



# RESEARCH DAY

THURSDAY APRIL 4, 2019



8:00 AM TO 4:00 PM  
NEW NORTH BUILDING  
U OF T MISSISSAUGA



Institute for Management & Innovation  
**UNIVERSITY OF TORONTO**  
MISSISSAUGA



Thursday April 4, 2019

# EVENT PROGRAM



- 8:00 AM Arrival and Registration
- 8:45 AM Welcome
- 9:00 AM Professor Heather Maclean
- 10:00 AM Three Minute Research Paper Presentations by MScSM Students
- 10:40 AM Coffee Break and Poster Viewing by MScSM Students
- 11:10 AM Professor Daniel Scott
- 12:10 PM Three Minute Research Paper Presentations by MScSM Students
- 12:50 PM Lunch and Poster Presentations by MScSM Students
- 2:00 PM Professor Laura Derksen
- 3:00 PM Three Minute Research Paper Presentations by MScSM Students
- 4:00 PM End of Program



Keynote Speaker:

# LAURA DERKSEN

Laura Derksen is an Assistant Professor of Health Economics with the Department of Management at the University of Toronto-Mississauga. She is an applied microeconomist with research interests in health and development. Laura's research investigates the link between the diffusion of information, social interactions, and health seeking behavior. She tests theoretical models of behaviour by conducting randomized field experiments, and analyzing both qualitative and quantitative data from administrative health records and individual interviews.

**Title of Presentation:** Who Knows? How Access to Information Affects the Shape of a Social Network

**Abstract:** Social networks are often useful for policy. If you want to spread information, change attitudes, or encourage the adoption of new technology, it often helps to target influential people first. However, the social network itself might change in response to a policy intervention. I will examine whether information access plays an important causal role in network structure. I and my coauthor (Pedro Souza, University of Warwick) conducted a randomized experiment in boarding schools in Malawi. We provided access to Wikipedia to a sparse subset of students. We measured complete social networks at baseline and endline, including many types of social links. The intervention has a large and lasting effect on the social network. Treated nodes become significantly more central in the network. This changes the structure of the network as a whole, the network of information links, and the network of personal friendships. By providing information to some nodes in the network, we change the very structure of the social network. This endogenous response of networks is important for several reasons. First, attempts to measure spillovers based on baseline networks may be inadequate. There are also potential implications for information diffusion, learning, and technology adoption. Theory suggests that to maximize diffusion it is important to target the most influential nodes. This is often costly, and may be less important if the network adapts around those who are targeted.





Keynote Speaker:

# DANIEL SCOTT

Dr. Daniel Scott is a University Research Chair and Executive Director of the Interdisciplinary Centre on Climate Change at the University of Waterloo.

He has worked extensively in the areas of climate change and the global tourism sector, including leading international collaborations with the United Nations World Tourism Organization, United Nations Environment Programme, the World Meteorological Organization, and the World Travel and Tourism Council. He has been a contributing author and expert reviewer for the Intergovernmental Panel on Climate Change Third, Fourth, and Fifth Assessment Reports, as well as the recent special report on 1.5°C.

His work has been featured in many leading media outlets, including The Economist, New York Times, Washington Post, Wall Street Journal, BBC international, Climate Central, Breitbart, Sports Illustrated, Time, Huffington Post, Scientific American, National Geographic, CBC, Al Jazeera.

**Title of Presentation:** The Future of Global Tourism in a Climate Disrupted World

**Abstract:** Tourism has grown tremendously over the past 50 years to become a leading global economic sector representing nearly 10% of GDP and jobs worldwide. The impacts of accelerating climate change and climate policy to decarbonize the global economy will have far-reaching impacts on the competitiveness of tourism destinations and international travel patterns in the decades ahead. The Davos Declaration on Tourism and Climate Change recognizes that climate change must be considered one of the greatest challenges to the sustainability of tourism in the 21st century. This presentation will discuss the evidence for this conclusion and the implications for tourism sector contributions to the UN Sustainable Development Goals.



Keynote Speaker:

# HEATHER MACLEAN

Heather L. MacLean is a Professor in the Department of Civil Engineering at the University of Toronto. A particular focus of her research has been the systems level evaluation of current and emerging energy systems, transportation technologies and infrastructure systems, with attention to climate change and other environmental impacts. Recently, she has published on incorporating explicit variability and uncertainty analysis into life cycle assessment. Within her research she has worked with many industries as well as governments. Results of her work have been incorporated into emerging technology designs, company operations, and regulations. Heather is a Fellow of the Canadian Academy of Engineering and Engineering Institute of Canada (EIC) as well as the 2017 recipient of the Dr. Albert E. Berry Medal from the Canadian Society for Civil Engineering, and later this month she will be awarded the EIC's Julian C. Smith Medal for "Achievement in the Development of Canada".

**Title of Presentation:** Life Cycle Approaches: Informing Decisions Toward More Sustainable Cities

**Abstract:** While sustainability is a commonly used term, it is not straightforward to determine whether a product/system is sustainable. I will briefly outline tools that can assist in evaluating aspects of sustainability. I will then discuss a set of systems level evaluations of the built environment that I have worked on with my graduate students/postdoctoral fellows including; Moving toward net zero greenhouse gas emissions building through a retrofit of a heritage building - Evergreen Brickworks Kiln Building, meeting GHG reduction targets in the U.S. light-duty vehicle fleet, relationships between building features in 'green' schools and students' academic performance, residential energy use in Dar es Salaam's neighbourhoods, and governance workshops in Dar es Salaam and Lusaka.

## **An Assessment of the Municipal Materials Management Stream Using the Circularity Index: A Case Study of the City of Mississauga and the City of Iqaluit**

*Emily Anderson*

Economic development, population growth, urbanization and increased consumerism all contribute to the growing quantity of waste generated around the world. In parallel, this will only increase the need for improved waste management to reduce the level of waste materials that contaminate landfills and the natural environment. The most effective way to stop waste from polluting the environment is via prevention. The Circular Economy is a management approach that keeps materials in a system, and thus has been recognized as a successful method for reducing the amount of waste that is produced or mismanaged in a community. This study will help to identify the circularity and/or sustainability of activities within a municipality along the materials management stream, with a focus on plastics. Two case studies were conducted in the City of Mississauga, Ontario and in Iqaluit, Nunavut. For each case study, we piloted a preliminary version of the Circularity Index (CI), which can be utilized to identify the circularity and/or sustainability of activities along the materials management stream. Data collection included interviews with various professionals in the city, an evaluation of outdoor sites and retail stores, and an evaluation of the waste management facilities in the city. Finally, with all of the data in hand, a representative score, or index, was created for the community. An analysis of the lifecycle of plastic waste generation of the City of Mississauga and the City of Iqaluit shows that neither community operates under a fully circular waste management model. Going forward, it would be useful to expand the circularity index program by comparing communities that are more similar, so that they might learn from each other.

## **Analysis of the Design Process and Identification of Characteristics Influencing the Reuse Potential of Buildings**

*Aishwarya Babu*

Growing cities are facing environmental risks of waste debris and carbon emissions that is furthered by the construction industry. Optimizing embodied energy is recognized as a crucial means to improve energy management in a building's overall life cycle. Enabling the reuse of structural components through the process of deconstruction is most efficient at reducing embodied energy, and promoting environmental preservation through the higher recovery value of resources in its end-of-life cycle scenario. However, the design process at the pre-construction stage is the primary hindrance for components reuse. Competencies of components reuse require an in-depth knowledge of how the design process—affecting a building's characteristics and the deconstruction procedure—will influence the reuse of structural components. In this paper, the characteristics relating to Design for Reuse (DfR) and Design for Deconstruction (DfD) interventions, and its influence on the viability of components reuse is explored. A literature review is conducted to assess the role of the design process on components reuse. Relevant characteristics are categorized by the following: direct influence on components reuse; influence on ease of the process; and, influence on prolonging the lifespan of a building. The identification of characteristics are employed in the development of a framework for evaluating the reuse potential of a building. This can assist in the optimization of future construction projects.

## **Utilizing Impact Benefit Agreements for Environmental Protection and Well-being Between Industry Development and Indigenous Communities within Canada**

*Heather Book*

The rapid expansion of the natural resource sector, primarily mining, across Canada carries adverse impacts to the surrounding environment, and Indigenous communities in close proximity to these projects. The past two decades have brought the use of Impact Benefit Agreements (IBAs) into common practice in attempt to mitigate these adverse effects and bring mutual benefits to both the project proponent and community. The objective of this research is to assess IBAs to determine whether or not they provide an accountable framework for environmental protection and Indigenous well-being within the natural resource sector. The Meadowbank Gold Mine and the Mary River Mine, both located in Nunavut and on Inuit land, are two case studies that will be used to identify and evaluate the priorities of IBAs. Both IBAs were found to meet their economic objectives, while making strides to be more inclusive of social factors, such as Inuit culture. Based on this assessment, priorities on environmental impacts are still an area where IBAs can improve upon, as well as improvements on overall accountability measures. This paper explores emerging tools and legislation that can be applied to the IBA process that will allow for better alignment of their priorities with local, national, and international commitments to environmental protection and Indigenous well-being, and further ensure accountability to these priorities and objectives made in the agreement.

## **Environmental Sustainability in Sports: A Comparative Analysis of Waste Diversion in North American Professional Sports Venues**

*Tom Chen*

The North American sports industry is projected to grow to over \$73 billion this upcoming year. At the center of sports in North America are the athletes, the fans, and what brings them all together under one roof, the sports venues. With fanbases growing larger every year, the environmental footprint of hosting a professional sporting event grows larger as well. Professional sports venues in North America can hold up to 80,000 fans per game, and each fan generates 1.14 to 1.46 lbs of waste per game. This study looks at which venues throughout the top four professional sports leagues in North America, the MLB, NBA, NFL, and NHL, are performing the best in terms of diverting this waste from landfill through recycling and composting efforts. Waste generation was estimated per-game and per-season. Based on these estimates, venues were ranked by league based on how much waste they diverted from landfills. The best practices of these facilities were identified and addressed so that they can be possibly transitioned into all venues across all four leagues. Barriers and challenges were also identified to analyze what was preventing waste diversion initiatives from starting and/or succeed at venues. The results show that the best practices were: Innovative Partnerships with Waste Management Companies, Compostable and Recyclable Materials at Concessions, Easy-to-Understand Signage and Fan Education, and Internal Leadership, and the barriers identified were: High Costs, Fan Engagement, Constant Changes at the Venue, and Ineffective Management Structure or a Lack of Opportunity. Internal and external collaboration, creativity from venue operations, and identification of cost savings are strategies to remove the barriers and challenges identified and install the best practices identified within these venues.

## **How Municipalities are Supporting Urban Agriculture Development & Identifying the Challenges Being Faced**

*Samantha Dilorio*

Today's food system is facing a number of challenges in the realm of sustainability and social equity. Although producing a mass amount of food, the global food system cannot feed the growing world population, meaning cities are looking for alternative ways to become more self-sustaining and food sovereign. For this reason, cities are taking part of the local food movement and have started supporting activities like urban agriculture. Municipalities have recognized that urban agriculture provides numerous environmental, social, economic and health benefits for communities, although, there may be barriers to development such as restrictive zoning by-laws, policies and regulations. By analyzing municipal policies and conducting interviews with municipal staff it was found that many municipalities are lacking the capacity to fully dedicate to community garden programs and other urban agriculture activities. Although recognizing that improvements and updates for example, to zoning by-laws and policies must be made in order to create more opportunities for urban agriculture. Secondly, obtaining and/or maintaining community support and enthusiasm can be a challenge for municipalities, especially if residents are on long waiting lists for gardening space. Lastly, it is clear that municipalities recognize the importance of urban agriculture and have intentions to continue growing community garden programs and start new urban agriculture activities.

## **A Comparative Analysis of Urban Green Space Planning and Management Across Urban Areas in Ontario**

*Averyl D'Souza*

Over the past century, Southern Ontario has undergone unprecedented expansion. It is estimated that many of these regions, especially the Greater Toronto Area will rapidly grow as it is projected to receive large amountsof immigration. Along with this growth comes the challenges of balancing the concurrent social, economic and environmental needs of society. As a consequence, green space is often sacrificed to accommodate development. This leaves large cities that havelimited available space, struggling to enhance their green spaces. While, small to medium size cities have to be proactive in protecting their green space as to not fall victim to the ramifications of urbanization.

Under provincial legislation, each municipality is required to have and update their "Official Plan" (a document that guides land use planning within the province). Furthermore, over the past couple decades Ontario municipalities have adopted a regional ecological systems approach called natural heritage system planning to bridge the gap between green space conservation and land use planning.

The purpose of this study is to understand which of Ontario's urban municipalities have developed the strongest green space policies within their Official Plan, assessing how each municipality prioritize various aspects of natural heritage system planning in comparison to other urban municipalities within the province. I developed and applied a natural heritage sustainability scorecardframework for assessing these policies. This scorecard framework is intended to assist planners in easily disseminating which of Ontario's most populous or rapidly urbanizing regions are the most progressive in their approach to protecting, maintaining and enhancing their green space by identifying leading municipalities to model natural heritage policies after.



## **The Current State of Economic Life in the Black Population in Toronto, Ontario**

*Irene Duah-Kessie*

Racial economic disparities in Canada is a large contributor to and indicator of sustainable development. Recent urban literature on social sustainability has revolved around environmental injustices, rather than confronting the historic role of racialization in producing racial inequalities that have persisted across life times and generations. To fill this gap in the literature, this paper aims to demonstrate the impact of institutional racism on the ways resource distributions disparities are characterized by race and gender such as employment, income, and education. Using 2016 Census data, we quantify for the first time the proportion of people in Canada's most populous area for the Black population who have enough resources to live a healthy life. The analysis of the data was conducted by researchers at the Wellesley Institute. Weighted frequencies and cross-tabulations by race, sex, and education were used to estimate the percentages of people in three income categories: below the Low-Income Measure After-Tax (LIM-AT), between LIM-AT to thriving income, and above thriving income. An intersectional analysis is applied to understand the ways in which race, gender, and education intersect and how current approaches to poverty measurements influences their intersection in economic outcomes.

## **Road Salt in the Credit River Watershed**

*Martina Filipic*

Road salt has been a cause for concern since its rise to popularity in the 1950's. From surface and groundwater contamination, to its residency time in soils, to its adverse effects on wildlife and vegetation, sodium chloride loading in urbanized areas is something that must be monitored and controlled. Nutrient cycling in Lake Ontario may be disrupted or halted altogether, city infrastructure such as the Gardiner Expressway may continue to crumble, and chloride concentrations may harm wildlife populations if they continue to rise. This study is in part a literature review drawing out the effects and background information regarding sodium chloride and its alternatives, which is then applied in the context of a case study in Mississauga's Credit River watershed. Chloride concentrations in the watershed show slowly rising values between the years of 2005 and 2018, in parallel to the observed rising concentrations in Lake Ontario. This carries future implications as the water quality of the lake may degrade if road salt practices are not altered

## **Social Norms As Nudges To Encourage Commute Mode Shift**

*Christopher Ford*

Single-occupant vehicles (SOVs) maintain a significant share of travel modes in Canada and the United States, however shifting transportation behaviour towards alternatives presents an important issue for sustainability due to the significant environmental and social impacts associated with SOV driving. This study examines the potential application of behavioural economics principles - in particular, the tendency towards social conformity in human decision making - to facilitate behaviour change away from SOV use in the daily commute. A hypothetical experiment is performed to test the effect of a descriptive, injunctive, and mixed norm message on willingness to try driving, taking public transit, and taking active modes (e.g. cycling, walking) to get to work.

## **How Retail Investors React to Socially Responsible Mutual Funds: An Experimental Approach to Estimating Relative Fund Flows**

*David Hageraats*

Socially responsible investments (SRIs) - also known as sustainable, responsible, and impact investments - are defined by the inclusion of non-financial criteria, such as environmental, social, and governance (ESG) factors, when making investment decisions and/or executing shareholder rights. SRIs are growing at an exceptional pace and are becoming increasingly accessible to individual investors through retail products such as mutual funds and exchange-traded funds (ETFs). This research explores how individual investors react to the performance of SRI mutual funds compared to their conventional counterparts. Two groups of American survey participants were recruited using Amazon Mechanical Turk's online platform and screened for investment ownership. Each group received a hypothetical mutual fund scenario, either SRI or conventional. Based on a performance outcome relative to expectations, participants indicated their subsequent investment decision using a qualitative scale with encoded quantitative values. Contrary to some of the previous non-experimental literature, the comparative analysis suggests that retail investors are more sensitive to the performance of SRI mutual funds, particularly when performance meets and exceeds expectations. Mutual fund providers will be interested in understanding this behaviour so they can better retain customers and appropriately market their SRI products. This work also targets a significant gap in the SRI fund literature, as the few studies on the relationship between flow and performance are outdated and yield mixed results. In order to solidify the findings, future experimental research should give investors the opportunity to choose their preferred fund type as opposed to randomly assigning groups.

## **SUSTAIN-ABILITY: How Smart Cities Can Leverage AI for Environmental Sustainability**

*Alfred Jesse Hudecki*

Currently, over half of the world's population resides in urban areas, and by 2050, that number is projected to jump to nearly 70%. This fact - coupled with the most recent forecast by the UN estimating the global population to hover around 9.8 billion people by 2050 - will work out to approximately 7 billion people living in cities and urban areas at that time. As we're already seeing the tremendous impact cities can have on Earth's core processes, these cities must effectively plan for future environmental sustainability - and fast. Smart cities and artificial intelligence (AI) are staple buzzwords in our day and age, however the combination of the two has not been investigated in detail when it comes to the potential impact on environmental sustainability. AI is made up of a host of tools meant to increase the accuracy and speed of prediction, and smart cities are meant to bring cities into the digital era - working to increase efficiency and livability in cities. Effectively leveraging AI as a tool for sustainability within smart cities requires (among other things); access to open data portals, effective pilot studies, a resident-based design method, and a set of KPI's to measure successes. Planners can also look to New York City, Singapore, and Stockholm, and the developing Quayside by Sidewalk Labs to understand use cases in the environmental planning domains of energy, water, and transportation. Capitalizing on this transition will be one of the requirements to ensure the sustainability of these urban environments.

## **Making Sustainability the New Norm: An Analysis of Social Practice Theory**

*Gurdeep Kang*

Current normative behaviours are unsustainable and causing negative social, environmental and economic impacts. Despite growing public awareness about environmental issues, unsustainable behaviours continue to persist due to unchanged norms and social practices. Theories of behaviour have typically focused on the individual as the unit of change, however, the behaviour of individuals develop in social contexts, and therefore to have long-term environmental sustainability, changing individual behaviours is not sufficient. Moving beyond the individual as a unit of change, social practice theory (SPT) broadens the perspective and does not view the individual in isolation, but rather uses a holistic approach. This theory recognizes that change is needed in the physical, organizational, and political infrastructures that make up society. This research examines how change occurs, by understanding how social practices are developed, maintained and modified. Findings from the literature were applied to understand the recent movement towards reducing and eliminating single-use plastics, in particular plastic straws. We investigated whether this represents a shift in social practice and consider what may have caused this change. Preliminary results indicate that environmental awareness and motivations to reduce environmental impacts have strongly given meaning to the shift of the social practice, though the way these have been implemented varies by country. These findings can inform policy decisions by developing policies that target specific elements of the social practice ultimately creating large-scale social change, and promoting sustainability as new norm for behaviour.

## **Perceived Barriers to Sustainability of Scuba Dive Operators in the Galapagos Islands**

*Spencer Karabelas-Pittman*

Tourism industry trends in the Galapagos islands mirror those of many other popular coastal and island destinations making it suitable for case study analysis. Absolute demand for scuba dive tourism has been increasing while consumer desires continue to shift towards aspects of discovery, culture, nature and adventure, while expectations centered heavily around quality, comfort, and sustainability. The Galapagos islands are unique in that the entirety of the archipelago is designated as a UNESCO terrestrial and marine park and managed by the Galapagos National Park Directorate (GNPD), which provides regulations for allowable area of inhabitation, number of licensed businesses, and the expectations of business management towards environmental impact reductions. The Galapagos Islands Scuba Tourism System is made up of overlapping and interconnected stakeholder groups; these are scuba dive tourists and academics, scuba industry operators, the host community, non-governmental organizations, governmental organizations, and the natural environment. Top down sustainability demands from governmental agencies and bottom up sustainability demands from the interconnected scuba dive tourists and academics are uniquely required to be met by scuba industry operators. Through interviews conducted with scuba industry operators on San Cristobal and Santa Cruz islands, this paper will highlight how operators perceive demands from other stakeholders for sustainability alongside their perceived challenges to enhancing sustainability within their own operations. Recommendations are then made to enhance communication and collective action within and between stakeholder groups, alongside institution of measurable sustainability targets and indicators.

## **The Influence of Nudges in Digital Feedback to Reduce Residential Energy Consumption**

*Rabeet Khan*

Although there are energy consumption sectors with far more devastating impacts on the environment, the residential space can be the dark horse in spurring greater energy efficiency. Through an extensive literature review, this research identifies exceptional case studies which utilise enhancements in digital feedback systems to yield energy savings. Using a lens of behavioral economics (BE), public policies, government initiatives, new technologies, and various business models, are examined to identify nudges that are affective in altering residential consumption. Following this analysis, various behavioural insights are acknowledged and best practices are compiled to reveal opportunities and challenges for elevating consumer consciousness towards sustainable energy practices.

## **Is Mindfulness a Tool to Cultivate Sustainable Behaviour?**

*Samir Khonji*

Societal behaviour is an aggregate of individual behaviour. This paper investigates mindfulness as a potential tool to cultivate the psychological and spiritual development needed to enhance individual sustainability. It explores and provides a rationale for the selection of four core aspects of sustainable behaviour at an individual level – (1) consumption, (2) compassion, (3) commitment to social justice and equity, and (4) connectedness to nature – and examines the potential effect that mindfulness may have on each of them. Techniques taught in a clinical setting, specifically Mindfulness-Based Stress Reduction (MBSR), are used as a framework within which mindfulness practices are assessed. The study suggests that mindfulness may have a positive impact on each of the aspects, with an interpretation that is consistent with the Buddhist conceptualization of mindfulness as an antidote to delusion; it proposes a hypothesised model to capture the core relationship between mindfulness and sustainable behaviour, as it is defined in this context.

## **Sustainable Diets: Examining Environmental Concerns as a Distinct Motivation for Avoiding Meat**

*Olivia Lahaie*

The public discourse on reducing meat consumption as part in a healthy and sustainable diet has taken off as more people begin to understand the true environmental costs of livestock production. The aim of this paper was to examine the motivations and actions of individuals who have adopted meat-avoiding diets by investigating whether environmental concerns should be considered a distinct motivation for meat-avoiding behavior, and if environmentally motivated meat avoiders would represent a distinct behavioral group. An online survey of people who self-identified as reducing their meat consumption was conducted comparing environmental, health, and moral/ethically motivated meat avoiders along several dimensions of the Unified Model Vegetarian Identity and environmental consciousness. The results showed that environmental meat avoiders had distinct motivational and behavioural profiles from the other types of meat avoiders. Environmental meat avoiders had a unique dietary pattern and were far more flexible in their diet than morally motivated meat avoiders. As well, environmentally motivated meat avoiders did not attribute their dietary choices to moral beliefs and did not self-identify with their diet. Instead they showed a generic pro-environment self-identity that could possibly be the result or cause of other environmentally friendly behaviours. Future study should examine how pro-environment self-identity may be used to influence the adoption of more sustainable diets.



## **Designing a Low Emission Zone for Toronto's Financial District to Reduce Transportation Greenhouse Gas Emissions**

*May Lim*

Transportation is the second largest contributor to Toronto's greenhouse gas (GHG) emissions, 80% of which from personal vehicles. Unlike the building sector, which emits the greatest of all, Toronto has yet to see land use related policy action to reduce transportation-related emissions. In the meanwhile, Low Emission Zones (LEZ) have emerged as a popular policy instrument in many other cities to discourage high-emitting vehicles from driving in city cores or ultimately phase the city out of internal combustion vehicles. While there is good coverage of existing LEZs' impact on air quality in literature, transportation GHG emission reductions of different Low Emission Zone scenarios are seldom analyzed. This paper focuses specifically on City of Toronto's financial district area, and estimates the total GHG emissions (in CO<sub>2</sub>eq) for three LEZ scenarios; an old vehicle ban, organic Electric Vehicle (EV) uptake of 50%, and a congestion charging scheme that hypothetically reduces 30% of traffic entering the district. It is observed that although the aspirational 50% EV uptake scenario results in the highest decline in emissions, congestion charging also significantly lowers the GHG footprint in the interim during which such uptake level is unlikely. Literature review finds that congestion charging and other price-based policy mechanisms are key incentives for encouraging EV sales and generating sustainable revenue for the jurisdiction. Finally, the paper also discusses relevant precedents or LEZ's overall transferability to Toronto.

## **Building Healthy, Sustainable Communities: A Scoping Review of Western Diet Impacts on Health Outcomes in Ghana, Africa**

*Linxi Mytkolli*

In Ghana, one of the fastest developing urban centers of Sub Saharan Africa (SSA), the incidence of non-communicable diseases (NCDs) is disproportionately higher among urban dwellers, especially those with higher socioeconomic status. This concentration is due to varying environmental and socioeconomic factors at the individual and community levels. Rapid urbanization, changes in occupations, and technology have been cited for the increasing physical inactivity among these populations— increasing incidence of NCDs. This is reinforced by the emergence of new urban lifestyles with sedentary routines. Considering the lack of social protection policies and for sustaining the well-being of vulnerable populations within these urban centers, emerging and unusual patterns of non-communicable diseases present significant challenges to health care systems in the developing world. To understand the implications of this growing issue, the purpose of this paper was to investigate how the uptake of Western diets influences health outcomes in urbanized populations in Ghana. The analysis found that the health implications of dietary changes due to urbanization disproportionately impacted women, though the majority of papers did not address the gendered nature of the outcomes. Additionally, the analysis found a greater need for primary prevention policies and programmes. The findings were mapped against a model for healthy and sustainable community design which captured the existing focus on public health capacity, and highlighted a greater need for collaborative solutions incorporating environmental and economic aspects in order to promote healthy, sustainable community development in rapidly urbanizing communities in Ghana and beyond.

## **Understanding the Relationship Between Corporate Governance and ESG Performance: A Guide to Sustainable Decision-Making in Apparel**

*Danielle Reid*

The apparel industry is riddled with sustainability challenges related to environmental management, compliance in supply chain management, raw material sourcing, fair labour, and health and safety in supply chains. Much of this is related to the labour and resource intensive nature of the industry, and the fact that much of its supply chain is global and fragmented. Apparel companies have deepened their interest in sustainability issues for an assortment of reasons, such as risk management, stakeholder pressure, and competitive advantage. This has led to a closer examination of corporate governance, as it influences the processes, mechanisms and relationships through which decisions are made. By assessing sixteen factors related to corporate governance, and cross-referencing the findings with ESG performance data from Sustainalytics from 34 apparel companies, this paper creates a framework to illustrate which corporate governance mechanisms are most conducive to sustainable decision-making in the apparel industry. The main objective of this is to create a corporate governance framework. The four principal features of the framework are transparency, accountability, executive structure, and relationships. Under each are recommendations for mechanisms or processes that ought to be adopted due to their positive correlation with ESG performance. The findings suggest that participation in certain multi-stakeholder initiatives (namely BCI, ZDHC, LWG, and the Textile Exchange), use of quantitative data in reporting, supply chain audits, materiality matrices, involvement with the UNGC, integrated reporting, and supplier disclosure are positively correlated with ESG performance. Additionally, differences in region and industry sub-sector were incorporated to understand the impact these variables had on governance practices and ESG performance.

## **Incentivizing Innovation in a Circular Economy**

*Nicolás Sabogal*

It is important now to pay attention to the ways that we design and produce things. Historically, we have shaped our economic activities based on a linear economy where resources are extracted, transformed, consumed, disposed and accumulated in landfills. Unfortunately, this model of production is not sustainable because a linear economy does not take into consideration the fundamental laws of physics that govern the natural environments in which we depend on. Nevertheless, this economic framework that has allowed us to develop our society in multiple dimensions is capable to integrate such laws, and in doing so, the model gets enhanced to a circular economy model. By using this model, it becomes clearer to identify how we affect the environment, and in the same manner, how the consequences of such interaction further affects us and our economic activities. It encourages preservation of our natural capital, maintaining a high value on materials through circular resource flows and designing out negative externalities. Shifting to a circular economy requires a fundamental change in which we produce and consume goods, therefore it is necessary to understand the guidelines that product designers and managers need to follow in order to adapt their future innovations on its principles. This study provides an overview on the innovation guidelines to shift society towards a circular economy, as well as policy recommendations for governments to incentivize innovation within this framework.

## **A Review of Green Roof Stormwater Management Potential in Urban Areas with City of Toronto as a case study**

*Stephen Seccareccia*

Managing stormwater is a crucial characteristic of urban centres. Every year Toronto discharges millions of tons of fecal matter into Lake Ontario because of an inability to manage stormwater. Stormwater management systems in Toronto, dating back to the 1950s, are not able to accommodate the loss of absorptive space to the impervious surfaces, increased precipitation levels and high population density. In the last thirty years rapid migration from rural settings to urban zones has resulted in significant expansion of the built environment into the natural environment. Removing key environmental services - particularly a loss of absorption, retention, filtration and evapotranspiration of stormwater via green space. This study analyzed the impact on the City of Toronto's stormwater capacity by mapping green roof technology to the free flat-roof space within the downtown core. A 3D Massing tool found on the Open Data Portal for the City of Toronto was used to measure the available flat-roof space of commercial buildings, no residences were measured. The total opportunity area was cross-referenced against the water retention characteristics of ZinCo Inc's extensive, semi-intensive, and intensive green roof technology. Data collection was divided into districts and informed by cataloguing the type, location, and presence of a pre-existing green roof. The study obtained data on Toronto rainfall volume that led to fecal matter discharge. The study found that green roof implementation across the city resulted in as much as 10% of all rainfall during discharge events being absorbed, filtered, and safely released into the atmosphere via transpiration.

## **Closing the Transit Gap: Exploring the First and Last Mile Problem in a Growing Suburban Neighborhood**

*Sepeedeh Shahabadi*

This paper examines the significance of the first and last mile problem that exists in suburban neighborhoods of York region. Through examining Richmond Hill as a case study for such neighborhoods it identifies the transit service gaps that exist in areas with populations that rely highly on these services as well as transit services that are being underutilized. The proposed transportation mode choice research is based on a comprehensive literature review of mode choice decision making and how its impacted by social and environmental factors. Using TTS data two maps are generated to illustrate Automobile and Transit usage in each Transit Area Zone (TAZ) during weekday morning peak hours will be compared to transit services provided in each TAZ. Transit services are calculated through count-based opportunity measures. Additionally, the literature review is used to shed light on why certain areas have a low transit use despite higher public transportation. The findings of this study show pockets of neighborhoods with underused of underutilized transportation system Automobile dependency increases steadily north-ward as density is reduced. Subsidized auto-share and ride-share programs could be a potential solution for some of these neighborhoods. This paper could provide a basis for calculating ridership and ROI for increased transit services in this neighborhood.

## **The Need for a Made-In-Canada Orphan Drug Framework**

*Julia Shen*

Health is a basic social need in Canada and quality health promotes success, productivity and productive contribution to society. Rare diseases are not a choice and can significantly impact an individual or family's social quality of life. It is estimated that 6000-8000 rare diseases exist and 1 in every 12 Canadians are affected; yet, only 5% of currently studied rare diseases have a treatment. Analysis of 33 global countries (Australia, EU countries, Asian countries and the United States) with and without orphan drug frameworks were scanned for their policies that supported research & development (R&D) and patient access to rare disease treatments. National rare disease plans, orphan drug designation, placement of drug on reimbursement list and R&D policies were effective methods in the analyzed global policies. Furthermore, the orphan drug approvals in Canada was compared to that against the U.S. and less than 60% of indications were found to have marketing approval in Canada. In Canada, 75% of those approved indications were also found to garner approval after the U.S. These results suggest that Canada could benefit from a national legislation or strategy to address rare disease. The current national proposal of a supplementary process is a step in the right direction but is insufficient in providing support for R&D and may continue to limit patient access. An OECD country such as Canada should take responsibility in providing and equitable access strategy to individuals inflicted with a rare disease.

## **Responsible Pension Management: Navigating Real Asset Investments in a Changing Climate**

*Jonathon Smith*

It is estimated that the investments of pension funds outvalue those of all other institutional investors combined. Managing assets on behalf of millions of beneficiaries worldwide, the global pension landscape is highly diverse, stretching across a broad range of investment strategies, asset classes, and geographies, some of which are more sensitive to the risks and opportunities of climate change than others. With this in mind, it is the aim of this research to develop an understanding of if global pension funds are considering the impacts of climate change when making investments specifically into real assets. By utilizing a mixed-method approach, this research profiles the known risk/return characteristics of the major types (classes) of real assets, identifies whether funds have increased or decreased their allocation in real assets, and assesses how funds are disclosing associated climate-related risks and opportunities. Based on the three sample pools used in this research (i.e. Canada/U.S., Europe, and Australia), it is evident that there are considerable differences in how global pension funds are both investing in real assets and disclosing associated climate risks and opportunities. The results of this research showed that although Australian funds grew the most with respect to overall assets under management (AUM), it was Canadian/U.S. funds who experienced the most significant increase in real assets, both with respect to absolute real asset allocation as well as investment dollars. With respect to disclosure, Canadian/U.S. funds and European funds were found to have the strongest performance while Australian funds varied in their disclosure performance.



## **Venture Capital Valuation of Less Mature Clean Technology Firms – An Overview**

*Omar Soliman*

Valuation of cleantech remains a new area within peer reviewed literature. Most economic/finance journals contain information on venture capital, or valuation methodologies. However, there isn't a significant body of information available on venture capital valuation, with respect to cleantech. This research paper focuses on alternative energy cleantech, which centres on wind, solar, hydro, advanced batteries, and general energy solutions that look into low carbon technologies. Existing information on cleantech valuation, addresses the question for larger energy firms, which have been established beyond the start-up stage. Such firms are valued using more recognized methods. Admittedly, there exists a gap in academia, when examining less mature cleantech firms. This study takes a novel approach in examining valuation within the literature, in order to compare perceptions on valuation presented by literature. This is done in conjunction with a literature examination on external factors, such as oil prices on clean-tech equity, and policy tariffs/subsidies. The survey component was conducted with cleantech venture capitalists, where they were asked questions, which aim to determine the applicability of unique valuation methodologies within a specific firm. These include the Venture Capital Method, First Chicago method, the Berkus method, the scorecard method, and the discounted cash flow method. Such comparisons were studied, in order to determine discrepancies, and similarities from set methodologies by Toronto based venture capital firms. The fundamental purpose of this research piece is to link the valuation process of cleantech, with the purpose of increased support for sustainable ventures. Due to the value cleantech firms add beyond provisioning clean energy generation, they demonstrate promising growth not only within profitability, but in increased mass adoption.

## **Gender and Racial Bias in the Workplace: A Comprehensive Review**

*Momina Sumbal*

In a social climate rife with heightened consciousness of discrimination, harassment, and systematic oppression, it is crucial to understand the nature of social inequalities and the biases that fuel them. By examining workplace dynamics and leadership pathways, it is possible to gain an understanding of how societal norms and attitudes can impact marginalized group members' ability to fulfill their social, economic, and professional potentials. This comprehensive review of scholarship and contemporary literature explores how gender and racial biases act as barriers against individuals in the workplace and, specifically, in their ascent to leadership positions. First, this work explores women's experiences in the workplace and leadership by assessing the impacts of diversity and inclusion policies on company performance, and reviewing concepts such as descriptive and prescriptive stereotypes, glass ceiling and glass cliff effects, sexism, and the double bind. Second, this work explores the impacts of gender stereotypes on men through masculinity contest cultures and toxic leadership. Third, this work reviews racial discrimination in the workplace through an analysis of microaggressions, emotional tax, and the double jeopardy experienced by women of colour. The analysis of independent identities (i.e. race and gender) is brought together through a review of intersectionality theory and its impact on management and workplace culture. After a thorough assessment of the impacts of gender and racial biases, this review builds on global best practices to develop recommendations for effectively recognizing and eradicating the perpetuation of harmful stereotypes in the workplace, as well as barriers to implementation and systemic change.

## **Waste(d) Potential: Challenges and Opportunities in Incorporating Organics Waste Diversion in Privately Managed Urban Multi-Residential Residences**

*Paulina Szlachta*

Organics waste diversion in urban areas presents a unique challenge for policy-makers, building managers, building staff, collection companies, and residents. This paper discusses the state of Toronto's organics waste diversion in multi-residential homes, specifically examining the challenges for those multi-residential buildings not participating in city collection but who depend on private haulers for their waste, recycling and organics collection. Both challenges and opportunities organics diversion system implementation are discussed from policy, governance, environmental, infrastructure, economic and social perspectives. Discussion of the combined challenges and potential mitigation strategies follows the research conducted through interviews with key stakeholders. Through these pooled perspectives we can assess the effectiveness of potential programs and proactively address issues when implementing organics diversion strategies in buildings where no such programs previously existed. Themes emerging from the research centre around barriers such as ineffective stakeholder collaboration and a lack of building-level leadership, availability of economically superior options offered through private waste haulers, and participation of residents. Opportunities for increased implementation of organics diversion systems in urban areas are dependent on a variety of factors including enforcement and incentivization, political will, and accessible infrastructure changes.

## **Conceptualizing, Characterizing and Corporatizing Environmental Justice (EJ): Using Online Retailing as a Case Study for EJ Implementation in the Era of Ever-Increasing Digitalization**

*Philip Szwiec*

Online retail sales are growing at a faster rate than sales through conventional brick-and mortar stores and will continue to grow for the foreseeable future, reaching almost \$7 trillion/year by 2022 (Boston Consulting Group 2017; Financial Times, 2018). Much of this growth can be attributed to globalization and the internet's ease of access, enhanced interactions, and effective (as well as cost-efficient) communication channels. This radical reconfiguration of underlying spending processes precipitates environmental adversities, including, but not limited to, increased energy use, (packaging) waste generated, transportation, and returns management. Fortunately, there is a societal megatrend of implementing and wholly incorporating environmentally conscious practices within business processes and the literature related to continuing environmental consequences is well detailed. There is, however, a dialogue of dearth surrounding environmental justice in conversations surrounding CSR and sustainability at large in corporations. This paper aims at filling this research gap by conceptualizing and characterizing environmental justice through using online mega-retailers Amazon, Inc. and eBay, Inc. as instructive examples to develop a best-practice framework for implementing EJ practices and policies in multi-variegated companies. This is done through (a) defining EJ for corporations, (b) conducting an extensive literature review of existing EJ papers, and (c) devising a framework for EJ using in situ practices from the public health and environmental toxicology disciplines, complemented by policies from the extractive sector. The discussion from this paper is meant to provide a macro-perspective on the incorporation of environmental justice within the online retail sector and produce generalizable (albeit substantiated) results about its state and future outlooks

## **Recycling of Textiles from the Apparel Industry, the Feasibility within Canada**

*Mackenzie Taylor*

This study applies and analyzes the current development of textile recycling that is occurring within France and the United Kingdom, and how these initiatives can be applied to Canada. The downstream supply chain of the apparel industry is now starting to be tackled to mitigate the environmental issues stemming from the industry. The consumption and production of clothing rises every year, due to the fast fashion industry. Fast fashion companies use very complex fibers, making it difficult to recycle the garments, therefore resulting in clothing ending up in landfill. Within the UK, a coalition called SCAP, which has brought together many stakeholders involved in the supply chain of recycling textiles, including used-clothing collectors, recycling facilities, fashion companies, scientists, and government. This allowed for data collection, and further developments in the recycling of clothes. The EPR policy within France, the only one of its kind in Europe, requires producers, including clothing companies to pay a tariff, in which these funds then contribute to the collection and recycling of the producer's waste. Within Canada, the current state of textile recycling is on a very small scale, and the amount of data currently available is limited. It would be difficult for Canada to implement an EPR policy, as the industry is too small and under developed to take on the necessary steps of an EPR policy. In order for the recycling of textiles to increase in scale, licensing of used-clothing collectors needs to be implemented, allowing for better data and knowledge. The formation of a coalition within Canada would help to ensure the data will be used in an efficient and streamlined manner to ensure the further development of the textile recycling industry.

## **Renewable Energy Minigrids as a Tool for Rural Electrification in Developing Countries - Implementation Issues & Possible Solutions**

*Laura Väyrynen*

Renewable energy minigrids can be used as a tool to help solve two major global issues: climate change and lack of energy access. Minigrids can help curb climate change through facilitating the construction of clean energy infrastructure, and they can provide electricity access to rural areas in developing countries. However, they have yet to reach mass commercial deployment. This research paper explores the current state of minigrids and energy access in the rural Global South, identifies the most common implementation barriers to commercial growth of the minigrid sector, and explores the various solutions in use in the space. The information was gathered through an academic literature review and interviews from key players in the field, which were mainly minigrid companies hosting projects in developing countries. The interviewees' answers corresponded strongly with the findings of the literature review. It was found that while every minigrid project has a variety of factors affecting its success, the most common barriers can be categorized under system design, access to capital & financing, regulatory environments, cost of the system, and cultural and social barriers. Challenges that were highlighted across the board under these categories were logistical difficulties due to remote locations, unfavorable regulatory environments, small profit margins, and consumers' lack of funds. The results of the study demonstrate the need for, for example, improved best practice sharing among industry players, more flexible financing mechanisms, and a clearly outlined electrification policy by the national government.

## **Designing a Motivation-Oriented Educational Environment for Undergraduate Students**

*Vladyslav Verminskyi*

Numerous studies have shown rising stress levels and mental health concerns amongst university students, driving the urgent need to provide help. However, the literature is short on studies about increasing student motivation to learn, which, in the first place, could reduce the likelihood of mental health issues occurring. This paper, therefore, approaches the issue through achieving and sustaining high student motivation. The research highlights effective methods for educators to encourage and retain high motivation amongst undergraduate students, who are still forming their attitude towards higher education. The approach to student motivation takes perspectives on academic components, personal factors and individual variabilities amongst students. The findings suggest that creative assessments, positive relations with professors and applying class material in real-life situations increase student motivation effectively. The personal “domains”, including physical health, spiritual satisfaction, intellectual development and relationships with people, although not causing high student motivation, appear to contribute to it. Moreover, individual variation amongst students’ resilience, persistence and attitudes to goal achievement suggests the need to provide personalised academic support aimed to invoke the sense of competence amongst the students, while giving everyone opportunity to use their full potential. Implementing these findings in real life will require creative approaches from educators, which involve emphasizing the importance of their subjects, sharing subject-related personal stories, encouraging students to apply class material creatively and providing opportunities to explore the subjects beyond curricula. Still, students would be responsible for using the opportunities provided, completing the assigned work and for their personal well-being.

## **The Art of Deposit Return Systems: An Analysis of Key Economic, Political, and Operational Factors**

*Kristen Vitullo*

While some companies are voluntarily making changes to their wasteful practices and product packaging, the creation of robust policy is key to ensuring that corporations and consumers take action to reduce the volume of recyclables ending up in landfills and the environment. In many places, the beverage industry plays an important role in the production of waste from single-use products like bottles and cans, and is thus responsible for helping to fund initiatives such as deposit return systems. These are becoming increasingly popular as a way to capture high amounts of disposable materials for recycling, and in the last five years jurisdictions across Europe, Australia, and the UK have adopted or expressed interest in rolling out mandatory take-back programs for drink containers. This research draws on a variety of sources to identify how deposit return systems have been designed in forty-one jurisdictions around the world. The data collected demonstrates that there are many economic, political, and operational factors that must be considered throughout the development and implementation of this type of policy. It is critical to understand the impacts of different design aspects such as how much a consumer is refunded for a container, the convenience and accessibility of collection facilities, and the financial contributions of different actors within the scheme. The findings discussed will provide valuable insight for government leaders and policy makers looking to institute new and effective waste management systems.



## **Barriers to Sustainable Procurement of Food in Toronto Restaurants**

*Amy Winters*

Despite capturing an increasing share of the Canadian food dollar, the contributions that the restaurant sector make to a sustainable food system are still not very well understood, particularly in the area of food procurement. Therefore, this study aimed to discover what barriers Toronto restaurant owners, managers and/or chefs perceive/experience in adopting more sustainable procurement practices. Seven sustainable procurement indicators were established through a review of the literature: local, better meat, organic, providing vegetarian options, sustainably sourced seafood, seasonal and supporting global farmers and conservation. A survey was deployed to twenty-one restaurants in Toronto asking what barriers they perceived/experienced to each of the seven indicators. Most restaurants specified external sourcing barriers, with cost being most prominent across all categories. Availability of local and seasonal produce, and logistics for supporting global farmers and conservation were other notable barriers identified. Ultimately, restaurants have the potential to contribute to improving the food system by increasing their engagement in sustainable procurement practices in addition to employing a pedagogical space for learning and engagement in food system challenges. Further investigations are required as this study provides only a starting point to more concretely identify perceived barriers in all categories. On a broader scale, the need for greater education on sustainable food systems and agriculture, as well as greater participation of municipal government are essential in bringing agricultural and food systems concerns to the forefront.

## **Precision Agriculture in Taiwan: Barriers and Strategies for Technology Development and Adoption**

*Yu Hsuan Amy Yang*

Farmers historically faced a variety of issues on which decisions must be made, such as new competitors and changing consumer tastes. These decisions were traditionally made based on experience of what has worked in the past, with the intuitions being largely subjective and internal to the farmers. However, a new issue that has arisen in recent years is a changing environment as a result of climate change, and given the unpredictable effects of climate change on agriculture which range from changes in rainfall patterns, higher temperatures and shifts in growing seasons, a new approach is needed to make farming management decisions in order to keep up with climate change and meet the growing demand for food. Precision agriculture (PA) has been seen as a potential solution to this problem, which the U.S. National Research Council defines as “a management strategy that uses information technology to bring data from multiple sources to bear on decisions associated with crop production.” Taiwan’s Council of Agriculture has recently started to develop PA technologies in an attempt to overcome challenges facing the agricultural sector in Taiwan. Through interviews with stakeholders in precision agriculture, barriers to adoption of PA technologies in Taiwan were identified, which include high cost, lack of data, and lack of collaboration among stakeholders. Strategies are proposed to overcome these barriers which include consideration for the local development of technologies that focus on high-revenue crops meant for export, increasing the availability of data, and encouraging inter- and intra-collaboration among PA stakeholders. This paper is a first attempt to address barriers in PA development and adoption in Taiwan, and it remains to be seen how the proposed strategies can aid in bringing about a positive shift towards PA technologies in Taiwan’s agricultural sector.

## **Sector specific Global Reporting Initiative (GRI) scoring compared to market capitalization, stock price volatility and sustainability news in Oil & Gas, Materials, and Financial Services Sectors**

*Derek Ye*

This study explores, in the Canadian context, the relationship between the level of reporting disclosed by an organizations as measured by the Global Reporting Initiative (GRI) sector specific standards and its implication on financial performance and market capitalization. The TSX 60 Index is used to separate the top ten companies by market capitalization in the Oil & Gas, Materials and Financial Service sectors for comparative analysis with their respective GRI scores. We find evidence that while there are positive correlations between high GRI scores and market capitalization, the extent to which the observability of a negative relationship between GRI scores and stock price volatility are limited. However, some of the results accessed for the relationship of stock price volatility and GRI score depends on the exposure of sustainability related issues that are sectors specific. Thus, the additional analysis between GRI scores and the frequency of positive sustainability related news released was also determined. The research conducted herein has important implications in understanding the materiality of sustainability reporting and how it relates to company financial performance and portfolio management decisions.