

# Graduate Student Research Slide Presentations Online Guide

**April 11-14**



This week we celebrate the scholarly accomplishments of WMU graduate students from across the University through research slide presentations. Faculty judges evaluate the presentations and students with the highest scores are awarded prizes. We are pleased to welcome you to this exciting virtual event highlighting the diverse research and scholarly activities of our graduate students.

We are offering this event this year virtually to keep student and mentor's intellectual property protected we will be utilizing Mediasite located in Elearning. Student presentations will only be viewable by those who have a Bronco NetID.

**Directions:** We recommended you use earphones while viewing a presentation. Each student independently recorded their presentations and the volume varies on each recording. You will be prompted to enter your Bronco NetID to view the research presentations. Each presentation is 5-7 minutes in length and includes PowerPoint slides. Please note it may take a few moments to load each video, depending on your internet speed.

Presentations will be viewable April 11-14, 2022  
Check our website on Monday, April 18 for results

**Mousa Abushattal**

Mentor: Dr. Valerian Kwigizile

CIVIL AND CONSTRUCTION ENGINEERING

["Associating Driver Behavior to Surrounding Environments and Cyclist Presence"](#)

**Abstract:** Cycling is an active mode of transportation that offers various advantages, including less pollution, reduced congestion, and improved rider health. Despite these advantages, cyclist safety is considered one of the most significant challenges that prevent cyclists from riding on the road, particularly while riding alongside a motor vehicle. As a result, this study aims to see how the surrounding environment influences driving behavior while interacting with bicycles, particularly in a complicated situation like a work zone. Several cognitive workload measurements, such as heart rate, skin conductivity, and ocular parameter, have been utilized to quantify the workload. The findings reveal that the environment configurations considerably influence the driver's cognitive workload and driving behavior.

**Wisam A. Al Isawi**

Mentor: Dr. Gellert Mezei

CHEMISTRY

["Nanojars: Selective Extraction Agents for the Removal of Harmful Anionic Pollutants from Water"](#)

**Abstract:** Although water pollution by anions has attracted growing attention worldwide due to its profound threat to the health of human beings and the environment, selectively removing environmentally harmful anions from water is a challenging task due to the nature of anions. Our lab developed anion-encapsulating agents known as nanojars that trap harmful anions such as chromate, arsenate, and phosphates from water. Furthermore, by rigidifying the nanojar's outer shell, we improved the nanojar's anion selectivity to achieve higher anion encapsulation efficiency.

**Mir Angkur**

Mentor: Dr. Susan Pozo

ECONOMICS

["Do Remittances Protect Against Child Marriage: The Rohingyas in Bangladesh?"](#)

**Abstract:** The main hypothesis is to explore whether remittances -monetary and other resources sent by other family members and relatives living elsewhere in the country or abroad could act as a protective role against child marriages for the Rohingyas in Bangladesh. Rohingyas are the

ethnic minority people of Myanmar and vast majority have been in Bangladesh in refugee camps since 2017. I use the first wave of Cox's Bazar Panel Survey (CBPS) 2019 in Cox's Bazar and Bandarban districts of Bangladesh. The CBPS is a joint venture between the Yale Macmillan Center and the World Bank. The survey has information for 5011 households and 9090 adults. The analysis relies on the linear probability model (LPM) and 2SLS estimation methods. The paper results suggest that the prevalence of child marriage is more common among Rohingyas than the local community. The estimation results also confirm my query that remittances act as a protective tool against child marriage for the Rohingyas in Bangladesh.

### **Samantha Atkins**

Mentor: Jeff Spoelstra, Sustainability

ENGLISH

#### ["Never Not Writing: How I Found the Nexus of Passion and Skill Through Sustainability Work"](#)

**Abstract:** In the fall of 2021, I was hired as a research assistant by the Office for Sustainability to coordinate a semester-long, hands-on learning experience called the “**Wesustain** Internship.” My primary goal, as the person tasked with improving and updating the internship’s curriculum, was to apply my professional expertise in education to make an already-potent learning opportunity even more effective. To do this, I conducted all sorts of research, including interviewing previous interns and coordinators, reviewing past curricular material, and conducting mini-literature reviews covering fourteen different topics, one per each week of the internship. I assumed that with my master’s degree in secondary education and status as a Phd candidate, the fruition of my efforts would be a more structured, more highly academic internship. But as I explain in this presentation, the outcome I got surprised me— Through this sustainability-oriented pedagogical research, I stumbled into a profound transformation in both my professional writing and in my identity as an educator.

### **Kanchani Basnayake**

Mentor: Dr. Upul Attanayake

CIVIL AND CONSTRUCTION ENGINEERING

#### [“Creep and Shrinkage in the 2nd Avenue Network Arch Bridge Post-Tensioned Members”](#)

**Abstract:** The first freestanding network arch bridge in Michigan was designed to carry the 2<sup>nd</sup> Avenue traffic over the interstate (I) 94 in Detroit. The unique concrete mix used in the post-

tensioned members and the loading applied during the construction sequence of this bridge, affect the creep and shrinkage behavior of the post-tensioned members. Creep and shrinkage cause long-term prestressing force losses in post-tensioned members and cause significant deformation in the structure. Hence, the creep and shrinkage characteristics of the concrete mix is studied under laboratory conditions. Further, the creep and shrinkage strains in the post-tensioned members are field measured during its construction sequence. The findings are used as input in a finite element model of the bridge to estimate the final stress in the post-tensioned members.

### **Melissa Beck**

Mentor: Dr. Sandra Borden  
SCHOOL OF COMMUNICATION

#### **"Don Draper: Trauma, Memories and Identity in Mad Men"**

**Abstract:** Asking the research question: "How do mnemonic elements in AMC's Mad Men represent the long-term effects of trauma on personal identity?" can help us understand more about relationship dynamics of those who have suffered past traumatic events, whether it is our loved ones or acquaintances, our ourselves.

The research method I am applying is a textual analysis investigating how past traumatic memory events depicted in the show have contributed to the construction of Don's narcissistic identity as a way of coping with shame.

This analysis consists of investigating specific episodes in the show and the ways that mnemonic elements are used to represent the long-term effects of shame-inducing traumatic events on personal identity and I believe that observing the representation of trauma via Don's personal memories can help with the assumption of "prosthetic memory" by the audience and has the potential to open doors of empathy navigating personal relationships.

### **Megersa Daksa**

Mentor: Drs. Mathew Higgins  
ECONOMICS

#### **"Monetary Policy, Risk Aversion and Uncertainty Spillover Across Markets"**

**Abstract:** In this presentation, I present the research work titled "Monetary Policy, Risk Aversion and Uncertainty Across Markets" under the supervision of Professor Mathew Higgins. In this study, we examine the effect of monetary policy on risk aversion and uncertainties in four

markets. We also examine risk aversion and uncertainty spillover across these markets. We measure uncertainty with the expected volatility of returns estimated using the machine learning approach. By decomposing implied volatility indexes (VIX's) into risk aversion and uncertainty for each market, and using structural vector autoregression (SVAR), we show that monetary policy has a significant effect on risk aversion and uncertainty across markets. We also show that there is risk aversion and uncertainty spillover across markets.

### **Listiani Eran**

Mentor: Dr. William W. Cobern

MALLINSON INSTITUTE FOR SCIENCE EDUCATION

#### ["Teaching Orientation and Pedagogical Reasoning: A Study of Indonesian Preservice Science Teachers"](#)

**Abstract:** This presentation is about preservice science teachers' knowledge for teaching based on Shulman's idea of knowledge base for teaching. The development of teacher reasoning with respect to pedagogical knowledge has been an essential aspect of teacher education and development. Teaching orientation is an aspect of pedagogical knowledge and an area for investigation, especially with respect to preservice science teachers who are just learning how to be effective teachers. Using the teaching orientation spectrum developed by Cobern, Schuster, Adams, Skjold, Muğaloğlu, et al. (2014) along with Shulman's (1987) model of pedagogical reasoning, this study profiles Indonesian preservice science teachers' teaching orientations and the reasons behind their orientations by using a mixed-method study combining survey and interview methods. The results show that student-centered instructions are the most preferred method with various reasons behind the selected orientation. These reasons are influenced mainly by the teacher and student roles in the classroom. Understanding preservice science teachers teaching orientation and pedagogical reasoning is essential to support the development of their knowledge for teaching.

### **Kristen Foley**

Mentor: Dr. Heather Petcovic

GEOLOGICAL AND ENVIRONMENTAL SCIENCES

#### ["Instructor Selection and Use of Virtual Field Experiences in College Geoscience Courses"](#)

**Abstract:** Virtual Field Experiences (VFEs) are a growing supplement and gateway to traditional fieldwork in the geosciences. With VFEs becoming more frequently used in college geoscience courses, how instructors find and choose VFEs for their students is critical to creating greater

accessibility. VFEs that are not easily accessed by instructors may go unused, and the effort of making them may be wasted. Findings of this study suggest that instructors consider a wide range of digital resources to be VFEs, such as YouTube videos, photos, websites, and open educational resources such as immersive virtual field trips. Results also show that instructors invest significant time to search for and adapt VFEs to meet their course needs because available VFEs, while containing quality content, fail to meet instructors' learning goals. Instructors recognize that VFEs provide opportunities for students who may not otherwise be able to go into the field, and often find the resources to use through their professional networks. Results of this study will help VFE developers understand what instructors want from VFEs, enabling them to better design their products. Results will also contribute to a growing understanding of how geoscience instructors find and use VFEs to adapt traditional fieldwork to online teaching.

### **Ana Lidia Gungulo**

Mentor: Dr. Christine Moser

ECONOMICS

#### ["Informal Sector Response to the Covid-19 Pandemic: Informal Traders in Mozambique"](#)

**Abstract:** This study assesses how traders engaged in the informal sector in Mozambique were affected by the containment measures and how they are responding financially by looks at cross border traders and local traders and compares how they were able to cope both with COVID-19 related policies and financially. I conducted a phone survey. The results show that the use of savings increased, borrowing decreased for both traders. Remittances sent decreased, while remittance received: held quasi-constant. Sources of credit: changed for cross-border traders, while local traders always relied on family and friends.

### **Mohammad Jaminur Islam**

Mentor: Dr. Shameek Bhattacharjee

COMPUTER SCIENCE

#### ["Automated Detection of Traffic Disruptions in Large Scale Smart Connected Transportation Systems"](#)

**Abstract:** One of the most challenging aspects of smart transportation is detecting incidents to mitigate the effects of various traffic incidents in a city. There are roadside units and ambient transportation sensors to collect vehicular data that provide real-time traffic monitoring. In this work, First, an incremental region growing approximation algorithm is proposed for optimal Spatio-temporal clustering of road segments that divides the road segments into highly

correlated clusters. These clusters enable identifying a Pythagorean Mean-based invariant as an anomaly detection metric that is highly stable under no incidents but shows a deviation in the presence of incidents. Second, a real-time data-driven anomaly-based incident detection framework is proposed for a city-scale smart transportation system. We perform extensive experimental validation using mobility data collected from the City of Nashville, Tennessee, and prove that the method can detect incidents within each cluster in real-time.

### **Xin Li**

Mentor: Dr. Regena Fails Nelson

TEACHING, LEARNING AND EDUCATIONAL STUDIES

["The effect of Preschool and Kindergarten Participation on Later Achievement of Language-Minority Student: A Sociocultural Perspective"](#)

**Abstract:** This quantitative study aims to illustrate the language-minority students (LMS)' preschool and kindergarten experience with sociocultural perspective by investigating the preschool and kindergarten experience, family environment, and school environment. Longitudinal data from the U.S. nationwide Early Childhood Longitudinal Study, Kindergarten (ECLS-K), was used to apply a hierarchical linear model (HLM). This study explores whether and how preschool and kindergarten experiences are associated with LMS' cognitive and socioemotional outcomes. This study examined LMS' cognitive gains obtained at the end of kindergarten, third grade, fifth grade, and eighth grade. This study offers new perspectives on how sociocultural environments impact the cognitive development of LMS.

### **Nazife Onaral**

Mentor: Dr. Mine Dogan

GEOLOGICAL AND ENVIRONMENTAL SCIENCES

["Exploring Effects of Tree Roots on Infiltration Process"](#)

**Abstract:** Effects of the root structures on soil infiltration dynamics are not clearly defined. Imaging the complex tree root structures and movement of water through the root ball is a challenging task without damaging the trees and roots by conventional methods. Commonly used methods are invasive, labor-intensive, and not easily accessible. Geophysical methods are effective and reliable to map the subsurface structures and monitor infiltration processes. We designed and conducted an irrigation experiment on two different tree species to monitor infiltration processes around a root ball in different time snapshots. During the experiment, circular GPR and ERT data were collected. As a result, we present a map of the root structure and

soil moisture distribution change in time around the root ball by employing novel high-resolution geophysical methods.

### **James Allen Rhodes**

Mentor: Dr. Elise de Doncker

COMPUTER SCIENCE

#### **"Design and Implementation of an Efficient Priority Queue Data Structure"**

**Abstract:** Priority queues are among the most useful of all data structures. Existing priority queues have a vast amount of overhead associated with them. There is a need to have a data structure that can be used as a priority queue with low overhead. The data structure should have the operation where the data item with the minimum/maximum value is the next item to be deleted. The data structure should also have the function of a calendar queue where elements with the same or similar priority have the same key. For example, all of today's appointments will have today's date as their key. To that end, a new data structure has been developed that has both of these features. The functionality and efficiency of the data structure will be demonstrated by utilizing it to implement two applications, adaptive multivariate integration and the 15-puzzle. In adaptive multivariate integration, the key is an error estimate. The data has many items with similar keys and the maximum is the next item to be deleted. The key for the 15-puzzle is a heuristic cost. The data has many items with the same key and the minimum is the next item to be deleted.

### **Blayne Alexandra Rogers**

Mentors: Drs. Ajay Gupta & Elise de Doncker

COMPUTER SCIENCE

#### **"Parallel Resource Defined Fitness Sharing: A Study on Parallel Optimizations for Nicheing Algorithms"**

**Abstract:** This research evaluates the resource-defined fitness sharing algorithm for parallelization and algorithmic optimization. RFS is commercially competitive against shape nesting software but is limited by the time required to find a solution. The goal of this research is to employ parallel and algorithmic optimizations on a parallel RFS algorithm. With this aim, the new algorithm would improve on the time required to find a solution, which resolves the algorithms primary deficiency when compared to other commercial algorithms. This research culminates in the presentation and analysis of an efficient parallel resource-defined fitness sharing algorithm.



## **Jason Ulysses Rose**

Mentor: Dr. Linda J. Borish

HISTORY

### ["Who is an American? Nativism and Contested Americanism in the Jazz Age"](#)

**Abstract:** The 1920s often gets viewed as an intermission between two periods of reform or viewed as a time of conformity. While a case can be made for these extremes, a heavily contested debate on what it means to be a "true American" is the true culprit and it influenced both the stagnation in political reform and how the decade gets interpreted. During this time, some people promoted an Americanism centered on Protestantism while those excluded, largely Blacks, Catholics, and Jewish Americans largely advocated for a more inclusive society. This debate manifested itself in a conflict over contested terrain and contested identities.

## **Hezha Sadraddin**

Mentor: Dr. Xiaoyun Shao

CIVIL AND CONSTRUCTION ENGINEERING

### ["Development of Geographically Distributed Real-Time Hybrid Simulation testing method for Floating Wind Turbines"](#)

**Abstract:** Floating wind turbine (FWT) is a marine structure that produces clean energy from wind in deep water. Experimental studies, which are facing scaling conflict between the Froude and Reynolds number, are used to predict dynamic response under coupled wind-wave loads. Real-time hybrid simulation (RTHS), combining numerical simulation and physical experiment of numerical and physical substructures in real-time, overcomes the scaling conflict. Furthermore, RTHS can be executed to leverage the available large-scale wind tunnels and water tanks that are geographically distributed, leading to distributed RTHS (dRTHS). In this research, a dRTHS testing method is proposed for FWT to overcome scaling conflict, test larger scaled-model, and avoid numerical computations that exist in RTHS tests. In dRTHS, the FWT is divided into two substructures including a wind turbine tower and floating platform which are tested separately in a wind tunnel and wave tank communicating through a network in real-time. According to the virtual dRTHS and physical hybrid simulation results, developed methods could be a good alternative testing method for FWT.

**Sukanya Saha**

Mentor: Dr. Ramakrishna Guda

CHEMISTRY

**["Excited State Interactions between Perovskite Nanostructures and Carbon Dots"](#)**

**Abstract:** In this study, interaction between two novel-architectures carbon dots and a series of CsPbX<sub>3</sub> perovskites is studied with steady-state spectroscopy to make better optoelectronic devices. The water-soluble CDs are brought to toluene by phase-transfer using surfactants, to study the interaction between them. The quenching seems to be arising from static quenching where the CD and Perovskite forming a complex as the PL lifetimes are unchanged with the addition of CDs. Marcus's theory explains the electron transfer in molecular donor-acceptor complexes, used to understand the charge-transfer between perovskites and carbon nanostructures.

**Shivi Saxena**

Mentor: Dr. Ramakrishna Guda

CHEMISTRY

**["Thin Film and Rigidification Strategies for Gold Cluster Photoluminescence Enhancement"](#)**

**Abstract:** Quantum sized gold clusters are luminescent in contrast to larger gold nanoparticles and are utilized for various optical applications such as biological imaging and optical sensors. However, low Photoluminescence Quantum Yields (PLQY) are always a concern for clusters. The research goal of present study is to enhance PLQYs of gold clusters using different approaches. The luminescence is greatly enhanced by cluster shell rigidification that blocks non-radiative pathways and that can be achieved by solidification or making thin films. Films of cluster with water soluble polymer Poly Vinyl Pyrrolidone and Nafion were synthesized by drop casting method. The films showed manifold enhanced PL emission compared to their solution analogues. Uniform film deposition in controlled manner governing thickness can be achieved during the electro-polymerization by incorporating clusters in monomer solution during their electrochemical polymerization process. Luminescent and device ready gold clusters are exciting for several optical applications like imaging. In contrast to conventional toxic heavy metal nanoparticle films, gold nanocluster films are less-toxic and biocompatible.

**David Sherman**

Mentor: Dr. Debra Lindstrom

OCCUPATIONAL THERAPY

["Activity: A Predictor of Well-Being during the COVID-19 Pandemic"](#)

**Abstract:** The study aims to expand support in the literature for the connection between activity participation and well-being by exploring older adults' experiences during the pandemic. Engagement in activity plays a crucial role in identity formation and well-being. However, the relationship between participation and well-being has various mechanisms underlying the effect. Secondary data from the Health and Retirement Study 2020 Early Wave, was analyzed using a cross-sectional, correlational design. Results suggest that for older adults in the United States activity engagement predicts both directly and indirect well-being. Findings are consistent with literature where the activities people do promote well-being.

**Christopher Woodley**

Mentor: Dr. Heather Petcovic

MALLISON INSTITUTE FOR SCIENCE EDUCATION

["Affective Motivations for Learning How to Herp. A Phenomenological Study of Learning a Science Process Skill"](#)

**Abstract:** Monitoring animal populations is an important part of determining and maintaining ecosystem health. Reptiles and amphibians in particular have been recognized as important indicator species because of their sensitivities to habitat disturbances and diverse habitat requirements. However, herping (finding and identifying reptiles and amphibians) is a complex skill that can be difficult to teach in a formal setting. While the basics of herping can be taught in a formal setting learning and mastering this skill appears to happen largely outside of the classroom. Here I share some results of a phenomenological study based on interviews with 11 experienced herpers. Participants consistently described positive experiences with herps and opportunities to practice with mentors as being important in learning how to herp. Also important was being introduced to reliable sources of accepted information, such as field guides or trustworthy web sites, as nearly all participants described these in their own learning in addition to the challenges in identifying reliable information. These findings suggest that undergraduate field work should focus on providing students with positive encounters to improve affective motivations to pursue practice on their own, opportunities to network with potential mentors and exposure to accepted learning artifacts of the community of practice.

*Thank you for joining us today!  
Check our website on Monday, April 18  
for results.*