



THE UNIVERSITY OF
WINNIPEG

Faculty of
Graduate Studies

6TH ANNUAL

**3-MINUTE THESIS
COMPETITION**

**ONE SLIDE.
NO PROPS.
3 MINUTES.**

April 11, 2019 Eckhardt-Gramatté Hall



3-Minute Thesis Presentation Schedule

	Name	Program
1	Alyssa Stulberg	BioScience
2	Hoorah Moghaddam	ACS
3	Maria Espinel	MAIG
4	Justis Henault	BioScience
5	Maryam Bafandkar	ACS
6	Courtney Bear	MDP
7	Apurva Bhardwaj	BioScience
8	Nadia Chaharsoughi	ACS
9	Jamie Card	BioScience
10	Erika Vas	MDP
11	Anthony Leong	BioScience
12	Dharitri Tripathy	ACS
13	Marie Josée Nadeau	BioScience
14	Taylor Wilson	MDP
15	Kristina Muise	BioScience

Judges:

Dr. Doug Goltz, Dean of Science

Dr. Jacqueline Mcleod Rogers, Department Chair, Rhetoric,
Writing, and Communications

Dr. Melanie O’Gorman, Graduate Program Chair, Environmental,
Resource, and Development Economics

Participants

Alyssa Stulberg

Master of Science student in Bioscience, Technology, and Public Policy

Co-authors: Tina L. Cheng, Jeff T. Foster, Katy L. Parise, Daniel L. Lindner, Barrie E. Overton, Quinn E. Fletcher, Kaleigh J.O. Norquay, Winfred F. Frick, Craig K. Willis

Environmental Cleaning Agents to Reduce Contamination of Bat Hibernacula with *Pseudogymnoascus destructans*

The introduction of *Pseudogymnoascus destructans* (Pd), the causative agent of white-nose syndrome (WNS), has killed millions of hibernating bats across North America. The ability of Pd to survive in environmental reservoirs allows pathogen growth and transmission regardless of host population size, which could facilitate WNS-driven extinction of bat species. Treatment of environmental reservoirs may therefore reduce continental pathogen spread and population-level impacts. The objective of my study is to determine the efficacy of ultraviolet-C light and polyethylene glycol in reducing Pd contamination within hibernation environments.

Hoora Rezaei Moghaddam

Master of Science student in Applied Computer Science and Society

Supervisor: Dr. Sheela Ramanna

Tolerance-based Methods in Natural Language Processing for Large Web Corpora

Natural Language Processing (NLP) is a field in machine learning to understand, analyze, manipulate natural language rules and convert them into a form that computers can understand and process. Named-entity recognition is a subtask of information extraction that seeks to locate and classify named entities such as nouns and relational phrases in unstructured text into pre-

defined categories such as the person names, organizations, locations. In this research, we use a tolerance-based machine learning method to recognize linguistic entities gleaned from thousands of webpages. The Web is a rich source for large collections of text for linguistic investigations, often with the help of a commercial search engine. Our model uses a large corpus of webpages to extract noun phrases with the help of sets of co-occurring contextual patterns. In addition, our tolerance-based algorithm will classify these entities into predefined categories useful in information retrieval.

Maria Espinel

Master of Arts student in Indigenous Governance

Traditional Knowledge and Natural Resource Management of the Indigenous Communities of Mojanda and Ozogoché

In Ecuador, Mojanda and Ozogoché lakes are like paradises on earth. This landscape is surrounded by Indigenous histories, traditions and songs. Those communities are living on the lands before the roads access them and should be compensated for sharing their knowledge and hospitality. These places are being visited by tourist from all over the world. Unfortunately, the Indigenous communities receive nothing from tourism nor their management of protected natural areas. These communities live life in poverty. This research will be describing the Mojanda and Ozogoché Indigenous communities' current situation and recommend a mechanism to involve them in tourism and in the management of natural areas. A long term objective is to generate policies to promote teamwork among central and local government and Indigenous communities to manage tourism and natural areas. This research looks into improving the Ecuadorian Indigenous peoples quality of live. We cannot have paradises without equality and justice.

Justis Henault

Master of Science student in Bioscience, Technology, and Public Policy

Supervisor: Dr. Richard Westwood

Assessment of Oviposition Behaviour and Larval Microhabitat Location for Potential Reintroduction of Endangered Poweshiek Skipperling (*Oarisma poweshiek*) in Manitoba

The Poweshiek Skipperling (*Oarisma poweshiek*) (PS) is an endangered butterfly endemic to tall grass prairie in North America. Habitat loss is the primary factor contributing to the decline of this species from seven jurisdictions in Canada and United States but biological and structural factors within PS habitat also regulate survival. Poweshiek Skipperling requires microhabitats with certain characteristics for adult nectar feeding, basking, reproduction, and provision of food and shelter requirements for immature stages. I investigate the variables that control adult activities and larval survival and movement within microhabitats. Female oviposition activities were observed to locate larvae and determine actual host plants for PS in the field. This research will guide future management and reintroduction efforts for the long-term survival of PS in Manitoba.

Maryam Bafandkar

Master of Science student in Applied Computer Science and Society

Supervisor: Dr. Christopher Henry

Plant Identification for Autonomous Farming

Improving the efficiency of current agricultural practices will play an important role in meeting rising food demand. Adopting autonomous systems to help in cultivating crops is one way to address these issues, but developing algorithms to identify plants is still challenging. Current deep learning neural networks can perform this task, but they require a large number of images taken from plants in various situations where each image is labeled with the corresponding plant species. The focus of this work is to develop deep learning neural networks that will classify unknown images of plants to be used in farming automation to increase crop yield.

Courtney Bear

Master of Development Practice student in Indigenous Development

Sacredness of Water: The Need to Protect

In the Indigenous worldview, women are acknowledged for their knowledge of water and are regarded as its protectors. Water is life, and without it, nothing would survive. Despite this, Indigenous women are often left out of the conversation around water rights, management and health for Indigenous communities. In providing knowledge and insight on the sacredness of woman as water carriers this abstract aims to share key points on the relation of Indigenous women's protection of water and health for people and the nation. There is a great importance for Indigenous women to play a crucial role in the decision-making regarding water rights. Water rights are essential when it comes to protecting water and related health issues for First Nation communities and Canada as a whole. Peoples in society must become more actively involved to protect water and acknowledge the integral role Indigenous women play.

Apurva Bhardwaj

Master of Science student in BioScience, Technology, and Public Policy

Supervisor: Dr. Shailly Varma Shrivastav

IGFBP-3: Understanding Its Promiscuous Nature with Its Binding Partners

Insulin-like growth factor binding protein-3 (IGFBP-3), a key secretory/ circulating protein in the insulin-like growth factor (IGF) pathway, plays an important endocrine role. It is also under investigation for other critical roles in cellular processes. IGFBP-3 functions both in the extracellular and intracellular compartments and regulates cellular functions such as cell growth, survival and apoptosis. The involvement of nuclear IGFBP-3 in transcriptional regulation, DNA damage and induction of apoptosis support its role in cancer progression and apoptosis. Rapamycin is an inhibitor of mammalian target of rapamycin (mTOR), which is a ser/thr kinase is also under several clinical trial for the treatment of cancers including head and neck cancer.

We treated mammalian breast cancer cell line, MCF-7 and HepG2 cells with rapamycin at different time points, isolated the nuclear and cytoplasmic fractions and determined the IGFBP-3 levels using Western blot analyses. We were interested to identify other molecules interacting with IGFBP-3, and therefore also carried out immunoprecipitation using different cellular fractions.

Nadia Moazen Chaharoughi

Master of Science student in Applied Computer Science and Society

The Understanding of Emergent Mechanisms in Living Systems

Have you ever heard about bio-inspired systems? Getting ideas from a living organism? Mechanisms, the organism might use in addressing problems. You might have heard about the ant colony optimization algorithm, which is a probabilistic technique for solving computational problems. But if we go further, we find out more complex and adaptive living systems; For example, our body system, more in depth, ideas about information processing in the immune system has inspired so called artificial immune systems: programs that adaptively protect computers from viruses and other intruders. To understand how to take advantage of these systems, we have challenges to comprehend how the information processing arises and in what sense do natural systems emerge with capabilities and functions? These unanswered questions remain a subject of confusion and thorny debate among scientists. Having such a description would provide a “high-level language” for biology and with many practical applications in other realms.

Jamie Card

Master of Science student in BioScience, Technology, and Public Policy

Co-Authors: John Bieber, Michael Louison, Cory Suski, and Caleb Hasler

Biological Consequences of Winter Catch-and-Release Angling

Catch-and-release (C&R) angling occurs when recreational anglers release fish after capture. These events involve stressors that illicit physiological responses, and depending on a variety of factors, mortality is a possible outcome. The effects of ice-angling on fish are understudied and it is possible that damage results from ice and air exposure, which could negatively impact released fish. The objective of my study is to quantify the severity of winter C&R angling on yellow perch (*Perca flavescens*). Fish were exposed to air and ice for 3 minutes upon capture to assess biological consequences. Individuals experienced the greatest amount of heat loss in the dorsal musculature over the treatment period, though other tissue temperatures were also below freezing. Tissue damage will also be assessed using histology and gene expression techniques. These results will aid in establishing best practices for anglers to follow while handling fish during cold temperatures.

Erika Vas

Master of Development Practice student in Indigenous Development

Community-Driven Tiny Houses: Reframing On-Reserve Housing in Canada

As a result of colonization, along with numerous human and Indigenous rights infringements, substandard on-reserve housing conditions continues to be a major social issue for Indigenous communities in Canada. The housing issue has not been adequately addressed by the government and may compromise future generations. A solution implemented by several Indigenous communities across Canada is the usage of Tiny Houses. However, the effectiveness of this solution has not been evaluated. In this presentation, we ask what are tiny houses, why are Indigenous communities using them, and are they effective?

Anthony Leong

Master of Science student in BioScience, Technology, and Public Policy

Human Responses to Human and Non-Human Infant Cries

All mammalian infants cry to recruit the attention and care of their parents, as do infants of many other species. Previous research has shown that deer mothers approach the cries of infants from other species, and that human participants respond empathetically to non-human infant cries. The present study examined the hypothesis that humans will evidence similar emotional and physiological responses to human and non-human infant cries. Over three study sessions per participant, we presented short sound clips of different cries (human, white-tail deer, and fur seal) or control sounds to adult female participants and measured emotional responses via survey and physiological responses via saliva samples. Survey results showed that humans responded similarly to human and non-human infant cries, but not the control sound. Salivary assay results showed that human and non-human cries, but not the control sound, elicited an immediate (3 minutes post-stimulus) spike in the bonding neuropeptide oxytocin.

Dharitri Tripathy

Master of Science student in Applied Computer Science and Society

Distributed Computation with Complex Adaptive Systems

There are various algorithms developed by researchers to handle design and implementation issues in distributed computations. Distributed computations exist in a variety of real systems, at the same time these algorithms have limitations when there is an adhoc computing scenario. Complex adaptive systems (CAS) are characterized by having many members with simple functions and limited communication among them. The emergence of swarm intelligence from simple members activities boasts autonomy and self-sufficiency, which allows them to adapt quickly to changing environmental conditions. It has identified the relationship between emergent computation and local agents' properties, its dynamicity to obtain global results. We are researching computational models to analyze the consequences of different actions, its impact by controlling the component's properties to achieve global solutions to get insights about how real systems work, thereby making improved decisions in their management.

Marie-Josée Nadeau

Master of Science student in BioScience, Technology, and Public Policy

ERVK Integrase Blocks Antiviral Immunity

Endogenous retrovirus-K (ERVK) is a group of retroviral elements in the human genome that are upregulated in the brains and spinal cords of patients with Amyotrophic lateral sclerosis (ALS), a neurodegenerative disease without a cure. A hallmark of ALS pathology includes DNA damage, a phenomenon known to be initiated by retroviral integrases (INs). Thus, I am investigating the role of the ERVK IN enzyme in ALS. My research shows that ERVK IN causes DNA damage and prevents antiviral IRF3 activity in astrocyte brain cells. I am further investigating how the cellular pathway leading to IRF3 activation is disrupted by ERVK IN. Lastly, I am repeating these experiments with the addition of integrase inhibitors to determine if ERVK IN-mediated cellular effects are reversed. As ERVK is known to be active in ALS, this gives hope that IN inhibitors can be repurposed as an effective treatment option.

Taylor Wilson

Master of Arts student in Master's in Development Practice

Decolonizing the Food Guide for Indigenous Health and Education: A Critical Review of the 2019 CFG

In 2019, the Government of Canada revised the Canadian Food Guide (CFG), a tool designed to combat health issues, with the promises of releasing a new and improved Indigenous Food Guide (IFG) that is more culturally relevant. Despite all that, the Canadian government's efforts to increase health promotion to address the Indigenous health issues, including the 2007 IFG have not been effective (Mundel 2010). The purpose of this research is to explore the CFG and its viability for success in engaging Indigenous youth populations in Canada. It will also establish the scholarly potential of an IFG as Indigenous health and development intervention in the era of reconciliation when conventional western food security and health promotion policies in First Nations are being reassessed. Providing a

culturally relevant IFG that considers location, circumstance, and the diversity of Indigenous cultures can play a key role in Indigenous health promotion and well-being.

Kristina Muise

Master of Science student in BioScience, Technology, and Public Policy

Co-Authors: Yvonne A. Dzal, Craig K.R. Willis

Humidity, Huddling, and the Energetic Costs of Hibernation in Big Brown Bats (*Eptesicus fuscus*)

During hibernation, mammals must balance energy expenditure and water loss, often in varying environmental conditions. My thesis will test the hypothesis that microclimate affects arousal frequency and drinking behavior in *Eptesicus fuscus*. I predict that bats in a dry environment will arouse and drink more frequently, and drink larger volumes of water than bats in a humid environment. Secondly, I will test the hypothesis that microclimate influence the effects of huddling on metabolic rate and water loss. I predict that metabolic and water loss will be lower for huddling compared to solitary bats. To test my hypotheses, I will hibernate *E. fuscus* in 8°C and either 98% or 50% relative humidity. After ~5 months, I will use respirometry to measure metabolic rate and water loss of solitary or huddling bats. Overall, my research will provide insight into the importance of huddling and humidity on the energetic costs of hibernation.



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The 3-Minute Thesis (3MT®) is an annual, university-wide research communication competition, originally developed by The University of Queensland, which challenges postgraduate degree students to communicate scholarly research and its significance to a panel of non-specialist judges in **three minutes or less.**

Graduate students from various disciplines compete for a **\$1000** top prize and a **\$500** People's Choice Award voted on by the audience!

The top prize winner will compete in the Western 3MT Competition at the University of Northern British Columbia on April 17th with a chance to compete at the National 3MT!

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