work; this paper explores how film festivals are working to advocate for film and assist filmmakers – through a range of workshops and industry programming -- develop their own projects and benefit from the symbolic and functional agglomerations that core international festivals convene. Even though much public interest and press focuses on celebrity sightings and film reviews, key festivals function as *de facto* markets and important nodes in the broader film industry and festival circuits. For many emerging and aspiring creative workers – such as directors, writers, producers and programmers -- festival spaces which range through structured/informal, professional/social, and open/exclusive settings are essential moments in achieving their projects and developing a career in this dynamic and highly competitive field. In this paper I argue that festivals serve an increasingly important role in the successful navigation of a sea of possibilities, especially for emerging independent filmmakers, as this already high-risk industry confronts new waves of co-production, new technology and emerging distribution platforms. Based on extensive interviews and participant observation at two of Toronto's major international film festivals, this research explores how festivals function temporary clusters, and can help independent filmmakers perform better than they would have otherwise.

## **Towards a Creative Economy in the Gulf?**

Louilia Kouchaji

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**Keywords:** Qatar, United Arab Emirates, economic diversification, post-industrial, sustainable economy, cultural and societal shift

### **Abstract**

The Emirates and Qatar are increasingly becoming regions ‘in vogue’ and are attracting more and more immigrants, tourists, companies, international competitions and educational institutions among others. Also, thanks to their significant hydrocarbon reserves, they have generated substantial revenues and wealth that have enabled them to undertake major investment projects in different areas. However, with the volatility of oil prices and the finiteness of the reserves, these two countries understood the importance of diversifying their economies away from hydrocarbons. Using the “3 Ts” analysis of economic development (Florida, 2002), this paper analyzes whether these two Gulf countries have the potential of becoming post-industrial, creative and knowledge-based economies with all the necessary elements for a sustainable economic prosperity. Drawing from various studies, research and reports, this paper focuses on reforms implemented by those governments, especially in regards to education and with the establishment of hubs combining research centres and international universities and other educational institutions. I also look at social and political reforms, especially in regards to women, and whether they are influencing people’s mentalities and bringing a cultural and societal shift. Ultimately, the paper assesses whether by shortcutting the traditional pattern of development and moving directly from a pre- to a post-industrial state, all these policies and reforms will achieve a sustainable and viable economy as well as less dependent on foreign labour.

### **The Role of the Artist in Toronto’s Creative Economy**

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**Keywords:** Artists, Commercial, Policy, Creative, Economy

#### **Abstract**

In recent years, the concept of the creative economy has garnered more attention in provincial, federal, and international policy circles. The creative economy envisions creativity as an input into the city’s economic engine. This philosophy attests to the importance of ‘creativity’ to generate ideas that generate profits and promote economic growth. Thus, the efforts to build a creative community have increasingly had an impact on the city, the province and the country. This raises the question, what is the role of the artist in Toronto’s creative economy? My findings have led me to conclude that in order for visual artists to capitalize on the creative economy philosophy, they need to become wittingly or unwittingly “commercial agents” with more effective business skills than ever before. In addition, those artists who handle the C.O.M.M.E.R.C.I.A.L. model well will be able to capitalize on creative economy discourses, while those still idealizing the romantic notion of the arts will not.

### **Examining the Occupational Typography of Canada’s Labour Force at Various Geographies**

Taylor Brydges

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**Keywords:** occupational typography, Canadian labour force, demographic characteristics

### **Abstract**

In recent years, the Canadian labour force has undergone significant changes. Indeed, the transition to a post-Fordist economy has reworked or eliminated many established job definitions. To nuance our understanding of these trends, this presentation utilizes an analytical framework based on Florida's (2002) occupational typography of the creative class, service class and working class to describe the Canadian labour force. In particular, this presentation will contextualize how the Canadian labour force breaks down into the three classes nationally, provincially and by Census Metropolitan Area (CMA). Drawing on descriptive data from the 2006 Canadian Census, this presentation seeks to offer a deeper understanding of the locational dynamics of the occupational classes, with a focus on demographic indicators that demonstrate both commonalities and areas of distinction among the classes across geography. In addition to surveying labour force participation rates and the educational attainment of the classes, an interpretation of standard demographic characteristics is also provided, allowing for the comparison of CMAs and provinces to the Canadian labour force average. Finally, this analysis provides the foundation for future research with the release of updated census data, allowing for meaningful comparisons over time.

### **Paper Session 5-1, Saturday, October 22, 2011, 2:15-3:55 pm, OA 2018**

Chair: Stephen Swales, Ryerson University

### **Cartography, Data Assimilation and Evaluation**

Papers:

#### **Sport Fishing on the Nipigon River: Uncovering History through Cognitive Cartographies**

Ashley Young

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**Keywords:** historical cartography, discourse analysis, sport fishing, CNR trade literature, Nipigon

### **Abstract**

Famous for its speckled trout, the Nipigon River, located north of Lake Superior, was a popular destination for gentlemen anglers who were also known as the "Victorian fly fishers" of the late 19<sup>th</sup> century. With the construction of the transcontinental railway, sporting retreats intensified and outfitting stations experienced an overflow of British, Canadian, and American visitors. Rail companies were fierce promoters of Canadian tourism and they produced a series of hunting and fishing brochures which featured trout fishing on the Nipigon River. By implementing cognitive cartographics, a method proposed by Denis Wood and John Fels, I have deconstructed and demythologized a travel map issued by the

Canadian National Railway in 1929. Through a structured discourse analysis I have explored the social implications of the *Map of Arrowhead Country* (1929) and interpreted the knowledge and image it has constructed of the Nipigon region. Comparing these understandings with the existing historiography, I offer a critical history and geography of the Nipigon as it has yet to be revealed – through maps.

### **Evidence for the Atmospheric Coupling Processes Derived from a Data Assimilation System**

Xiaoyong Xu<sup>1\*</sup>, Jonathan Li<sup>1</sup>, and A. H. Manson<sup>2</sup>

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**Keywords:** Data assimilation, mean winds, tides, atmospheric coupling processes

#### **Abstract**

In the Canadian Middle Atmosphere Model Data Assimilation System (CMAM-DAS), standard meteorological observations are assimilated only in the troposphere and stratosphere with no increments applied in the mesosphere. The mesospheric response is thus entirely due to internal model dynamics. This study analyzes the mesospheric winds and tidal structures from the CMAM-DAS. The model results are verified using radar and satellite measurements. This work demonstrates that the CMAM when constrained by tropospheric and stratospheric observations can provide a realistic description of mesospheric winds and tidal variability, thus providing evidence for the coupling of the mesosphere with the lower atmosphere.

### **An Assessment of Ecosystem Vulnerability Caused by Land Use Change: A Case Study in the Pearl River Delta Region, China**

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**Keywords:** Ecosystem vulnerability, land use change, adaptive capacity, Pearl River Delta Region

#### **Abstract**

Land use change has affected almost every aspect of the earth and has been causing many environmental and ecosystem problems. Studying ecosystem vulnerability of land use change could help maintain the sustainable use of land resources and function of ecosystems. This study investigated ecosystem vulnerability in a coupled human-environment system by modeling and assessing the potential impact of land use change on ecosystem and socio-economic adaptive capacity. A model was applied to the Pearl River Delta Region of Southeast China, to assess future impacts on ecosystems and their adaptive capacity, as well as ecosystem vulnerability on both quantitative and spatial scales. The follow methodology was used: (1) Simulation and forecast of regional land use change: improved CLUE-S modeling was used to forecast future

land use scenarios in the study area. A spatial correlation factor was added to the spatial allocation module of CLUE-S, by which the spatial correlation effect was considered and the fit was improved. Two land use changes were modeled and analyzed, a planning-oriented land use change scenario and a scenario based on current land use change rates; (2) Impact of land use change on ecosystem vulnerability: based on land use modeling and eco-service function calculations, the relative change method and fuzzy assessing method were used to investigate potential impact and adaptive capacity on ecosystem vulnerability, respectively. The HSV visualization method was then used to determine ecosystem vulnerability caused by land use change in the study region from 1985 to 2020, on both spatial and quantitative scales.

### **Paper Session 5-2, Saturday, October 22, 2011, 2: 15 pm-3:55 pm, OA 2015**

Chair: Dr. Joseph Leydon, University of Toronto

#### **Geography of Development and Education**

Papers:

##### **The Teaching of Geography in Ontario Secondary Schools: Current Challenges and Potential Solutions**

Stephanie Warr<sup>1\*</sup> and Joseph Leydon<sup>1\*</sup>

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**Keywords:** geography, teaching, secondary schools, Ontario

##### **Abstract**

The effective teaching of geography in Ontario secondary schools has significant implications for the development of strong geographic skills in the student population. Geographic education prepares young adults with vital skills necessary to live in an increasingly interconnected and globalized world. A lack of geographic education isolates us from the world and impedes our capacity to make well-informed decisions. Student success and interest in geography in secondary school influences the likelihood of continued study of the subject in post-secondary education. Based on a review of geography course textbooks and course offerings in the Halton and Peel District School Boards, classroom observations, and teacher interviews, this paper identifies some of the key challenges that impede the effective teaching of geography in Ontario secondary schools. The authors offer recommendations to mitigate these challenges that focus on improved training for teachers through partnership with organizations such as the Canadian Association of Geographers, greater collaboration with university geography departments, and more effective use of technology to facilitate the gathering and sharing of resources pertaining to the teaching of geography.

##### **Transnational Migrants' Remittances as Potential Development Finance**

Mohammad Moniruzzaman, PhD Candidate

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**Keywords:** migrant, remittances, development finance, unrequited transfer, economic crisis.

## **Abstract**

Migrant remittances are the most direct and measurable benefit of international migration and are a key feature of migrants' transnational living. In recent years there has been a renaissance in the interest in remittances as a potential source of development finance in many developing countries. Globally these "unrequited transfers" are the second largest source of external finance, twice the size of Official Development Assistance (ODA) and almost as large as Foreign Direct Investment (FDI). In many developing countries remittances are the single largest source of development finance, and in some cases are equivalent to almost fifty percent of Gross Domestic Product (GDP). The volume and stability of remittances have transformed these flows into some of the most beneficial private transactions in the global economy. Evidence shows that remittances are predominantly altruistic transfers, providing less volatile and more resilient sources of external financing to developing countries. Moreover, remittances are not merely economic transactions. These private transfers provide social insurance and safety nets which reduce households' vulnerability to external shocks. Analyzing the case of Bangladesh, one of a major remittance receiving countries of the world, this paper argues that remittances insulate and shield the receiving countries from the excesses of the global financial crisis and offer an example of migrants' transnational engagement with development.

## **The Feminization of Migrant Caregiving Labour in Canada: A Comparative Analysis of the Barriers and Vulnerabilities Faced by Filipina Nurses and Live-In Caregivers**

Lualhati Marcelino

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**Keywords:** gendered migration, temporary foreign migrant labour, systemic barriers, live-in caregiver program (LCP), care regime

## **Abstract**

International migration from the global south to "receiving" countries is rising. The migration of women in caregiving sectors, especially is growing. In Canada, there are two prevalent types of migrant women in the care regime: professional nurses and temporary nannies. Nurses and nannies are entrenched in the feminization of migrant labour and occupy 'traditional female roles' as caregivers in the care regime. The cracks in which many migrant nurses and nannies in Canada fall through partly exist because there are few safeguards for exploitation. This research comparatively analyzes the experiences faced by migrant caregivers from the Philippines. I employ a qualitative measure of analysis of secondary data research, including academic journals, non-governmental and governmental organizational data sets, such as United Nations Research Institute for Social Development (UNRISD) and Citizenship and Immigration Canada (CIC). Overall, this study is a critical analysis of two types of female caregiving migrant labour in Canada: professional nurses and temporary nannies; highlighting the distinct working and living experiences they face in separate labour, as well as the systemic barriers they share together as migrant women.

## **A ‘Quality of Life’ Offence: Official Discourses of Graffiti Management at the Municipal Level**

Caroline Larocque<sup>1\*</sup>

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**Keywords:** graffiti, graffiti management, urban renewal, quality of life, Canada

### **Abstract**

The purpose of the intended research is to explore how ‘quality-of-life’ (QOL) offences are managed at the municipal level given ongoing shifts toward more neoliberal forms of governance in Canadian cities. The research aims to unpack how responses to graffiti have changed in the past twenty years and conversely how graffiti management policies and initiatives are legitimated. Second, it seeks to unpack the creation of victims or perpetrators in the official discourses of QOL offence management using graffiti management as one example. For instance, who, in official documents, are said to be the likely perpetrators of graffiti and who are the victims of this offence? Furthermore, it seeks to explore how discourses of urban renewal inform the management of that which affects the ‘quality of life’ within cities. The research described above represents an intended course of study to take place in the upcoming year at the Masters level. It seeks to speak with persons who are working in an official capacity to manage, influence, shape, or mandate graffiti management in Ottawa, Ontario, Canada. As the research is ongoing, this paper represents a reflection upon what has been produced thus far as well as a musing upon the difficulties faced in justifying doing research *on graffiti*.

## **Who Stopped the ‘Gravy Train’? A Geopolitical Analysis of Voting Patterns in the 2010 Toronto Mayoral Election**

Joseph Leydon<sup>1\*</sup>, Andrew Misiak<sup>1\*</sup>, Stefani Blazevic<sup>1\*</sup>, and Joel Lauper<sup>1\*</sup>

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**Keywords:** Geopolitical analysis, mayoral election, voting patterns

### **Abstract**

The 2010 Toronto Mayoral election presented voters with a clear choice between two candidates offering very different visions for the city. The victorious candidate ran a populous campaign focused on respect for voters through reversal of some of the taxes imposed during the previous administration and a promise to end the ‘gravy train’ by cleaning up city finances. This study provides an analysis of the voting patterns in the election linking candidate support to the socio-economic characteristics of voters. Using ArcGIS, we join voting data at the level of polling subdivision for eight city wards and compare the resulting maps to those illustrating socio-economic data extracted from the Census of Canada at the Dissemination Area level. We argue that family income, education levels, period of immigration to Canada and residential characteristics all influenced voting patterns. Much of the existing geopolitical literature focuses on federal and provincial rather than municipal elections and offers analysis on voting at the

constituency level. Our case study suggests that mayoral elections in large urban centres provide an opportunity to gain important perspectives on voting patterns and argues that analysis at the polling subdivision yield the most valuable insights.

### **Paper Session 5-3, Saturday, October 22, 2011, 2:15-3:55 pm, OA 2014**

Chair: Dr. Dana Helene Wilson, University of Toronto

#### **Geography of Health and Lifestyles**

Papers:

##### **Exploring Gendered Relationships Between Aboriginal Rights, Urbanization and Health Among Aboriginal Women and Men in Toronto**

Laura Senese<sup>1\*</sup> and Kathi Wilson<sup>1</sup>

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**Keywords:** Aboriginal, health, rights, urbanization, gender

#### **Abstract**

Aboriginal urbanization in Canada has increased dramatically over the last half century. Aboriginal rights may be an important factor in shaping Aboriginal women and men's experiences of urbanization, as they are largely restricted to those living on reserves and have differed considerably by gender, owing to patriarchal colonial legislation in Canada. Through their impacts on social determinants of health, these differences in spatial access to Aboriginal rights may have implications for the health of Aboriginal peoples living in urban areas, which may vary by gender. However, Aboriginal health research has tended to focus on reserve-based populations and very little research has explored Aboriginal rights in the context of Aboriginal urbanization, or considered potential gendered implications for health. Using a social determinants of Aboriginal health framework, this research explores relationships between Aboriginal urbanization and Aboriginal rights, focusing on how they may differentially impact the health of Aboriginal women and men, through in-depth interviews with 36 Aboriginal women and men living in Toronto. Interviews were transcribed verbatim and analysed using a grounded theory approach. Participants conceived of Aboriginal rights largely as the rights to specific services/benefits, to self-determination and to respect for Aboriginal cultures/identities. There was a widespread perception among participants that these rights are not respected in Canada, which is heightened when living in an urban area. This lack of respect for Aboriginal rights was perceived to negatively impact health and it was suggested that these health implications may be negotiated differently by Aboriginal women and men in Toronto.

#### **Making the Case for Integrating Crime Prevention and Health Promotion: Insights from a Neighbourhood Study in the Region of Peel**

Dana Wilson<sup>1\*</sup>

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**Keywords:** crime, health, neighbourhood well-being, social inequalities.

### **Abstract**

Although there is a great deal of evidence to suggest that both poor health outcomes and criminal activities have roots in socio-spatially defined inequalities, few studies have connected community health and wellbeing with crime and violence. This talk describes an ongoing multi-stakeholder study in the Region of Peel that focuses on the intersections between local socio-economic conditions, violent and gun-related offences, and health and wellbeing at the community level. Findings from a geographical analysis of gun-related offenders will be revealed in addition to those from a pilot environmental survey that examines how community features contribute to both crime- and health- related phenomena in three localized neighbourhoods in Caledon, Brampton and Mississauga. The talk will conclude with a discussion of how research findings could be implemented to foster thriving communities through an integrated approach that recognizes vulnerable people in vulnerable neighbourhoods and considers crime prevention, health promotion, and social development initiatives concurrently.

### **Understanding the Impacts of Climate Change on a First Nation Community in the Western James Bay Region through the Use of Traditional Ecological Knowledge**

Benita Y. Tam<sup>1\*</sup>, William A. Gough<sup>1</sup>, Vicky Edwards<sup>2</sup>, and Leonard J.S. Tsuji<sup>3</sup>

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**Keywords:** First Nations peoples, climate change, traditional environmental knowledge, subarctic, traditional lifestyle

### **Abstract**

The impacts of climate change on the lifestyle and well-being of Fort Albany First Nation is examined through the use of traditional environmental knowledge (TEK). Community members indicated that there have been significant changes in timing of seasons, snow type and total snowfall, with an increase in extreme weather events. These changes have impacted animal behaviour, traditional harvesting activities and community infrastructure, which has led to socio-economic and well-being issues. The community has exhibited strength in adapting to the ongoing changes in the environment; however, their ability to adapt to climate change in the future is not certain.

### **Financing Health Care at the Local Level in Ghana**

Bisung Elijah

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**Keywords:** Health Care, Financing, Equity, Local Level, Ghana

### **Abstract**

There has been great interest in health care financing in Africa largely due to the critical role of health in the socio-economic development of developing countries and the numerous challenges confronting health care delivery and health care financing in Africa. However, the emergence of National Health Insurance in Ghana and the subsequent establishment of District Mutual Health Insurance Schemes has changed the structure of health care financing and has prospects for evolving into a sustainably system for funding health care. This paper presents the structure and features of health care delivery and financing at the local level in Ghana with a focus on examining the effects of the current system on access to and utilization of health facilities. Findings demonstrate that equity underpins the foundation of health financing in many countries suggesting the need for discourse towards a more ‘pro-poor’ and equitable National Insurance Scheme.

### **Food Allergic Consumers’ Purchasing Behaviour and Labeling Preferences: A Canadian Study**

B.YL. Chow<sup>1\*</sup>, S. J. Elliott<sup>2</sup>, A. Clarke<sup>3</sup>, M. Ben-Shoshan<sup>3</sup>, D.W. Harrington<sup>4</sup>, S. B. Godefroy<sup>5</sup>, J. Fragapane<sup>3</sup>, L. Soller<sup>3</sup>

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**Keywords:** Allergen Labeling; Food Allergy; Mixed Methods; Purchasing Behavior; Consumer Preferences

### **Abstract**

The Canadian prevalence of food allergies is estimated to be 7.5%. The only management strategy for allergic individuals is to follow a strict avoidance diet, which is dependent on food allergen labels on commercial food products. This study explores Canadian consumers’ purchasing behaviors related to allergen avoidance and perceptions of allergen labels using a mixed methods approach. The quantitative portion of this study draws upon a national Canadian survey that asked respondents to self-report purchasing behavior and consumers’ perceptions of Canadian allergen labels (n=1380). The qualitative portion (n = 12) interviewed families with anaphylactic allergies to peanut, tree nut and sesame seeds. Interviews conducted in the store setting during a regular shopping trip covered topics related to grocery shopping, use of and perceptions of allergen labels. Over 50% of Canadian households were found to be affected by food allergies, either directly or indirectly. 20% of affected families reported continuously purchasing products labeled with precautionary statements for an allergy-controlled environment. Qualitative results suggest that prior experience is the primary determinant of purchasing decisions. Allergen labels were found to be helpful but insufficient decision making

tools, due to text and contrast issues, as well as location of information. It was found that allergen labels in Canada are not as effective as expected, since consumers reported purchasing products labeled with precautionary statements. Unclear and insufficient labels resulted in uncertainty and confusion. Further policy refinements are needed to maximize communication.

## **Poster Presentations: OA 2017, 8:45 am-12:30 pm**

### **Rock Glacier Mapping in the Semi-Arid Chilean Andes**

Guillermo Azócar<sup>1 2\*</sup>, Alexander Brenning<sup>1</sup> and Xavier Bodin<sup>3 4</sup>

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**Keywords:** Andes, rock glacier, inventory, water equivalent.

### **Abstract**

The dry Andes are among the areas with the most abundant distribution of rock glaciers worldwide. However, this landform, which is considered the geomorphological expression of creeping ice-rich mountain permafrost, has not been widely studied in Chile. A rock glacier inventory has recently been compiled on behalf of the Chilean Dirección General de Aguas to map the distribution of rock glaciers in the Elqui, Limarí and Choapa watersheds in the semi-arid Andes of central Chile. The inventory was created using traditional methods of photointerpretation of rock glaciers described in the geomorphologic literature. Moreover, aspects related to geometric and geomorphologic context and anthropogenic impacts were identified from aerial photographs and digital elevation models. The results were summarized in a database containing 31 variables related to rock glacier features. 867 units were recognized covering 36.8 km<sup>2</sup> and storing a water equivalent on the order of 0.46 to 0.70 km<sup>3</sup>. Active rock glaciers represent 67% of the population of rock glaciers in the area; the remaining are inactive rock glaciers or could not be classified based on the available imagery. Between 29° and 32°S, the lower limit of rock glacier activity drops latitudinally from 4200 to 3400 m a.s.l. Overall, around 40% of active and 69% inactive rock glaciers are located at elevations with positive levels of regional-scale Mean Annual Air Temperature, suggesting that these rock glaciers may be subject to permafrost degradation. Finally, in the area of study 14 rock glaciers have been impacted by different types of human activities, in most cases mining.

### **Neighborhood Contexts for Safety and Social Well-Being in the Region of Peel**

F. Besik, G. Lee, and D. Wilson

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**Keywords:** Community, health, neighbourhood environmental survey, safety, youth, crime

## Abstract

Although there are a number of health surveys that address the wellbeing of residents and crime surveys that address the safety of residents, few studies have connected community safety and wellbeing within a crime context. From a population health perspective, the notion of “health and well-being” goes beyond traditional ideas of sickness and mortality, and instead, incorporates the diverse interactions between individuals and their broader environment, including crime and safety. Neighbourhood incivilities, defined as both social and physical features of the environment that produce feelings of negativity or anxiety within residents, are one local phenomena that can serve as a hindrance to overall community health and perceptions of neighbourhood safety. This paper presents preliminary results on the presence and nature of neighbourhood incivilities observed in three unique neighbourhood contexts from a field-based observational survey designed around community health and well-being conducted within the Region of Peel. The paper will conclude by identifying recommendations for improving the fabric of each neighbourhood as well as discussing the importance of gathering neighbourhood-specific qualitative data in order to most effectively identify practical yet nuanced opportunities to improve existing infrastructure and social services through local policy development.

## Integrating GIS and Statistical Software for Spatial Analysis and Predictions

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**Keywords:** Spatial modeling, geocomputation, GIS, R, landslide susceptibility

## Abstract

Geographical information system (GIS) software provides a wealth of geoprocessing tools, and statistical software offers a comprehensive set of models and techniques needed for spatial analysis and prediction. Both software environments need to be coupled in order to efficiently perform complex spatial analyses that make best use of the tools available in both software environments. The interfaces connecting the open-source statistical data analysis software R to ArcGIS and SAGA GIS are presented in this contribution as examples for recent developments in this direction. Two extensions to R (RPyGeo and RSAGA) have been written for this purpose and are available online for free from the Comprehensive R Archive Network (CRAN). As a high-level programming language, R enables the user to automate complex processing sequences, rendering their application more efficient and reproducible compared to a user operating in separate software environments. As a case study, generalized additive models are applied in a study on landslide susceptibility using the generalized additive model (GAM), a non-linear extension of the linear model. Research areas that particularly benefit from an integration of geoprocessing tools with advanced statistical tools include remote sensing, spatial data mining and habitat studies, among others.

## **Estimating Insured Property Losses from Severe Windstorm Events: A GIS and Meteorological Approach**

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**Keywords:** Insured losses, Loss estimation, GIS, Windstorms, Meteorology

### **Abstract**

Record keeping of atmospheric impacts such as property insured losses is a challenging task, often resulting in unreliable datasets. The main reason is that many atmospheric impacts are not observed until some time after the incurred damage. Thus, the specific date of damage is unknown and only an approximation (e.g., month) of damage can be determined. This makes the estimation of property losses from specific severe atmospheric events difficult. A methodology utilizing Geographic Information System (GIS) and meteorology is developed to resolve this problem. By applying GIS, we utilized the known location of the property insured loss reports, and combining with meteorological analysis of the past atmospheric and meteorological conditions to define the potentially impacted areas that are well defined in both space and time, we were able to attribute the uncertain property insured losses reports back to the specific windstorm event most likely associated with the damage. In cases where multiple windstorm events have occurred over the same areas (i.e. overlapping impacted areas) in a short time span, the insured losses are proportionally weighted to the windstorms, based on the dated insured losses attributed to those events. Our results indicated that the GIS-meteorology method resulted in more realistic results, both in total and regional insured losses. This has significant benefits to studies analyzing wind loads on building structure, windstorm risk, and insurance loss estimation modeling, which will ultimately aid building codes and standards designs, and the adaptation of insurance industry to severe windstorms.

## **Patient Satisfaction and Environments of Cancer Care: Engaging with Gatekeepers in Health Care Research**

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**Keywords:** health care providers, gatekeepers, environments of care, breast cancer, qualitative research

### **Abstract**

While breast cancer survival continues to increase so does the rate of new cases every year. Future diagnoses of the disease are projected to increase in Ontario as the population continues to age. Increasingly important are the design and delivery of treatment and care in the province. Ontario's regional cancer programs provide an organized system of adjuvant treatment and follow-up care in its 13 regional cancer centres. For breast cancer patients in particular, these centres become a part of daily activities, as appointments over five years of cancer care cause patient to repeatedly access these centres at varying frequencies over their treatment periods. This study looks at the role of the physical environment in the patient experience and resultant

satisfaction with accessing care at the Juravinski Cancer Centre (JCC) in Hamilton, Ontario, for a breast cancer diagnosis. Using semi-structured in-depth interviews, 23 patients are asked open-ended questions about travel experience, resources available closer to home, the city environment surrounding the JCC and experiences with the layout of the different clinical areas. Critical to recruitment and data collection in this study, is engagement with gatekeepers and the access to patients that they can provide. Through health care providers referring patients to the study, double-informed consent for participation is made, as physically and emotionally fit people that satisfy the inclusion criteria are identified. This presentation outlines the study's research design with an emphasis on the role of gatekeepers when sampling patients accessing health care.

### **Evaluating the Relevance of Business Improvement Area for Suburban Toronto**

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**Keywords:** Business Improvement Areas (BIAs), Retail Strips, Toronto

### **Abstract**

The goal of Business Improvement Areas or Districts (BIA/Ds) is to foster business and improve the local district through physical and promotional investments. This paper identified four candidate retail strip sites in North York, Toronto, to compare to eight established BIAs with the intent to evaluate the relevance and need for BIAs in North York. The candidate sites and established BIAs were evaluated using retail strip data between 2001 and 2010, with focus on composition, ethnicity and format of retail and vacancy rates, census tract data between 2001 and 2006 for local areas of the candidate sites and established BIAs, with focus on assessment variables such as population, dwellings, unemployment rate, education and income and field work of the candidate sites and established BIAs. The results of the analysis show that the candidate sites of Avenue-Lawrence and Yonge-Sheppard do not require a BIA association since the retail strips are performing well and the local areas are fairly wealthy. On the other hand, the Bathurst-Lawrence and Yonge-Finch-Steeles candidate sites seem like they have the potential to benefit from a BIA association, but with many considerations in mind.

### **Tephrochronology of the main Holocene tephra markers from Kamchatka Peninsula,**

#### **Russian Federation**

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**Keywords:** tephra, radiocarbon dating, macrofossils, Kamchatka Peninsula

## Abstract

The Kamchatka Peninsula in the Russian Far East is part of the Pacific Ring of Fire and is one of the most active volcanic regions in the world. Late Pleistocene-Holocene volcanism in Kamchatka results from the subduction of the Pacific Plate under the peninsula and forms three volcanic belts arranged in an echelon manner from southeast to northwest. One of the most important phenomena generated by Holocene volcanism in Kamchatka is the deposition of large quantities of volcanic ash (tephra) in the form of pyroclastic density current deposits and air-borne fine pumice. These deposits have a significant role in modifying the local environments – they obliterate ecosystems over vast areas, but also supply nutrients to the soils. They are also an important tool in paleoenvironmental research as they provide a great age control for past climate change, human evolution, and landscape change events. We present here new results on the tephrochronology of the main tephra markers in eastern Kamchatka, representative for some of the largest eruptions that occurred during the last 11,000 years in the region. These are Ksudach 1, Shiveluch DV, Shiveluch 6850, and Plosky (PL).

## Assessing Anthracene and Arsenic Contamination in Buffalo River Sediments

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**Keywords:** sediment contamination, anthracene, arsenic, ordinary kriging, Buffalo River

## Abstract

This study analyzed anthracene and arsenic contamination concentrations at various depths in the Buffalo River. Anthracene is known to cause damage to human skin and arsenic has been linked to lung and liver cancer. The Buffalo River is an Area of Concern defined by the Great Lakes Water Quality agreement between Canada and the United States. It has a long history of industrial activity located in its vicinity that has contributed to pollution problems. An ordinary kriging spatial interpolation technique was used to calculate estimates between sample locations for anthracene and arsenic at various depths. The results show that both anthracene and arsenic surface sediment (0-30 cm) is less contaminated than all subsurface depths. There is variability of pollution within the different subsurface levels (30-60 cm, 60-90 cm, 90-120 cm, 120-150 cm) and along the river course, but major clusters are identified throughout all depths for both anthracene and arsenic.

## Regional Analysis of the Impacts of Climate Change on Subsistence Fishing in Western James Bay Region of Northern Ontario, Canada

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**Keywords:** Aboriginal issues, climate change, fish die-offs, food security, traditional environmental knowledge

### **Abstract**

Climate change is of particular importance to people of the western James Bay region of northern Ontario because of the potential impacts on subsistence activities. The subsistence lifestyle is the cornerstone of the regional mixed economy, and important to the health of First Nations. Our study used traditional environmental knowledge (TEK) to investigate whether there was a temporal relationship between extreme climatic events in the summer of 2005, and fish die-offs in the Albany River, northern Ontario. This study also relies on climate models to examine a potential shift in subsistence fish species distribution due to climate change. The TEK revealed no sightings and/or harvesting of regionally-novel fish species, nor climatic-related effects on known fish species, other than the 2005 summer fish die-offs. Climate data for the period of the fish die-offs in the Albany River revealed not only a temporal relationship between maximal air temperatures during the heat waves and the fish die-offs, but also a concurrent period of reduced precipitation. The heat waves of July 2005 also forced Cree fish harvesters to change their time of harvest, to prevent spoilage of netted fish. Climate models revealed rising temperatures for all seasons in the western James Bay region; thus, novel fish species may be observed in the future due to climate change and indirectly impact the health of Cree harvesters who subsist on fish. Additional climate change and food security research is required so that subsistence harvesters have more information on which to proactively plan adaptive strategies.

### **Influences of Hurricanes on Southern Ontario's Precipitation Extremes**

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**Keywords:** Tropical cyclones, Precipitation Extremes, Southern Ontario

### **Abstract:**

During the Atlantic tropical cyclone (TC) seasons (June-November) from 1950-2000, extreme rainfall events and their association with the occurrence of TCs are examined in Southern Ontario, Canada. Events of PEs (PEs) are defined as the top 50 precipitation daily events in each of the five selected cities (Windsor, London, Toronto, Trenton and Cornwall). The most amount of rainfall was recorded in Toronto with 121.4mm in one day. The historical record shows TCs can still induce precipitation extreme with extensive rainband coverage, despite failing to landfall in Southern Ontario. On average, one-tenth of PEs in each city coincides with TCs. Statistical testing using the frequency table analysis shows the observed influence of PEs by TCs is significantly higher from the expected outcome. To further test if TC intensity is able to affect the number of PE-TC relationship, TCs are classified as strong or weak based on their maximum wind speed recorded during their lifetime at 178km/hr. The Pearson's chi-squared test indicates the number of PEs affected by strong TCs is significantly higher than by weak TCs. Possible causes of the TC development and intensification are identified as a result from changes of large-

scale climatic pattern. As a result, future warming of climate may expand TC genesis regions and/or extend TC season, favourable to TC intensification. This spatial-temporal expansion of TC development is of obvious concern for population living at coastal regions.

## **Towards a Sustainable Public Transportation System in the Regional Municipality of York: Analysis of the VIVA Rapid Transit (BRT)**

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**Keywords:** Transportation, Land Use, Transit-Oriented Development (TOD), Population, Transit Ridership

### **Abstract**

Regional Municipality of York is one of the fastest growing areas in Canada, and has dominated by the low-density development that is typical in suburban areas where land is plentiful and private car travel is the dominant transportation mode. However, transportation has become a major issue facing regional and municipal governments due to a rapid population expansion in the York Region. In order to accommodate the population expansion, VIVA Bus Rapid Transit (BRT) was developed in 2005 by using a phased strategy. Increasing ridership has become the main priority, which is another step towards a sustainable development in transportation in the York Region. Furthermore, Regional Municipality of York has adopted the transit-oriented development (TOD), in land use planning, in order to accommodate the change towards a sustainable public transportation system. TOD is a mixed-use residential and/or commercial area designed to maximize access to public transportation, and is generally located within a radius of one-quarter to one-half mile (400 to 800 metres). The purpose of this research is to examine the VIVA stations that are included in the Phase II of the construction, dedicated transit lanes, and how it has affected the land use planning (TOD), population, transit ridership, and high/low residential density development in York Region. General results revealed that several VIVA stations have made a transition to transit-oriented development, and also experience an increase in population, transit ridership, and high density apartments in the 400 metre radius near the bus stations.

## **Dieldrin Concentrations in Great Lakes Sediment: Spatial and Temporal Trends**

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**Keywords:** sediment contamination, dieldrin, ordinary kriging, Great Lakes

### **Abstract**

This study examines the spatial distribution of dieldrin, a persistent organic pollutant previously used as an agricultural pesticide, in the sediments of the Great Lakes System. Using Environment Canada Sediment Quality data for both historical and contemporary sampling periods, graduated symbol maps were generated for Lakes Superior, Huron, St. Clair, Erie, and Ontario.

Additionally, ordinary kriging was applied to the Lake Erie and Lake Ontario datasets. The use of ordinary kriging allows for a more in-depth understanding of the spatial trends occurring within the Great Lakes sediments. Cross-validation was performed to ensure that all of the interpolated surfaces were statistically valid. Results indicate low dieldrin levels with no evident point sources in both the historical and contemporary sediments of Lakes Superior, Huron, and St. Clair. This suggests that dieldrin has mainly entered these lakes via atmospheric deposition and some agricultural runoff. Dieldrin concentrations in Lake Erie have increased since the historical sampling period, indicating a shift in the spatial distribution of the contaminant. Historically, levels were higher in the eastern-most depositional basins, but contemporary data show that the western side of the lake exceeds Canadian sediment quality guidelines. The prediction surface generated in this study clearly shows that the Detroit River is a point source of contamination. Alternatively, lakewide dieldrin concentrations in Lake Ontario have decreased between sampling periods. While historically the Niagara River was a point source of contamination, levels in the Niagara Basin have been reduced. In all cases, the highest levels of dieldrin are seen in the depositional basins of the lakes.

### **Modelling Air Pollution Contributions of a Large-Scale Suburban Development, Richmond Hill, Toronto**

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**Keywords:** Suburban Developments, Vehicle Hours Traveled, Vehicle Kilometres Traveled, Richmond Hill, Mortality and Air Pollution.

#### **Abstract:**

Suburban expansion occurs around many city centres. These developments are mainly single land use residential areas and rely on automobiles for travel to work and other amenities. The proximity of these developments to jobs and other amenities requires longer commutes which results in more vehicle hours traveled (VHT) and/or more vehicle kilometres traveled (VKT). This study is focused on the Richmond Hill development in the Greater Toronto Area (GTA) which encompasses an area of 6.2 square kilometres and almost 7000 homes. Research shows that the average household has two or more vehicles, which is much higher than households located within the city centre. This study investigates whether increased emissions due to automotive dependency results in negative health effects and increased mortality in suburban developments.

### **The Detection of Weekday-Weekend Effect of Extreme Ground-Level Ozone (O<sub>3</sub>) Events in Toronto Downtown Area, Canada**

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**Keywords:** Ground-level Ozone, Weekday-weekend Effect, Extreme, Air Quality, Toronto

### **Abstract**

Ground-level ozone (O<sub>3</sub>) is perhaps the most familiar pollutant because it is associated with summer haze and smog alerts. The 2000 to 2008 weekday-weekend variations of ozone concentration in the Toronto Downtown area of Canada were examined. The goal of this work is to determine whether the weekday-weekend effect of extreme ozone events could be detectable during the nine-year study period. The results from this research show that during the study period, there were a total of 85 days (about 2.59% out of the whole study period) listed as the days having an extreme ground-level ozone event with the O<sub>3</sub> concentration  $\geq 80$  ppb, which is the current Ontario Ambient Air Quality criterion for extreme ozone concentration, in the Toronto Downtown site. A Days-of-the-Week ratio of 0.46 is generated with the 26 weekend days and 59 weekdays having the extreme ground-level ozone events. This ratio is higher than the ideal ratio of 2:5 or 0.4 (two weekend days and five weekdays in a typical seven-day week). In addition, the hourly O<sub>3</sub> concentration curves generated in this research show that the hourly average weekend O<sub>3</sub> concentrations were higher than the hourly average weekday O<sub>3</sub> concentrations, especially during the hours between 6:00hr to 9:30hr (24-hrs). As a result, the weekday-weekend effect of extreme ground-level ozone events was detectable in the Toronto Downtown area of Canada during the period from 2000 to 2008.

### **Weather-Related Crash Risks in Prince George, British Columbia**

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**Keywords:** Road-weather hazards, motor vehicle collisions, precipitation, transportation

### **Abstract**

Canadians rely heavily on motorized transportation and the increase in vehicle use over the last half century has increased society's exposure to vehicle collisions. Exacerbating the issue of transportation related risk is inclement weather. Weather reduces pavement friction, impairs driver visibility and makes vehicle handling more difficult, which creates hazardous conditions for motorists and increases the risk of vehicle collisions. Studies show that the rates of road collisions are higher during precipitation events, though the degree of increase varies from study to study due to variations in weather and driving conditions as well as differences in methods. The goal of this current study is to gain an understanding of the links between weather and travel risk in Prince George, British Columbia and to compare the relative risk of collision and injury during precipitation relative to 'normal' conditions. This study also seeks to explore any differences in collision characteristics between events and controls. These results are based on an adapted matched-pair analysis technique, using the day level as the unit of analysis over a four-year period (2003-2007). Preliminary results indicate a modest increase in vehicle collisions during weather conditions with precipitation  $>0.4$ mm. This research demonstrates the value of the adapted matched-pair analysis in computing the relative risk of collisions and injury during precipitation relative to 'normal' conditions.

## **Impacts of Fertilization on Soil Greenhouse Gas Dynamics in a Nitrogen-Polluted Mixed Deciduous Ontario Forest**

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**Keywords:** Ontario forest, greenhouse gas, nitrogen, phosphorous, fertilization

### **Abstract**

Forest soils are important global sinks for atmospheric methane (CH<sub>4</sub>) and sources of nitrous oxide (N<sub>2</sub>O) and carbon dioxide (CO<sub>2</sub>) making them crucial for global climate. In central and eastern North American forests, atmospheric nitrogen (N) deposition from industrial and agricultural activities has increased N inputs, leading to phosphorous (P) limitation. This study aimed to characterize the impacts of N and P additions on soil greenhouse gas dynamics in an allegedly N-polluted and P-limited temperate mixed forest. Sixteen fertilization plots were established and given one of four treatments: control, N, P, or N+P. Greenhouse gas fluxes characterized June, July, and August through use of static flux chambers and measurement of CH<sub>4</sub>, N<sub>2</sub>O, and CO<sub>2</sub> concentrations with a gas chromatograph. All treatment and control plots consumed CH<sub>4</sub> however there were no clear differences between treatments and uptake remained relatively constant over the summer. Although we initially hypothesized that N<sub>2</sub>O emissions would be largest in N fertilized plots and smallest in P fertilized plots, emissions were highly variable both over time and between measurement plots and displayed no distinct patterns in terms of treatment effect. There were also no clear treatment effects on CO<sub>2</sub> fluxes, however over the summer the amount of CO<sub>2</sub> released to the atmosphere increased in all treatments. Although this study was based on a limited number of sampling times, it was unexpected that large N and P additions did not disrupt soil level greenhouse gas fluxes. Dominant vegetation has been shown to no longer be N-limited however N-saturation has likely not yet occurred where excess mineral N would have slowed CH<sub>4</sub> uptake and increased N<sub>2</sub>O efflux. More work is needed to characterize soil nutrient pools and explore other non-N<sub>2</sub>O denitrification products.

## **Quantifying and Tailoring Logs in Biopolymer Gels**

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**Keywords:** Biopolymer, Water Resource Management, Pollution, Remediation

### **Abstract**

Biomaterials derived from plant and animal sources represent a possible solution to diminishing oil supplies and overflowing landfill sites, especially when they can be made from low-value waste products of other industrial processes. Due to strong and numerous inter- and intra-

molecular bonds, these materials are difficult to process using conventional thermal methods. Instead, applications are limited to those that can be accomplished using solution-based techniques such as casting into thin films or forming soft gels through physical or chemical crosslinking. Once dry, such gels have mechanical properties very similar to common thermoplastics, but extremely large changes that accompany drying make prediction of final shape difficult. We have developed a simple method for mapping the distribution of moisture in these samples as a function of both time and space, allowing for comparison with existing theoretical modes of moisture transport and molecular mobility in polymer systems. Additionally, the information contained in these “moisture maps” can be used to illustrate the influence of gravity and the free surface of the sample on the time-dependent moisture content of the sample. The eventual aim of this work is the development of processing methodologies that *utilize* shrinkage and moisture loss, rather than attempting to *minimize* these changes through chemical stabilization.

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\*Poster Presenter